ROLE OF RISK ATTITUDED AND SOCIAL CAPITAL IN PINEAPPLE MARKETNG AMONG SMALL-SCALE FARMERS IN LUWERO DISTRICT, UGANDA

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A Thesis Submitted to Graduate School in Partial Fulfilment for the Requirement for the Master of Science Degree in Agricultural Economics of Egerton University

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DECLARATION AND RECOMMENDATION

Declaration

I declare that this thesis is my original work and has not been presented in this or any other university for the award of any Degree or Diploma.

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Recommendation

This thesis has been prepared under our supervision and submitted with our approval as University Supervisors.

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DEDICATION

To my loving mother, Musinguzi Nakate Margaret, sisters Grace, Shalom and Nissi

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ABSTRACT

Agricultural marketing is of paramount importance especially to small-scale farmers in Uganda as farmers derive their livelihoods and employment from agriculture. However, many small-scale farmers are characterized as being risk averse and in lack of social capital especially when it comes to marketing their farm output. Despite these bottlenecks, in Luwero district, small-scale farmers have greatly embraced fruit farming in the pineapple sub-sector as it is perceived to have high market potential both in local and export markets. However inspite how farmer risk attitudes and social capital impact pineapple marketing, effects these factors have had on choice of market outlets and effect accessing high value markets has on household income have not been fully studied and quantified. The objectives of the study were therefore: to compare socio-economic, risk attitudes and social capital attributes of small-scale pineapple farmers in different pineapple market outlets, determine the effect of risk attitudes and social capital on choice of a market outlet and to determine the effect choice of market outlet on small-scale farmers' household income. The empirical analysis in this study was based on primary data collected using a semi structured questionnaire from 272 small-scale farmers in sub-counties of Kamira, Kikyusa, Butuntumula and Zirobwe using the multistage sampling technique. Data was analysed using descriptive statistics, Multinomial Logit model and Propensity Score Matching model. Results showed that risk attitudes influenced likelihood of farmers selling in local markets by 15.0% with a decreased probability of selling at the farm gate by 12.3%. Social capital dimension of density of membership negatively affected choice of high value markets by 2.3% while trust and frequency of meeting attendance positively by 2.6% and 21.6%, respectively. Choice of export market positively contributed to farmer's household income by UGX 9,110,000 to UGX 15,200,000 at the 1% level of significance. The study therefore, recommends that to promote farmers to sell pineapples in high value markets, stakeholders should encourage farmers reduce agricultural risks through building up self insurance strategies. This can be through participation in off-farm activities to build a capital asset base, which will diversify household sources of income and counterbalance variations in product demand and prices in agricultural markets. For farmers to further build social capital, government should develop strategies that help farmers develop trust for transaction partners. This can be through establishing product price floor and ceiling and making this information available to farmers through extension providers and newspapers as this will establish reliable public market information transparency.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
DSIP	Development Strategy and Investment Plan
EU	European Union
EUREPGAP	European Good Agricultural Practices
FAO	Food and Agricultural Organization
FAOSTAT	Food and Agricultural Organization Statistics
GDP	Gross Domestic Product
GoU	Government of Uganda
HACCP	Hazard Analysis Critical Control Point
Hg/Ha	Hectogram per Hectare
IFAD	International Fund for Agricultural Development
IIA	Independence from Irrelevant Alternatives
Km	Kilometres
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MNL	Multinomial Logit
MoFPED	Ministry of Finance, Planning and Economic Development
NAADS	National Agriculture and Advisory Services
NGOs	Non-Government Organizations
PMGs	Producer Marketing Groups
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Science
SSA	Sub Saharan Africa
UBOS	Uganda Bureau of Statistics
UNIDO	United Nations Industrial Development Organization
UGX	Ugandan Shillings

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

The agriculture sector is a major employer in the Ugandan economy contributing 25.1 per cent of the Ugandan Gross Domestic Product (UBOS, 2015). The sector employs 85 per cent of the labour force (MoFPED, 2015) with over 72 percent of this labour force in the active population (FAO, 2015). Agricultural exports earned the country USD 1.44 billion registering a 7.0 per cent increase from 2014 (UBOS, 2016). However, the total export value of principal agriculture products is estimated at USD 297.3 million only (UBOS, 2016). The sector provides a large proportion of the raw materials used in manufacturing and therefore it is a key determinant of the country's efforts to reduce poverty (MAAIF, 2010).

However despite the sector's contribution to the economy, it is mostly composed of small-scale producers. These producers are faced with a myriad of constraints such as limited value addition, high energy costs, limited availability of quality inputs, climate change, poor commodity prices, increasing volatility in financial markets, low commercial agricultural levels, lack of linkage between research and farmers, low coverage of irrigation, land fragmentation, lack of agricultural machinery, pests and diseases, and poor transport network (MoFPED, 2016a). As a result, their productivity is low. In a bid to improve this situation, the government is intensifying promotion of commercial agriculture by supporting stronger linkages between farmers and agro-industries as well as farmers and export markets (MoFPED, 2016b). Additionally, the National Agricultural Sector Development Strategy and Investment Plan (DSIP) was designed to address these constraints through increasing agricultural production and productivity, increasing access to markets and value addition, creating an enabling environment for the private sector in agriculture and strengthening agricultural institutions (MAAIF, 2010).

Currently, the Ugandan government is promoting horticultural crop production amongst small-scale farmers by supporting development of the horticultural value chain (MAAIF, 2010). This is because the horticultural subsector has ability to bring quick returns to investment, contribute to exports, growth and poverty reduction and thus potential to impact future consumption trends (MAAIF, 2010). In Uganda's fruit farming and trade, the pineapple sub-sector has registered the most developed and established commodity chain (Ssemwanga, 2007). The pineapple sub-sector has gained popularity because of its potential

for rural development through increased youth employment, household incomes, poverty reduction and foreign exchange earnings (MoFPED, 2010). Consequently for most small-scale farmers, pineapple farming is considered an important source of income (McCulloch and Ota, 2002).

In spite potential of the sub-sector in increasing household livelihoods, pineapple production in Uganda is still low compared to other East African countries such as Kenya and Rwanda (FAOSTAT, 2016). This is attributed to the challenge of commercialization of small-scale pineapple farming with one major constraint being access to pineapple output markets (Poulton *et al.,* 2006). Among these constraints, farmers' risk attitudes and social capital play an important role in the pineapple market outlet decisions farmers make. These factors affect access to agricultural input and output markets, productivity, growth and development (Yu *et al.,* 2014). Therefore, the absence of appropriately harnessed social capital and institutional frameworks linking producers to markets, excludes farmers from making decisions to participating in high value markets (Yusuf, 2008). In addition farmers' risk attitudes are also imperative in shaping farmers' decisions as they influence agricultural decisions farmers make (Yu *et al.,* 2014).

Therefore, there is currently a growing body of literature analysing aspects of agricultural market participation in developing countries (Barham, 2007; Jari and Fraser, 2009; Jagwe *et al.,* 2010; Maina *et al.,* 2015). Nonetheless, while such studies may provide an indication of how small-scale farmers' choose to participate in markets, the role risk attitudes and social capital play in the choice of low or high value pineapple market outlets has not been analyzed. Further still, in as much as farmer risk attitudes and social capital influence market outlet decisions and willingness to choose high value markets, farmers may further fail to participate in highly profitable market outlets due to: costs and risks involved in market access, lack of trust and information about transactions and trade partners. These factors in conjunction with others such as quality input and output products, isolation from high value markets and other structural impediments beyond what this study has been able to assess may also influence market outlet choice.

1.2 Statement of the Problem

Market access remains a major challenge in the commercialization of small-scale agriculture. This has led to an increase in effort by the Government of Uganda (GoU) and other development partners in encouraging small-scale farmers to venture in pineapple farming as a development tool to enhance their livelihoods. However in the process of these farmers

endeavouring to access different market outlets (low or high value markets) to sell their produce, risk attitudes, social capital and other social economic and institutional factors may affect their choice of market outlets. The effects these factors may have on small-scale farmers' market outlet choices have however not been clear in empirical literature. Consequently, the impact market outlet choices farmers make have on household income due to accessing high value pineapple markets has not been evaluated. Therefore, this study aimed to fill these knowledge gaps.

1.3 Objectives

1.3.1 General objective

The general objective of this study was to contribute to enhanced livelihood of small-scale pineapple farmers in Luwero district through effective market outlet access.

1.3.2 Specific objectives

1. To compare the socio-economic, risk attitudes and social capital attributes of small-scale pineapple farmers in the different pineapple market outlets.
2. To determine the effect of risk attitudes and social capital on the market outlet choice made by small-scale pineapple farmers.
3. To determine the effect of the choice of market outlet on small-scale farmers household income.

1.4 Research questions

1. Do socio-economic, risk attitudes and social capital attributes of small-scale farmers significantly influence the choice of pineapple market outlets?
2. What effect does risk attitudes and social capital have on market outlet choices made by small-scale pineapple farmers?
3. What effect does the choice of market outlet made by small-scale pineapple farmers have on household incomes?

1.5 Justification of the study

In Uganda, agricultural output markets have been recognized for their enormous potential to unlock economic growth and facilitate rural development. Therefore, there is need to examine the role risk attitudes and social capital in market access and effect of high value market outlet choice on household income. As a result, market access has been identified as one critical factor influencing the performance of small-scale farmers' agriculture in Uganda. With this in mind the Government of Uganda has worked to improve agricultural markets through developing market infrastructure especially rural market facilities. This has

facilitated agricultural products meet international quality and safety standards giving the produce a competitive advantage in the export market. As a result, for small-scale farmers with access to these high value markets, profitability of their farming enterprises has greatly improved.

However with development aiming to achieve Sustainable Development Goals (SDGs), improved marketing efficiency especially in the Ugandan pineapple sub-sector will enable the country achieve the following SDGs as pointed out by Osborn *et al.* (2015): SDG 1 of eradicating extreme poverty for all people especially small-scale farmers who account for the largest part of the Uganda's rural population. Furthermore efficient pineapple marketing by small-scale pineapple farmers will enable Uganda achieve SDG 2 of ending hunger to ensure that all people particularly the poor and vulnerable, have sufficient access to food all year round. SDG 8 that entails promoting inclusive and sustainable economic growth, through full and productive employment for all will be achieved in Uganda through properly functioning agricultural markets. This can achieve higher levels of economic productivity through diversification, increased youth employment, technological upgrading and innovation. Subsequently, efficient pineapple market access will help the country achieve SDG 9 of building resilient infrastructure, to promote inclusive and sustainable industrialization. This will increase access to small-scale industries, support economic development, increase efficiency in resource use and increase access to information through improved communications technology.

This study will therefore offer more understanding on the role risk attitudes and social capital have on market outlet choices small-scale pineapple farmers make and how this affects their household incomes. Consequently this knowledge will be beneficial to future researchers, policy makers and development workers in identifying workable programs and objectives that can help to further reduce the uncertainty small-scale farmers' face that results from having to choose a market outlet from a set of available market outlet alternatives. This can go a long way in facilitating small-scale farmers' access to the most profitable market outlets.

1.6 Scope and limitation of the study

The study was restricted to sub-counties of Kikyusa, Zirobwe, Kamira and Buntumula in Luwero district, focusing only on small-scale pineapple farmers. The study concentrated much on investigating the role risk attitudes and social capital had on the small-scale farmers' market outlet choices and how these choices affected their household incomes. The study mainly relied on farmers' memory in data collection and this could have affected the

accuracy of results obtained. Furthermore, political uncertainty in the country due to the elections that had just been conducted may have affected data collected.

1.7 Definitions of terms

Market outlets are places where pineapples are sold or distributed by farmers.

Market participation refers to any market related activity which promotes the exchange and sale of pineapple produce.

Small-scale farmer is a pineapple grower who is characterized by landholding less than ten acres of farm land.

Risk is exposure of small-scale pineapple farmers to the possibility of economic loss or gains, physical damage of pineapples and a delay in payment for goods delivered as a consequence of the uncertainty associated with pursuing a certain market outlet.

Social capital is the formal and informal linkages of rural inhabitants through local organizations or groups in rural areas.

Bonding is the horizontal networking between members of the same group.

Bridging is the vertical networking between different groups.

Linking is the social distance between members in a network.

Social networks are interdependencies among small-scale pineapple farmers in which the attitudes, beliefs and constraints faced by one small-scale pineapple farmer are directly influenced by the characteristics and choices of other small-scale pineapple farmers.

Risk attitude is a pineapple farmer's willingness to take risk compared to other pineapple farmers.

Risk management is the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring risk.

Export market participant is a pineapple farmer who sells their pineapple produce in any pineapple markets outside Uganda irrespective of them selling some in the local markets.

Local market participant is a pineapple farmer who sells their pineapple produce in the Ugandan pineapple markets only.

CHAPTER TWO
LITERATURE REVIEW

This chapter reviews literature in the pineapple sub-sector as well as other studies that have focused on risk attitude, social capital and their effect on choices made by small-scale farmers. Hence this section aims towards exploring the effect farmer risk attitudes and social capital have on pineapple market outlet choices and how these impact small-scale farmers' household incomes.

2.1 Pineapple market outlets in Uganda

Small-scale farmers' market outlet decisions are uncertain due to the nature of agricultural markets. This is brought about by the variability in output produced, market participation costs and output prices (Muthini, 2015). As such, this has left many small-scale farmers optioning for the nearest to farm output market outlets instead of the most lucrative ones. Due to this, many small-scale farmers aiming to access highly profitable markets have to rely on middlemen. These middlemen thus end up accounting for the largest portion of pineapple sales in Uganda. As Msabeni *et al.* (2010) argued, middlemen increase the uncertainty around farmers accessing lucrative markets. This predicament is further made worse by the middlemen's unwillingness to enter into formal contracts with small-scale farmers. As a result, farmers do not trust them and this increases costs incurred in marketing their pineapples, especially in form of market and price research and transportation costs among others.

Since pineapple farmers operate in such uncertain market environments, they are compelled to accept any price offered to them by middlemen especially during or close to the harvesting period. This is due to the perishable and bulky nature of fresh pineapples which leads to high marketing costs. As such the supply of commodities such as pineapples in the short run is made highly inelastic (Cook, 2011). Attributable to these reasons, small-scale farmers find the need to deal with middlemen to ensure that their pineapple output is sold as fast as possible regardless of output price they are offered. Therefore in cases where markets have been heavily infiltrated by middlemen, farmers would be better off by organizing themselves into collective action such as Producer Marketing Groups (PMGs) or cooperatives and marketing through contract farming (Panda and Sreekumar, 2012). This has the potential to give farmers better bargaining power and more affordable market information about their produce over middlemen, who often manipulate and control the price in the marketing

system. Pineapple marketing in Uganda is therefore through the following market outlets in both the fresh or processed form:

i. Farm gate market

This outlet is characterized by wholesalers and middlemen who purchase pineapples from small-scale farmers at a low price for sell in urban markets at a much higher price (Ssemwanga, 2007). Farmers therefore choose to sell their produce at the farm gate instead of more lucrative distant markets because of the costs and bureaucracy involved in accessing these markets.

ii. Local market

The local pineapple market is strongly dominated by wholesalers in the central district markets. For this market, farmers collect their fruits in the local trading centre where they sell them to traders who supply the local and national central markets at market agreed prices. Alternatively Ssemwanga (2007) pointed out that wholesaler traders from urban markets may use services agents from time to time to guide them to farmer fields from where outsourced pineapples can be obtained. Also, some small-scale farmers' transport their produce to major urban markets using own, hired or public transport vehicles. This is usually without any proper packaging which will affect the quality and wholesomeness of the fruits but these farmers are still able to earn higher prices than those who sell at farm-gate (Muthini, 2015).

iii. Export market

This market offers better prices for farmer produce but requires reliable supply which should meet the stringent quality and safety standards required in the world market (Muthini, 2015). Therefore, for small-scale farmers to access this outlet there is need for them to ensure that quality specifications that apply for export transactions such as: organically produced pineapples, Hazard Analysis Critical Control Point (HACCP) and EUREPGAP standards of production among others are met.

To ensure that stringent quality standards are met, exporters mobilize farmers to produce organically and then later help get them certified under the exporting company (Ssemwanga, 2007). This enables exporters ensure that they have pineapple supply throughout the year and farmers are able to successfully ensure market and stable prices for their produce. With this in mind, it is important to note that fresh organic pineapples are sold at Ugandan shillings 600 to 800 per head, while in the non-organic market the fruits are sold at an average of Ugandan shillings 300-500 per head (Ssemwanga, 2007).

2.2 Risks and risk attitudes in agriculture

Major types of risks in farming include; yield, price and transaction risks (Hardaker *et al.*, 2004). These risks will encompass uncertainty and its consequences (Wissink, 2013). As a result a decision maker will have to make the distinction between what situation maybe a risk and what maybe uncertainty (Korir *et al.*, 2011).

According to Pindyck *et al.* (2005), people have different perceptions concerning risk. There are risk-averse, risk neutral and risk seeking individuals. Risk aversion is however found to be the most common preference toward risk. Therefore when facing considerably risky incomes or wealth outcomes most people are risk averse and will thus be willing to give up some expected return for a reduction in risk (Eke-Göransson and Rinman, 2012). Thus through the individual's actions like: willingness to buy insurance, tendency to choose a production system that is more diversified or in their marketing strategies their risk-averse preference can be revealed.

Additionally, risk attitude has been defined differently by various authors in the past and the different kinds of risk attitudes described include; 'Preference toward risk and risk-taking behavior' by Jing *et al.* (2003), comparative risk attitude (CRA) by Flaten *et al.* (2005) and relative risk attitude by (Meuwissen *et al.*, 2000 ; Wissink, 2013). It is therefore assumed that there are no farmers who enjoy taking risks thus everyone is risk-averse (Wissink, 2013). As such risk attitude is an important factor that shapes farmers' choice decisions and is context or situation specific (Shapira, 1997).

Furthermore, Pennings and Garcia (2001) pointed out that greater market orientation will consequently lead to higher degrees of risky and innovative behaviour thus different risk attitudes will relate to farmers' intention to use different market outlets. Due to this, the expected utility from choosing one outlet over other available alternatives will be strongly connected to an individual farmer's willingness to bear risk (Pindyck and Rubinfeld, 2005). Therefore, how a person perceives risk will shape their agro business management behaviour (Miller *et al.*, 2004).

2.3 Social capital in agriculture

There are three forms of social capital these include bonding, bridging and linking (Dufhues *et al.*, 2011). These different forms of social capital will have a distinct influence on the choice of market outlet made by small-scale farmers (Dufhues *et al.*, 2011). According to Jari and Fraser (2009), for small-scale farmers social networks are important in developing trust which sequentially encourages cooperation and regular exchanges among them. This results

into exchange of information and production resources and transmission through these networks. Such exchanges have the potential to considerably enhance agricultural productivity, increase household income and improve individual household welfare especially depending on the market outlet chosen (Jari and Fraser, 2009).

However it is worth noting that through the broadening of social networks small-scale farmers can develop trust with other market players and access better quality information about prices and markets especially at the time a market outlet choice has to be made (Dufhues *et al.*, 2011). This will greatly influence the individual farmers' decision and as a result the risk and uncertainty surrounding the farmers' choice can be reduced especially if this information is from reliable peers, neighbours and friends. Therefore this will shape the farmers perception of rewards and costs in the midst of risks and uncertainty (Rahelizatovo, 2002). As such the social capital effect has been found to be a positive factor in stimulating choices small-scale farmers make (Wambugu *et al.*, 2009; Dufhues *et al.*, 2011; Jari and Fraser, 2009 and Yu *et al.*, 2014).

2.4 Risk management in agricultural marketing

Farmers and agribusiness firms are faced with a high degree of risk because of certain new factors such as the increased price volatility of inputs and outputs, climate change, international trade restrictions, new and more stringent food safety standards (Broll *et al.*, 2013). Across time farmers and others have strived to advance ways of how to make farming less risky through getting better control over the production process (Eke-Göransson and Rinman, 2012). Due to this, the topic of risk management has gained increasing attention across all aspects of farming and in this study agricultural marketing. With this in mind, farmers nowadays take action to manage risks they face for two main reasons. To begin with, there are costs associated with risk and secondly farmers are usually risk averse.

Farmers therefore take different measures and actions to mitigate or cope with risk. The first measure is forward contracting. This enables farmers sell their future produce at an established price, time and quantity and thus guard against price risks (Wissink, 2013). Marketing contracts will give farmers the opportunity to be able to strive towards meeting several requirements such as those that pertain to quality and quantity through different production methods (Melyukhina, 2011). Malunda (2011) pointed out that in an effort to cope with seasonality, price volatility and serial declines in commodity markets, farming households may choose to diversify their income sources. This can be through income and farm enterprise diversification, organization flexibility, avoidance of high risk enterprises and

holding liquid reserves of cash. Intrinsically, income diversification will include widening the income earning portfolio for example through non-farm enterprises (Korir *et al.*, 2011).

According to Antón (2008), in some private markets specific agricultural risk can be pooled and or shared amongst different agents. For instance, production risk which has great bearing on agricultural marketing since it affects quantities and the quality of commodity available in markets can be managed through insurance contracts. Furthermore, product liability insurance further has the potential to help protect farmers in an instance that produce they sell harms consumers. This can go a long way in managing agricultural marketing risks farmers may be faced with (Li, 2014).

2.5 Factors influencing market outlet choices

Market outlet choice is a decision taken by small-scale farmers to establish whether or not to sell their farm produce and if the decision is to sell, which market outlet to sell through (Sigei *et al.*, 2014). As such access to agricultural markets through the different market choice outlets will be influenced by various factors. Physical barriers such as distance to markets and the lack of all-weather passable roads is a major constraint for many small-scale farmers and will in turn influence their choice of market outlet. As such physical barriers undermines small-scale farmers' ability to participate in both input and output markets as they incur high transaction costs in endeavours to access both input and output markets (Barham, 2007). Thus small-scale farmers will tend to choose an outlet that is easily accessible to them and that has a low cost to access. Furthermore, Minot (1999) showed that choice of market outlet among traders is negatively related to the distance to market sites and distance to market places negatively influenced choice of market outlet.

Market information is also important to small-scale farmer's market outlet choice as it allows these farmers make informed marketing decisions about which goods to supply where, search for potential buyers, negotiating, enforcing and monitoring contracts (Jari *et al.*, 2009). Therefore as participants in markets, small-scale farmers are usually at a distinct disadvantage especially as they lack access to relevant marketing information about consumer attitudes, quantity demanded, prices, produce quality, market requirements and opportunities as this is crucial for any transaction (Jari *et al.*, 2009).

Additionally, small-scale farmers' market outlet choice will be further influenced by the farmer's risk attitude. According to Yu *et al.* (2014), farmer's preference toward risk has an important implication for market competitiveness and the choice of market outlet farmers will

make. Market outlet choice is made difficult by the uncertainty surrounding the unexpected outcomes of choosing one outlet over another. Despite the fact that many high value market outlets like the export market may reduce both marketing and production risks and as well offer better and more stable output prices, choice of this outlet varies among different categories of small-scale farmers basing on variations in risk attitudes. According to Liu (2013), if the cost of perceived uncertainty about choosing one market outlet against another outweighs the expected potential benefits then the outlet with a higher costs visa verse benefits will not be chosen. As such risk-averse farmers are less likely to choose high value marketing outlets despite them being risk-reducing in nature.

The farmer's skills and experience especially in marketing will influence the farmer's choose of a market outlet. According to Sigei *et al.* (2014), small-scale farmers who are risk takers will be more agreeable to transporting their farm output to distant markets where they can command better prices for their output while risk averse farmers will mostly resort to sell their output at farm-gate or nearest local markets available. Furthermore Barham (2007), pointed out that many small-scale farmers lack collective organization that can give them the power they require to interact on equal terms with other actors in agricultural markets and as such will opt for markets with lowest transaction costs (farm gate) other than those from which they can acquire greatest returns from sell of their output. As such farm gate sales will tend to reduce the small-scale farmers' revenue since prices are relatively low (Montshwe, 2006).

Social capital in form of networks and interactions among agricultural producers may enable farmers to learn about benefits in different market outlets from their peers, imitate their peers' decisions or respond to their peers' experience, meaning that social capital can be a vital source of information in agriculture (Conley and Udry, 2010). As a result, social capital will influence the market outlet choice small-scale farmers will make. Therefore, to increase small-scale farmers' ability to choose to participate in more lucrative market outlets there will be need to reduce transaction costs and uncertainty about high value market outlets (Yu e*t al.*, 2014).

Sigei *et al.* (2014) further suggests that small-scale farmers' price preference has an influence on the choice of market outlet. Here, higher output prices offer an incentive to farmers so they can avail their output to these various selling points. He further proposes that when the farm-gate or the market price is higher, farmers will tend to sell at that point. As such

contract arrangements will have an influence on the choice of market outlet as these arrangements guarantee farmers ready market for their output at stable prices. As a result farmers will be inclined to choose outlets that have a ready market either at the farm gate or market place. In most cases, the farmer will choose farm gate because they incur no or less transaction costs.

2.6 Theoretical framework

This study was built on the expected utility theory. The expected utility theory dominates the analysis of decision making under risk and has been applied to describe economic behaviour (Kahneman and Tversky, 1979). In this study the theory is used to explain a pineapple farmer's risk attitude where the farmer is risk averse or a risk seeker. Consequently, expected utility is the sum of utilities associated with all possible outcomes, weighted by the probabilities that each outcome will occur (Pindyck and Rubinfeld, 2005). Following this, expected utility that can be obtained in an uncertain situation is calculated as follows:

$$E(u) = P_1u(X_1) + P_2u(X_2) + ... + P_nu(X_n) \quad \text{.....} \quad (1)$$

Where u is the utility function and X is an outcome (pineapple market outlet choice) that occurs with probability P. Therefore, to create a utility function it must be assumed that a small-scale pineapple farmer acts rationally and consistent when facing the task of making risky financial decisions. Consequently four basic axioms are formulated regarding the behaviour of small-scale pineapple farmers when making decisions (Lumby and Jones, 2003).

Initially, it is important to note that small-scale pineapple farmers are capable of reaching a decision based on the ability to rank different market outlet alternatives in some order of merit. This ranking of market outlet alternatives is then made so that alternative A is preferred to B, alternative B is preferred to C and then alternative A must be preferred to C. As such, small-scale pineapple farmers do not differentiate between market outlet alternatives that have the same level of risk. So their choice is based only upon consideration of the risk involved, rather than on the nature of available alternatives. As a result, small-scale pineapple farmers can specify any market outlet alternative whose returns are uncertain. Therefore the utility function clarifies in what way individuals will make decisions about risky alternatives, on the assumption that the decision is made in order to maximize their own expected utility index.

Furthermore, it is only possible to measure an individual's expected utility only if you can measure the person's individual value of a specific outcome (Pindyck and Rubinfeld, 2005). As a result, expected utility has a strong association with a person's willingness to bear risk. Consequently small-scale pineapple farmers can be categorized into three types; risk-averse, risk neutral and risk seeker. The different utility functions are illustrated in Figure 1. Further still a risk-averse individual will prefer a certain income before an uncertain income with the same expected value. In addition, a person is risk neutral if they are indifferent between a certain income and an uncertain income with the same expected value. However, a risk seeking person will prefer an uncertain income before a certain income, even if the expected value of the uncertain income is lower than the given income.

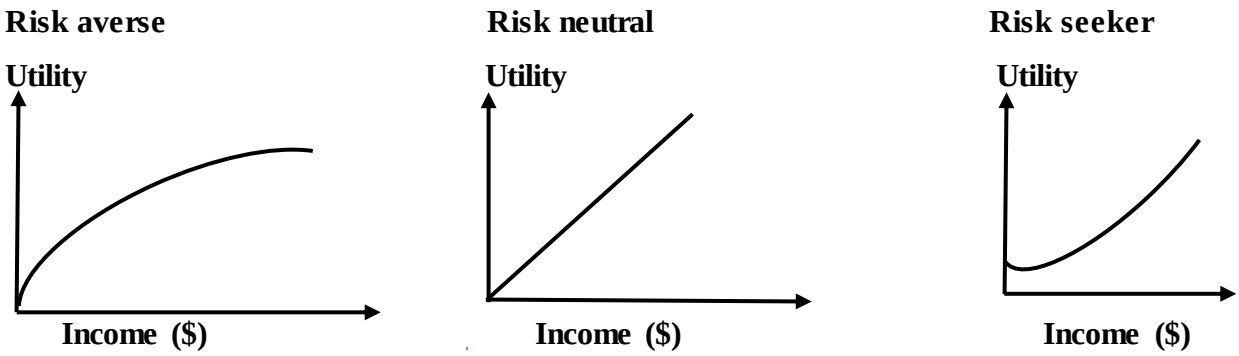

Figure 1: Example of utility functions.

Source: (Hardaker et al., 1997)

2.7 Conceptual framework

The conceptual framework in Figure 2 illustrates the interrelationships among the different key variables involved in this study and how they interact together. Here the decisions of where to sell pineapples by small-scale farmers was influenced by institutional factors like (social capital, group membership, access to extension services and contract marketing), socio-economic factors (age, education level of household head, gender of household head, vehicle ownership, risk attitudes and household size), market factors like (pineapple output quantity, prices of output, market information, marketing experience and market infrastructure) and exogenous factors like agricultural policies. Consequently these influenced small-scale farmers' market outlet choices and had an effect on the small-scale farmers' pineapple household incomes, food security and their welfare.

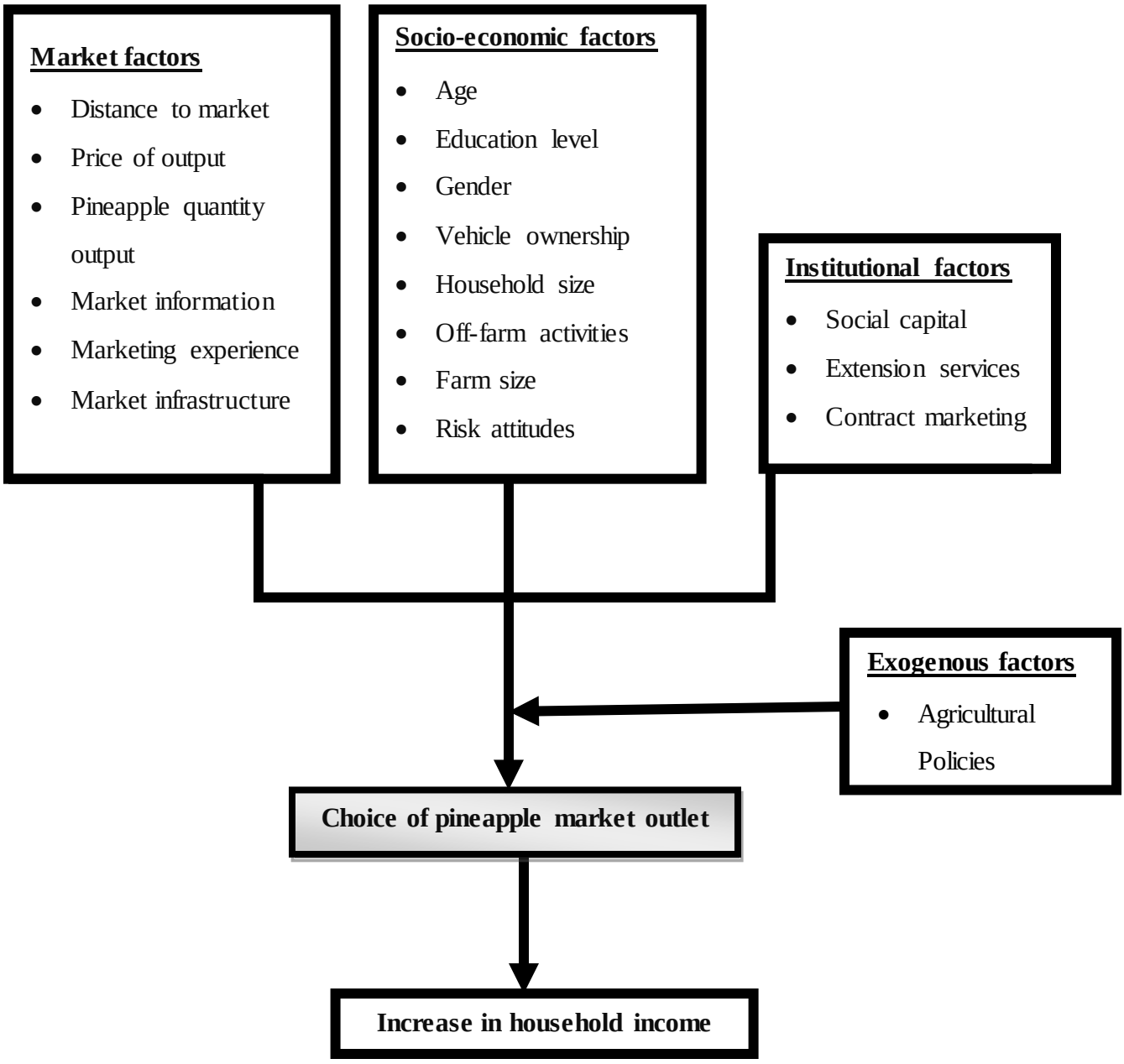

Figure 2: Conceptual framework showing factors influencing market outlet choice by small scale farmers.

CHAPTER THREE
METHODOLOGY

This chapter gives an account of the study area where research was conducted. It also explains the sampling procedure and determines the sample size of the population. The section of data collection method explains the tools that were used for collecting data. The analytical framework outlines the descriptive statistics and econometric models, giving the reasons why models were chosen.

3.1 The study area

Luwero district lies North of Kampala, between latitude 2° North of the Equator and East between 32° to 33° (Kirenda, 2009). It is bordered by Mukono and Wakiso districts in the south, Nakaseke in the west, Nakasongola in the North and Kayunga district in the East. This study was conducted in Luwero district as it has a comparative advantage in pineapple production and trade because of fertile soils and access to export markets through contract farming. The district has a total area of approximately 2577.49 square kilometers and is divided into ten sub counties of Bamunanika, Kalagala, Kamira, Kikyusa, Zirobwe, Makulubita, Nyimbwa, Butuntumula, Katikamu and Luwero. It has modified equatorial climate with mean temperatures ranging between 8°C and 35°C. The rainfall is well distributed throughout the year, with the average annual rainfall being 1,300mm. The district has a total of 474,627 people of whom 234,916 are males and 239,711 females. The people in the district are mainly engaged in agricultural and livestock production. Major horticultural crops grown include tomatoes, pineapples, cabbages and vegetables. Similarly cash crops such as coffee, vanilla and upland rice are grown. Other economic activities in the district include metal fabricators, carpentry, blacksmith, aluminium casting, charcoal burning, sand extraction, brick making and clay works. The study area is shown in Figure 3.

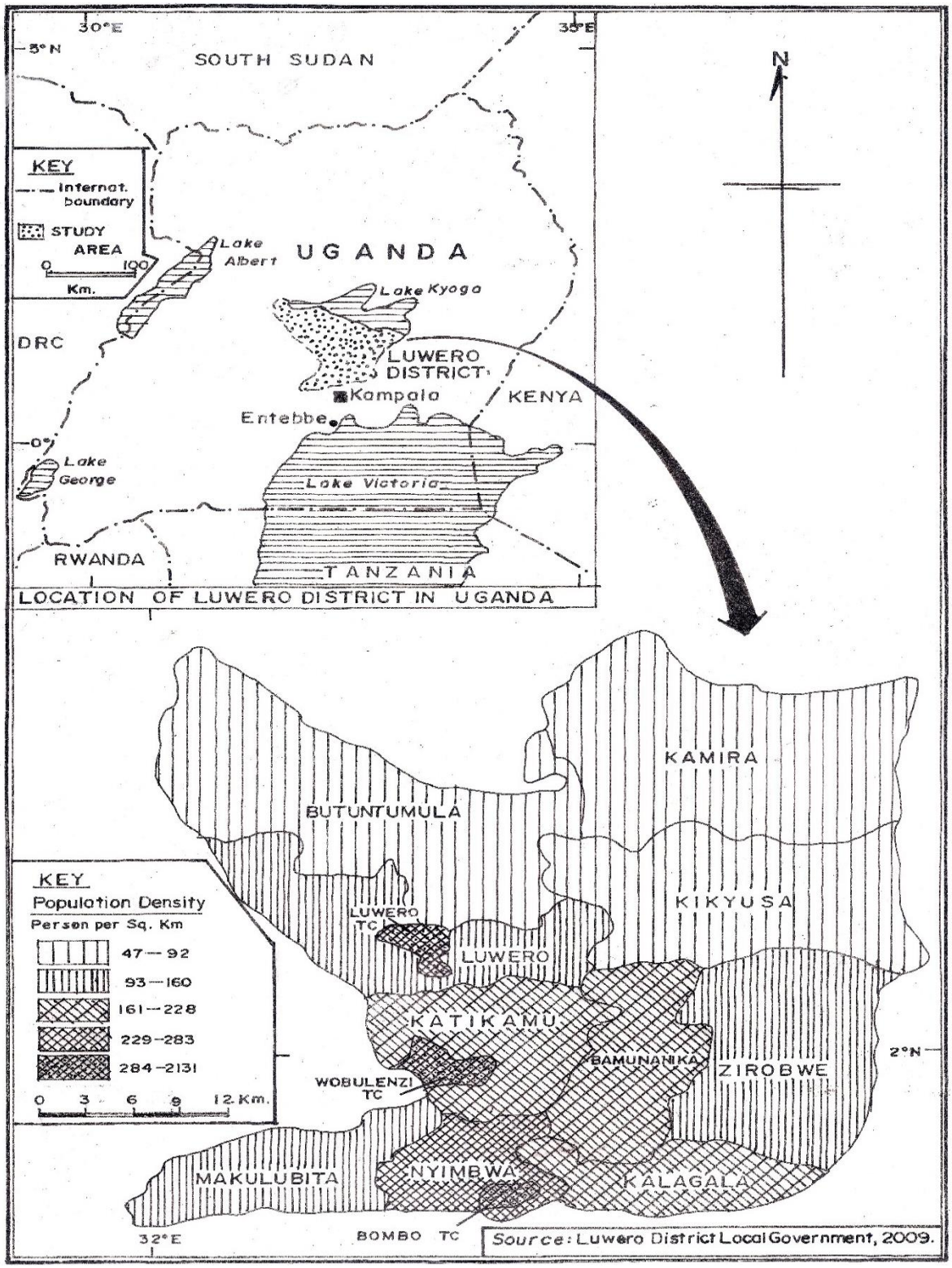

Figure 3: A map of Luwero District sub-counties and town councils

3.2 Sampling procedure and sample size

Multi-stage sampling procedure was used in the selection of a representative sample. To begin with, using purposive sampling sub-counties of Kikyusa, Butuntumula, Kamira and Zirobwe were selected. This was because they had the largest land acreage under pineapple farming. As such the number of small-scale farmers to be sampled from each sub-country was selected using stratified sampling and proportionately to the population of small-scale farmers under subsistence pineapple farming in each sub-county. Using this procedure, purposive sampling was used to select villages within each sub county that had pineapple farmers and from villages using random sampling small-scale pineapple households to be interviewed were selected. 53 small-farmers where randomly sampled from Kamira, 50 farmers from Kikyusa, 93 farmers from Zirobwe and 76 pineapple farmers taken from Butuntumula sub-county. The target population of the study was the small-scale pineapple farmers in Luwero district. The required sample size was determined using the proportionate to size sampling method by Anderson *et al.* (2007).

$$n = \frac{pqZ^2}{E^2} \quad \text{(2)}$$

Where n = sample size, p = proportion of the population containing the major interest, q= 1-p, Z = confidence level ($\alpha = 1.96$), E = acceptable error.

$p = \left(\frac{84{,}952}{405{,}900}\right) = 0.23$, q = 1-p = 1-*0.23* = 0.77 and E = 0.05. This results into a sample size of 272 respondents that is,

$$n = \left(\frac{0.23 \times 0.77 \times 1.96^2}{0.05^2}\right) = 272 \quad \text{(3)}$$

3.3 Data collection and analysis

Data collection

Through enumerators data for this study was collected using a semi structured questionnaire. The questionnaire was designed to capture data on the household, pineapple marketing, road infrastructure, marketing information, extension services, pricing and group membership. Both qualitative and quantitative primary data was collected through administrating the semi-structured questionnaire to 272 small-scale pineapple farmers. However, to evaluate the appropriateness of the research design, its clarity and relevance of the questions, the questionnaire used was pre-tested on selected farmers before data was collected. Appropriate

modifications were made on the pre-tested questionnaire to ensure relevant information related to the study objectives is collected.

Data analysis

Data from the field was edited, coded and cleaned to ensure consistency and accuracy and entered into computer software SPSS and STATA for analysis. The SPSS computer program was used to compare socio-economic factors of farmers in the different pineapple market outlets. STATA program was used to estimate the Multinomial Logistic model to determine the role of risk attitudes and social capital on choice of market outlet. Propensity Score Matching method was used to determine the effect choice of market outlet has on small-scale farmers' household income.

3.4 Analytical framework

3.4.1 Objective one

To compare the socio-economic, risk attitudes and social capital attributes of respondents in different pineapple market outlets, descriptive analysis tools such as mean, percentages, graphs, F-statistics and chi-square statistics were used.

3.4.2 Objective two

To determine the role of risk attitudes and social capital on the choice of pineapple market outlet by small-scale farmers in Luwero district, the Multinomial Logistic (MNL) model was used. The model was preferred because it allows for the analysis of decisions across more than two categories in the dependent variable unlike the binary probit or logit models which are limited to a maximum of two choice categories (Woodridge, 2002). The MNL is the standard method for estimating unordered and multi category dependent variables (Gujarati, 2005).

In MNL, a baseline alternative corresponding to the status quo also known as 'do nothing' situation was chosen. This is because one of the options had to always be in the respondents' choice set to be able to interpret the results in standard welfare economic terms (Hanley *et al.*, 2001). As such the Independence from Irrelevant Alternatives (IIA) is a major condition in the MNL that had to be satisfied. This IIA property required that the relative probabilities of 2 options being selected were unaffected by the introduction or removal of other alternatives (Hausman and Mc-Fadden, 1984). Gujarati (2009) argued that in cases where the dependent variable was an unordered categorical variable as will be the case in this study, multinomial logit was most appropriate subject to not violating the IIA.

According to Cattani *et al.* (2002), choice of a given market outlet was discrete since it is chosen among other alternative outlets. This decision for small-scale farmers was based on the option which maximized their utility subject to the farmer's risk attitude, social capital and transaction costs associated with each outlet. Therefore letting P_{ij} represent the probability of choice of any given market outlet by the pineapple farmers, this is represented by this equation:

$$P_{ij} = \beta_0 + \beta_1 X_1 + ... + \beta_k X_k + e \quad \text{.....} \quad (4)$$

Where i takes values (1, 2, 3) each representing the choice of market outlet (1 = farm gate, 2 = local market and 3 = export market), X are factors affecting choice of a market outlet, β are parameters to be estimated and e is the error term. With i alternative choices, the probability of choosing outlet j was given by:

$$\Pr ob(Y_i = j) = \frac{e_{z_j}}{\sum_{k=0}^{j} e_{z_k}} \quad \text{.....} \quad (5)$$

Where Z_j was a choice and Z_k was an alternative choice that could be chosen (Greene, 2000). The model estimates were used to determine the probability of choice of a market outlet given j factors that affect the choice X_i. With a number of alternative choices, log odds ratio was computed as:

$$Ln\left(\frac{P_{ij}}{P_{ik}}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k + e_i \quad \text{.....} \quad (6)$$

P_{ij} and P_{ik} were the probabilities that a farmer chose a given outlet and alternative outlet respectively. $Ln\left(\frac{P_{ij}}{P_{ik}}\right)$ is a natural log of probability of choice j relative to probability choice k, α is a constant, β is a matrix of parameters that reflect the impact of changes in X on probability of choosing a given outlet, e is the error term that is independent and normally distributed with a mean zero.

The Multinomial Logit model was expressed as follows:

$$P_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon_i$$

$$MRKTOUTC = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_3 EducL + \beta_4 HHsz + \beta_5 VOwn + \beta_6 MrktD + \beta_7 OutputP + \beta_8 Mif + \beta_9 MrktgE + \beta_{10} OutputQ + \beta_{11} RiskA + \beta_{12} Trust + \beta_{13} Mattend + \beta_{14} DGMbr + \beta_{15} MInfr + \beta_{16} ExtS + \beta_{17} CMrktg + \beta_{18} GMrb + \varepsilon_i \ldots\ldots\ldots(7)$$

Table 1: Variable used in the Multinomial Logit

Code Variable	Variable	Measurement of variable	Expected sign
Dependent variable			
MRKTOUTC	Household choice of pineapple marketing outlets	(1=Farm gate, 2=Local market, 3=Export market)	+
Independent Variables			
Age	Age of household head in years	In years (Continuous)	+
Gender	Gender of household head	Dummy (1=Male, 0=Female)	+/-
EducL	Education Level of household head	(1=No education, 2=Primary, 3=Secondary, 4=Tertiary)	+
VOwn	Vehicle Ownership	Dummy (Yes=1, No=0)	+/-
HHsz	Household size	Size of the household (Continuous)	+
MrktD	Market Distance	Time taken in minutes to walk to	+/-
OutputP		the nearest market	
Mif	Output Price	Ugandan Shillings	+
MrktgE	Market Information	Dummy (Yes=1, No=0)	+/-
OutputQ	Marketing Experience	In years (Continuous)	+
RiskA	Output Quantity	In kilograms (Continuous)	+
	Risk Attitudes	(1=risk averse, 2=risk neutral, 3=	+/-
Trust		risk seeker)	
	Trust	Trust level (1= low, 2= Fair,	+
Mattend		3=High)	
	Derived from number of meeting per season	Generated index (Continuous)	+
DGMbr			
	Number of groups one is a member	Number (Continuous)	+
MInfr			
	Market Infrastructure in availability of stalls	Dummy (Yes=1, No=0)	+
ExtS			
CMrktg	Extension services	Number of extension contacts	+/-
GMrb	Contract Marketing	Dummy (Yes=1, No=0)	+/-
	Group Membership	Dummy (Yes=1, No=0)	+/-

3.4.3 Objective three

To determine the effect choice of market outlet had on household income, the Propensity Score Matching (PSM) method was used. PSM method improved on the ability of the regression to generate accurate causal estimates by the virtue of its non-parametric approach to the balancing of covariates between the "treatment" and "control" group. Conventional

approaches to assessing the impact of an intervention using with and without method, has been hampered by a problem of missing data. Due to this, the impact of intervention could not be accurately estimated by simply comparing the outcome of the treatment groups with the outcomes of control groups (Heckman *et al.,* 1998). One of the alternative techniques followed to assess the impact of discrete treatment on an outcome is the propensity score matches developed by Rosenbaum and Rubin in 1983. The PSM approach aimed to build matched pairs of comparable users from the export market outlet participants and non-participants that showed a similarity in terms of their observable characteristics. This was achieved by grouping households from treated individuals and non-treated individuals which show a high similarity in their explanatory variables. Thus, to support results obtained from regression analysis the impact of choice of market outlet on household income was examined using econometric PSM method.

In this study households that participated in the export market were considered the treatment group and households that did not participate in the export market were considered as the control group. Ideally, the aim was to compare the level of market, socio-economic and institutional factors of export market participants to that of non-participants. This ensured that the average treatment effect or effect of choice of market outlet on household incomes could be accurately estimated.

To begin with, a logistic regression of treatment status (1 if a household participate in the export market, 0 if a household is a non-participant) was specified. This was run for the sampled households on observables and exogenous variables that included: sex, gender, level of education, vehicle ownership, household size, market infrastructure, distance to market, price of output, price of information, marketing experience, pineapple quantity output, risk attitude, social capital, extension services, contract marketing and group membership. The major concern of this regression was to predict the probability of a household participating in the export market outlet i.e. to predict propensity scores based on which, the treatment and control groups of households were to be matched using the matching algorithms**.** According to Gujarati (1995), the functional form of logistic regression model was specified as follows:

$$P_i = E(Y = 1/X_i) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1)}} \quad \text{.....} \quad (8)$$

Equation (9) can also be written as:

$$P_i = \frac{1}{1+e^{-z_i}} \quad \text{(9)}$$

The probability that a given household participated in the export market is expressed by (10) while, the probability for non-participants in the export market was given by:

$$1 - P_i = \frac{1}{1+e^{z_i}} \quad \text{(10)}$$

This can be written as:

$$\frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} \quad \text{(11)}$$

$\left(P_i/1-P_i\right)$ was the odds ratio in favour of participating in the export market i.e. the ratio of the probability of participating in the export market to that of the probability of not participating.

Lastly, taking the natural logarithms of equation (11) we obtained:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_0 + \beta_1 X_1 + ... + \beta_n X_n \quad \text{(12)}$$

Where;

P_i was probability of participating in the export market and it ranges from 0 to 1

Z_i was a function of n explanatory variables $\left(X_i\right)$ which is expressed as:

$$Z_i = \beta_0 + \beta_1 X_1 + ... + \beta_n X_n \quad \text{(13)}$$

Where;

β_0 was intercept

$\beta_1,...,\beta_n$ the slope parameters in the model

L_i the log of the odds ratio, which is not only linear in X but also linear in parameters

X_i is vector of the relevant sampled household's characteristics

If the disturbances term U_i is introduced in the logit model it becomes:

$$Z_i = \beta_0 + \beta_1 X_1 + ... + \beta_n X_n + U_i \quad \text{(14)}$$

Table 2: Variable used in the Logistic regression

Code Variable	Variable	Measurement of variable	Expected sign
Dependent variable			
EMPART	Household choice to Participate in export market	(1=participants, 0=non-participants)	+
Independent Variables			
Age	Age of household head	In years (Continuous)	+
Gender	Gender of household head	Dummy (1=Male, 0=Female)	+/-
EducL	Education Level of household head	(1=No education, 2=Primary, 3=Secondary, 4=Tertiary)	+
VOwn	Vehicle Ownership	Dummy (Yes=1, No=0)	+/-
HHsz	Household size	Size of the household (Continuous)	+
MrktD	Market Distance	Kilometres	+/-
OutputP	Output Price	Ugandan Shillings	+
Mif	Market Information	Dummy (Yes=1, No=0)	+/-
MrktgE	Marketing Experience	In years (Continuous)	+
OutputQ	Output Quantity	In kilograms (Continuous)	+/-
RiskA	Risk Attitudes	(1=risk averse, 2=risk neutral, 3= risk seeker)	+/-
Mattend	Derived from the number of meeting per season	Generate index (Continuous)	+
Trust	Trust	Trust level (1= low, 2= Fair, 3= high)	+
DGMbr	Number of groups one is a member	Number (Continuous)	+
MInfr	Market Infrastructure in availability of stalls	Dummy (Yes=1, No=0)	+/-
ExtS	Extension Services	Number of contacts with extension	+/-
CMrktg	Contract Marketing	Dummy (Yes=1, No=0)	+/-
GMrb	Group Membership	Dummy (Yes=1, No=0)	+/-

However, estimation of the propensity score was not enough to estimate the average treatment effect on the treated (ATT) of interest. This was due to the fact that propensity score was a continuous variable and the probability of observing two units with exactly the same propensity score was, in principle, zero. Therefore, after obtaining the predicted probability values conditional on the observable covariates (the propensity scores) from the binary estimation, matching was done using matching algorithms selected based on the data at hand. Some of the various matching algorithms that have been proposed in literature differ from each other with respect to the way they select the control units that are matched to the

treated and with respect to the weights they attribute to the selected controls when estimating the counterfactual outcome of the treated. However, they all provide consistent estimates of the Average effect of Treatment on the Treated (ATT) under the Conditional Independence Assumption **(**CIA) and the overlap condition (Caliendo and Kopeinig, 2008). Hence most commonly applied matching estimators include:

Nearest Neighbour matching (NNM): Here an individual from a comparison group is chosen as a matching partner for a treated individual that is closest in terms of propensity score (Caliendo and Kopeinig, 2008). It can be done with or without replacement options. The problem this technique faces is that where the treatment and comparison units are very different, finding a satisfactory match by matching without replacement can be very problematic (Dehejia and Wahba, 2002).

Radius and Caliper matching: In radius matching an individual from the comparison group is chosen as a matching partner for a treated individual that lies within a given radius and is closest in terms of propensity score (Caliendo and Kopeinig, 2008). One problem in radius matching is that it is difficult to know priori what choice for the tolerance level will be reasonable.

Stratification and Interval Matching: Here the idea is to partition the common support of the propensity score into a set of intervals (strata) and to calculate the impact within each interval by taking the mean difference in outcomes between treated and control observations (Imbens, 1994). To justify the choice of the number of strata to use, there is need to check the balance of the propensity score (or the covariates) within each stratum.

Kernel matching: Here all treated units are matched with a weighted average of all controls with weights which are inversely proportional to the distance between the propensity scores of treated and controls (Becker and Ichino, 2002). However, the drawback of this method is that possibly bad matches are used as the estimator (Caliendo and Kopeinig, 2008). Therefore, the proper imposition of the common support condition is of major importance for kernel matching method. As such the choice of a given matching estimator will thus depend on the nature of the available data set (Bryson *et al*., 2002).

Checking overlap and common support

Imposing a common support condition ensures that any combination of characteristics observed in the treatment group can also be observed among the control group (Bryson *et al*., 2002). The common support region is thus the area which will contain the minimum and

maximum propensity scores of treatment and control group households, respectively. However, comparing the incomparable must be avoided. This can be avoided by checking the overlap and the region of common support between treatment and comparison group. One way of determining the region of common support more precisely is by comparing the minima and maxima of the propensity score in both groups. The basic criterion of this approach is to delete all observations whose propensity score is smaller than the minimum and larger than the maximum in the opposite group. As such, observations which lie outside this region are discarded from analysis (Caliendo and Kopeinig, 2008).

Impact of export market participation on household income

The impact of farmer's participation in the export market on household income was further investigated by letting Y_i^T and Y_i^C be the amount of income for participants and non-participants respectively. As such, the difference in outcome between treated and control groups can be seen from the following mathematical equation:

$$\partial_i = Y_i^T - Y_i^C \quad \ldots\ldots 15$$

Y_i^T = Outcome of treatment (income of i^{th} household, when he or she participates in the export market).

Y_i^C = Outcome of the untreated individuals (income of i^{th} household, when he or she does not participate in the export market).

$\hat{\partial}_i$ = Change in outcome as a result of treatment or change of income for participating in the export market.

Equation (16) is then expressed in causal effect notational form, by assigning $D_i = 1$ as a treatment variable taking the value 1 if an individual received the treatment (participates in the export market) and 0 otherwise. Then the Average Treatment Effect of an individual i can be written as:

$$ATE = E(Y_i^T \mid D_i = 1) - E(Y_i^C \mid D_i = 0) \quad \ldots\ldots (16)$$

Where:

ATE, Average Treatment Effect: is the effect of treatment on household income.

$E(Y_i^T \mid D_i = 1)$: Average outcomes for individual with treatment, if he or she chooses to participate in the export market, $(D_i = 1)$.

$E(Y_i^C \mid D_i = 0)$: Average outcome of untreated individual, when he or she does not choose the export market, $(D_i = 0)$.

Furthermore, the Average Effect of Treatment on the Treated (ATT) for the sample can measured as:

$$ATT = E(Y_i^T - Y_i^C \mid D = 1) = E(Y_i^T \mid D = 1) - E(Y_i^C \mid D = 1) \quad \text{(17)}$$

CHAPTER FOUR
RESULTS AND DISCUSSIONS

This chapter presents both descriptive and econometric results of the study. First, the descriptive results of socio-economic, risk attitudes and social capital attributes of respondents in the different market outlets. Second the results and discussion of the Multinomial Logit model and Propensity Score Matching Model.

4.1 Descriptive results

4.1.1 Socio-economic attributes of small scale pineapple farmers in different market outlets

Table 3 presents results on gender and level of education of the household head. Results showed that on average 91% of market participants were male headed households. In the farm gate market outlet 89% of participants were male compared to 95% and 100% in local and export market outlets, respectively. This could be as a result of differences in decision making power between men and women when it comes to property rights that influence ability to produce and market pineapple output. Chikuvire *et al.* (2006) argued that women in SSA are disadvantaged in marketing due to unequal distribution of resources and cultural barriers. This has left men more likely to participate in markets and hence sell more due to their insight in bargaining, negotiating and enforcing contracts (Cunningham *et al.*, 2008). Adoko and Levine (2005) argued that men possess authority to use, sell and control many other factors of agricultural production unlike women.

Table 3: Gender and Education level of the household head relative to market outlet choice

Variable	Category	Percentages				χ^2
		Farm Gate	Local market	Export market	Overall	
Gender	Male	89.0	95.0	100.0	91.0	2.724
	Female	11.0	5.0	0.0	9.0	
Education Level	No formal education	6.3	8.1	0.0	6.6	19.575***
	Primary	45.0	39.2	0.0	42.3	
	Secondary	46.6	48.6	71.4	47.8	
	Tertiary	2.1	4.1	28.6	13.3	

***: significant at 1% level.

Concerning education level of household heads, majority (47.8%) of respondents had attained secondary education, primary education (42.3%), tertiary education (13.3%) and no formal education (6.6%). Over half of respondents in the local market (52.7%) and in export market (100%) had secondary education and above. However, about 48.7% of respondents in farm gate had also similar level of education. *Chi*-square results showed a statistically significant relationship at 1% between education level and type of market outlet. The export market having all its respondents with tertiary or secondary education could explain by the fact that with more education farmers had capability to access, interpret and understand market information and requirements than less educated farmers. This positions these farmers to better meet the market requirements in terms of standards and quality of the export market. Marenya and Barret (2006) pointed out that, higher level of education enhances farmers' managerial competencies and successful implementation of improved production, processing and marketing practices thereby making it possible for farmers to be able to meet quality standards, interpret and respond to new information much faster. Subsequently, farmers that are highly educated find it easy to understand and implement food standards (Kersting and Wollni, 2012).

Table 4 presents results on average age, household size, farm size, group membership and contact with extension service providers. The mean age across all outlets was 39.6 years, with household heads in farm gate, local and export markets having 39.3, 40.4 and 41.1 years, respectively. Age of household heads could explain the farmers' ability to accumulate capital for off-farm market investment and development of long term relationships with their clients (Sall *et al*., 2000; Adegbola and Gardebroek, 2007).

Table 4: Age of household head, farm size, household size, group membership and number of contacts with extension officers in relation to choice of market outlet

Variable	Market outlet choice				
	Farm gate	**Local market**	**Export market**	**Overall**	**F/Value**
Age (Years)	39.3	40.4	41.1	39.6	0.390
Farm size (Acres)	2.08	3.01	7.14	2.46	26.589***
Household size (Number)	7.00	7.20	7.00	7.10	0.145
Group membership	0.52	0.49	0.17	0.50	1.557
Number of contacts with extension	1.63	2.24	1.00	1.81	5.489***

***: significant at 1% level.

The average farm size for all respondents was 2.46 acres (Table 4). Farmers in the export market outlet had larger farm sizes (7.14 acres) in comparison to their counter parts in the

local and farm gate outlets that had 3.01 acres and 2.08 acres, respectively. Results were found to be significantly different across all market outlets at 1% significant level. This could be because with larger farm sizes the level of agricultural output produced increased. Output quantity thus determined the amount of produce a farmer was able to supply in the market, indicating the farmer's capacity to meet market quantity requirements, especially for the export markets. Neven *et al.* (2009) pointed out that, farmers who supplied export markets were five times larger than traditional farmers. Small farm size was noted to constrain smallholder farmers from high value markets, as their ability to supply high output volumes, consistent quality, time deliveries, out-of-season availability and standards requirements high value markets require to match trade competition is limited (Guptill *et al.*, 2002; Gregoire *et al.*, 2005; Reardon and Gulati, 2008; Shipman *et al.*, 2009).

In terms of household size, farmers at the farm gate and export market on average both had a household size of 7.0 members' while for local market participants, the household size was 7.2 family members. Family size of farmers implies increased labor for agricultural production. Therefore, as the household size increases, there is increase output produced but also need for strategies to ensure family consumption requirements can be met. Consequently increase in output means increase in marketable surplus, hence output commercialization (Gani and Adeoti, 2011). Household size could explain the family labor supply for production and household consumption levels (Alene *et al.*, 2008).

For number of contacts with extension officers, results in Table 4 show that farmers in farm gate and local market outlets had more (1.63 and 2.24, respectively) contact with extension service providers in comparison to their counterparts in the export market who had less (1.00) contact with extension service providers in a farming season. The difference in number of extension contacts among producers in the various outlets could be attributed to their variations in group membership. As through membership of farm gate and local market outlet farmers to more (0.52 and 0.49) in comparison to 0.17 group membership for export market participants, farm gate and local market participants had access to more extension services. This could have been in search of better and reliable market and production information, so they can access markets with higher product prices. Therefore, access to extension services avails ways through which knowledge, skills and information can be obtained and conveyed to farmers. According to Maina *et al.* (2015), farmers in producer groups had better access to extension services, which played an imperative role in empowering farmers with skills of

improved agricultural inputs access, better methods of production, marketing information and ability.

Figure 4 shows the household head's ownership of means of transport. In export and local markets majority (83% and 84%) of farmers owned means of transport, in contrast to the farm gate market where only 65% of farmers that owned transport means. Majority (66.7%) of export farmers owned lorries, in comparison to their counterparts in the local and farm gate markets who majorly (53.2% and 46.0% respectively) owned motorcycles. Ownership of transportation means by farmers minimized travel time and expenses to both output and input markets. For export market farmers, availability of transport ensures prompt delivery of output to markets while maintaining produce freshness and wholesomeness.

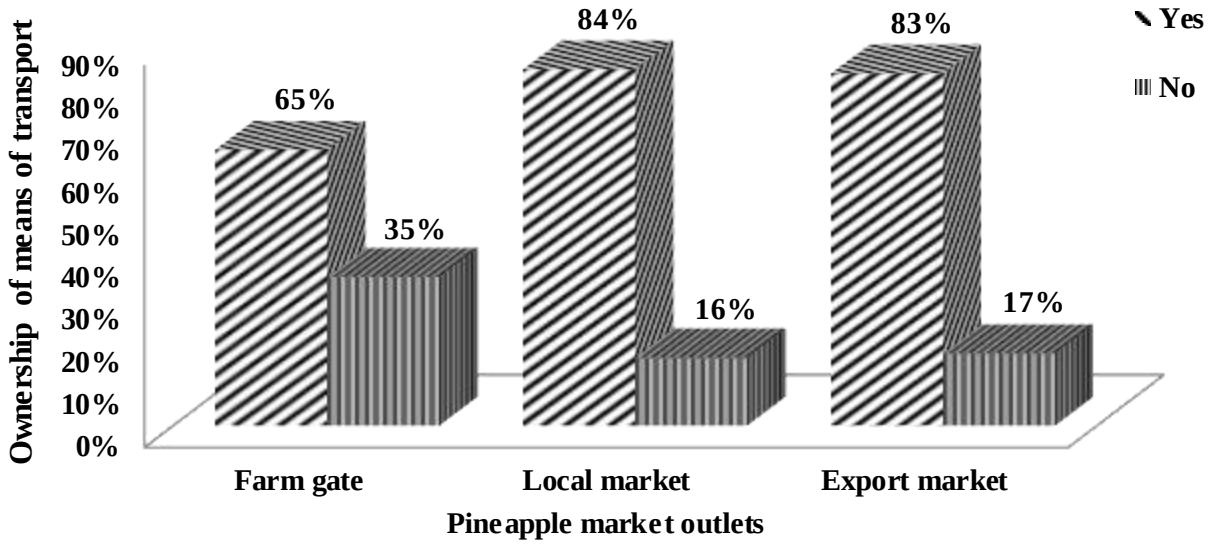

Figure 4: Ownership of transport means relative to choice of pineapple market outlet

In terms of participation in off-farm activities by the household head, results are presented in Figure 5. In farm gate market outlet, respondents that participate in off-farm activities were 42% in comparison to 64% and 67% in local market and export markets. This indicates that export market participants were more involved in off-farm activities than those in the local and farm gate markets. This could be as a result of exposure of household heads to wider sources of information due to participation in off-farm activities. This could bring about access to better and more profitable agricultural markets opportunities for farmers but also enable them have the ability to access additional income to purchase farm inputs and pay labor. These activities also enable farmers reduce and mitigate risks. Previous studies such as Kydd and Dorward, (2001) and Marenya and Barret, (2006) have argued that, off-farm

activities diversified farming household's income by providing additional income that farmers use to mitigate against climate change, purchase farm inputs and ensure that farm produce meets required trade restriction standards.

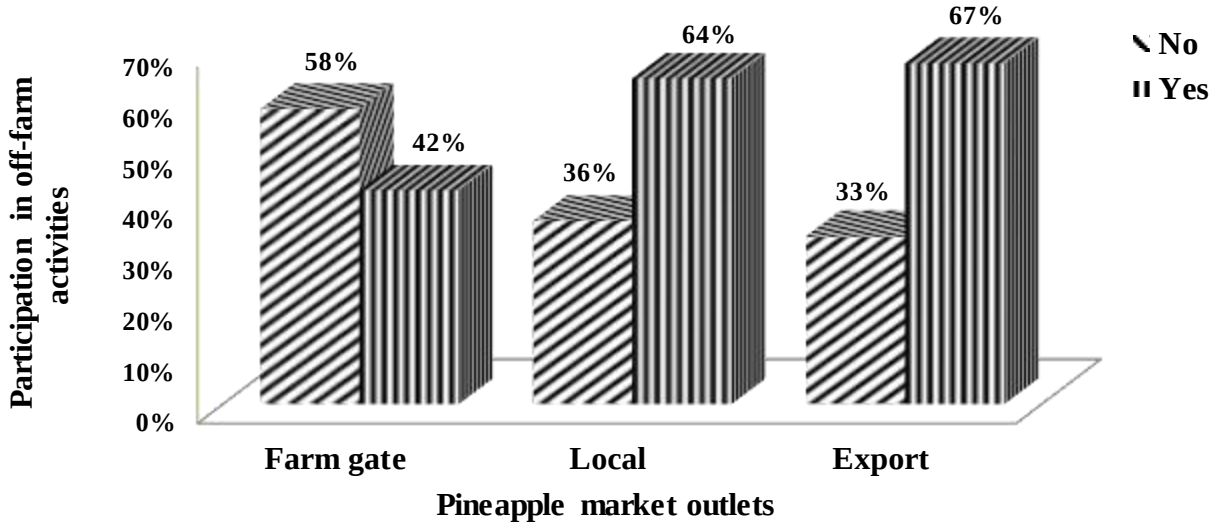

Figure 5: Participation in off-farm income activities in relation to choice of market outlet

4.1.2 Farmer risk attitudes and contract marketing

Table 5 presents results for respondents risk attitudes and contract marketing. The study adopted the lottery question to measure farmer risk attitudes as described by Yu *et al.* (2014). Farmers differ in the degree to which they accept risk and therefore, attitudes towards risk are related to their ability to accept a small gain or loss (Kahan, 2008). Consequently, farmers' attitudes may be classified as: risk-averse for those who try to avoid taking risks; risk seekers those who are open to more risky marketing options and risk neutral farmers for those who lie between the risk-averse and risk seeking position. Results presented in Table 5 show that in farm gate market the majority (67.9%) of respondents were risk-averse in contrast to 41.9% and 42.9% in local and export market outlets, respectively. However, farmers who are risk seekers were highest (57.1%) in the export market compared to 54.1% and 26.3% in the local and farm gate markets, respectively. There was significant relationship between market outlet choice and risk attitude of the chief decision maker at 1% significant level. This could be explained by the fact that risk seeking farmers were more willing to bare the risk that comes with accessing more profitable markets as a result of high transaction costs in efforts to get a better price and profit margins for their produce. Risk-averse farmers tolerated volatile produce prices at the farm gate to minimize transaction risks of accessing high value markets.

Table 5: Contract marketing and risk attitude in relation to choice of market outlet

Variable	Category	Percentages			χ^2
		Farm gate	Local market	Export market	
Risk attitude	Risk averse	67.9	41.9	42.9	19.884***
	Risk neutral	5.8	4.1	0.0	
	Risk seeker	26.3	54.1	57.1	
Contract marketing	Yes	8.9	20.3	71.4	26.641***
	No	90.6	79.7	28.6	

***: significant at 1% level.

Concerning contract marketing, at the farm gate 8.9% of farmers had contracts with traders in comparison to 20.3% and 71.4% in local and export markets, respectively. There was a significant relationship between market outlet choice and contract marketing at 1% level of significance. Most farmers in the export market had contracts unlike farmers in local and farm gate markets. This could be due to the need of output buyers in the export market to affirm reliability of product quantity and quality from farmers. Therefore, contractual agreements are able to ensure constant ready market for pineapple produce at stable product prices. Elupe and Nalukenge (2007) pointed out that, contract farming provided assured market, high prices, critical inputs and knowledge of new agricultural technologies to farmers. Furthermore, contracts provide a basis for sharing values, risks and decision making power between farmers and their transaction partners' hence allowing for mutually beneficial outcomes for both (Eaton and Shepherd, 2001).

4.1.3 Social capital dimensions relative to choice of pineapple market outlets

The study adapted measurement of social capital dimensions as described by Wambugu *et al.* (2009), which included density of membership, trust and frequency of attending farmer group meetings (Table 6 and Figure 6, respectively). Density of membership was measured by the number of local groups to which each household head belonged. Households in the farm gate market had a mean density of membership of 1.57 in comparison to 1.39 and 1.00 of respondents in local and export markets, respectively. Higher density of membership in farm gate can be attributed to the need by farmers to benefit from some public instituted poverty reduction programmes but also the search for diversity in production and marketing skills, information and knowledge. Group membership exposes farmers to a wide range of ideas that allows farmers the opportunity to have access to information through training and extension, as this facilitates information exchange among members reducing transaction costs and

empowering farmers to bargain and negotiate for better trading terms (Poulton *et al*., 2006; Jagwe, 2011).

Table 6: Density of membership, Trust and pineapple market outlet choice

	Choice of Market outlets			F/Value
Variable	**Farm gate**	**Local market**	**Export market**	
Density of membership (Mean)	1.57	1.39	1.00	2.865*
Trust level (Mean)	1.37	1.70	2.00	11.914***

***, *: significant at 1% and 10% level, respectively.

Concerning the farmer's trust for transaction partners, this was measured by asking to what level respondents trusted buyers in their respective market outlets. Table 6 shows that on average, households selling at the farm gate outlet had a low (1.37) trust level for parties to whom they sold pineapples in contrast to the fair (1.70 and 2.00) trust level among farmers in the local and export markets for their trade partners respectively. The fair level of trust among local and export market farmers for traders could be due to the higher product prices these markets offer and existence of contractual agreements between producers and their trade partners. Higher pineapple prices and contractual agreements encourage trust, thereby providing incentive for market exchange by reducing transaction costs farmers incur in terms of bargaining, negotiation, policing and enforcement every time an exchange has to be made. Contracts therefore provide farmers with assurance that trade partners will not breach agreements made. Knack (1999) argued that trust is beneficial to economic performance between strangers. Therefore, in societies where strangers were able to trust each other to act in collective interest, people could contract with a wide range of parties.

Frequency of attending group meetings was measured through a three scale criterion that is "never", "sometimes" and "always". Figure 6 shows that in the export market 100% of respondents always attended meetings in contrast to 86% and 72% of respondents who always attended meetings in the local and farm gate market outlet, respectively. These differences could be attributed to farmers in the export market outlet looking for more up to date information about production and market requirements to enable them meet export market requirements for produce quality. Several studies have argued that, frequency of attendance to meetings positively affects performance as meeting attendance is positively related to knowledge, information and skills received from social groups but also to exchange of experiences by group members (Yusuf, 2008; Wambugu *et al.*, 2009 and Adepoju and Oni, 2012).

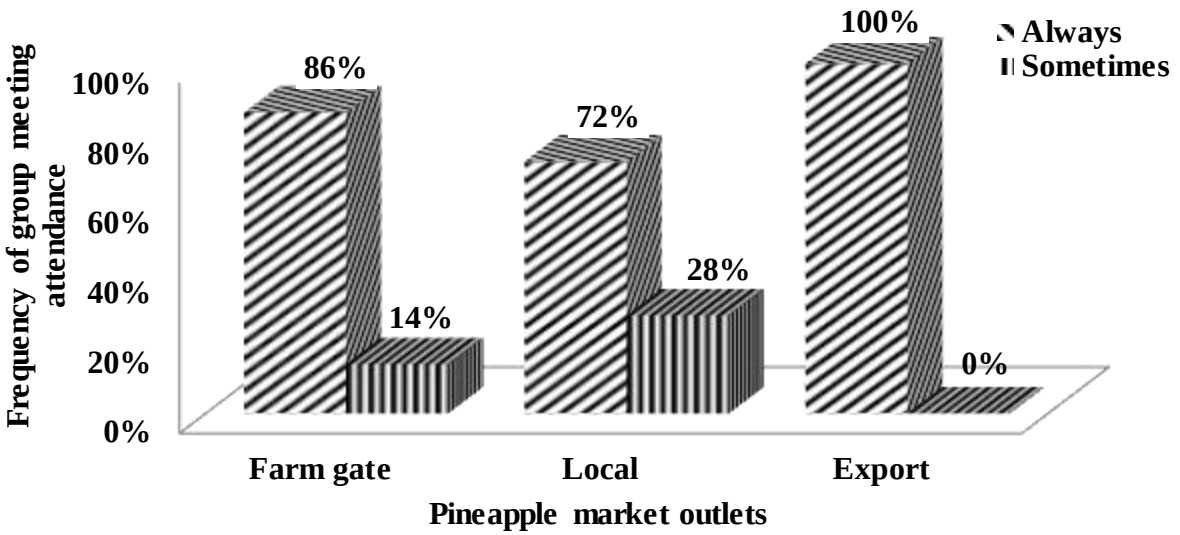

Figure 6: Frequency of attending group meetings in relation to market outlet choice

4.1.4 Market related factors and choice of pineapple market outlets

Table 7 presents results on distance to the nearest market and marketing experience in relation to choice of market outlet. On average, the distance in kilometres to the nearest pineapple market for farmers in the study was 7.09 Km (Table 7). Results show that farmers in the export market were farthest (12.44 Km) from the nearest market in contrast to those in the local and farm gate market who were located 11.42 Km and 10.26 Km from the nearest market respectively. Distance to the nearest pineapple market was found to be significantly different across all market outlets at 10% significant level. A plausible explanation for this could be that farmers in the export market target virgin farm land to prevent the use of inorganic fertilizers (ensuring production of organic pineapples), minimize effects from pests and diseases, and ensure access to large pieces of farm land and for production of big sized pineapple fruits.

Table 7: Results on distance to the nearest market and Marketing experience relative to choice of market outlets

Variable	Mean				F/Value
	Farm gate	Local market	Export market	Overall	
Market distance (Kilometres)	10.26	11.42	12.44	7.09	2.424*
Market Experience (Years)	4.75	5.26	6.24	5.26	4.976***

***, *: significant at 1% and 10% level of significance.

Concerning marketing experience (Table 7), on average farm gate participants had 4.75 years experience marketing pineapples in comparison to local and export market participates who

had experienced marketing pineapples for 5.26 years and 6.24 years, respectively. Results were found to be significant at the 1% level of significance. This could explain the ability of farmers' to develop market links through social capital accumulated over time participating in output markets. Therefore with the existence of such links between farmers and traders there was reduction in transaction costs incurred especially in searching for reliable trading partners and market information. This is consistent with findings by Sigei *et al.* (2014) who found that farmers with more years in marketing had higher ability to sell more pineapple produce in the market due to increase in their bargaining proficiencies and marketing networks.

Table 8: Results on road condition, access to market information and source of market information in relation to choice of pineapple market outlets

Variable	Category	Percentages				χ^2
		Farm gate	Local market	Export market	Overall	
Road condition	Good	4.2	5.4	0.0	4.4	0.519
	Bad	95.8	94.6	100.0	95.6	
Access to market information	Access	97.6	98.6	100.0	98.2	0.553
	No access	2.4	1.4	0.0	1.8	
Market information source	Traders	38.9	78.4	85.7	67.7	35.425***
	Fellow farmers	61.1	21.6	14.3	32.3	

***: significant at 1% level of significance.

Concerning the road infrastructure (Table 8), for households selling at the farm gate 95.8% of respondents rated the road infrastructure they used to access nearest market as bad and poorly maintained in comparison to 94.6% and 100.0% of respondents in local and export markets, respectively. Road conditions could explain the low pineapple prices received by farmers who sell at the farm gate outlet. This is as a result of high transport costs traders incur to access pineapples, arising from poorly maintained roads.

In terms of accessing market information, on average majority (98.2%) of respondents had access to market information (Table 8). Results showed that majority (78.4% and 85.7%) of farmers in the local and export market, respectively had their sources of market prices and demand information were traders in contrast to 61.1% of majority of farmers in the farm gate market who receive their market information from co-farmers. Source of market information significantly influenced choice of market outlet at the 1% level of significance, and this could be because farmers in export and local markets considered information from traders to be more legitimate and credible for economic exchange than information received at the farm

gate by fellow farmers. This provided these farmers with incentive to sell in the local and export outlets. Information thus plays a crucial role in ensuring that farmers know market outlet dynamics as farmers with reliable market information will be more tendencies to sell produce in high value markets than those without. According to Muthini (2015), lack of information reduced access to direct mango markets, as it made market access risky for farmers. Information farmers received at the farm-gate was not be classified as legitimate as it could not be guaranteed thus hindering access to direct markets.

4.1.5 Farm level financial economic benefits that characterize different market outlets

Profitability of any farm production system depends on the underlying cost structure and returns. Gross margin per acre in the various market outlets was computed and presented in Table 9. The cost structure for 272 pineapple farmers surveyed shows that on average, total production costs per acre for a harvesting season was higher for export market farmers in contrast to local and farm gate markets and was found to be significantly different across the market outlets at a 5% level. This could be attributed to higher costs incurred by export farmers in land rent, payment of labour and other costs (transportation, communication and certification) in contracts to their counterparts in local and farm gate market outlets.

Table 9: Farm level financial economic benefits from pineapple production per acre (UGX)

Variable	Farm gate	Local market	Export market	F/Value
Price per pineapple	916.75	1,618.92	5,428.57	380.830***
Total value of output	5,549,124.91	15,238,819.82	23,214,285.71	15.639***
Output produced	6053.04	9412.95	4276.32	0.140
Costs				
Land rent	290,348.06	351,423.63	400,000.00	3.732**
Labour	1,034,367.76	1,300,499.54	1,368,321.43	5.105***
Fertilizers	95,450.00	69,260.87	90,000.00	0.494
Herbicides	214,181.36	286,716.67	90,000.00	1.502
Seed	674,106.74	677,534.72	744,285.71	0.227
Others	63,971.55	709,622.02	2,412,000.00	25.088***
Total cost of production	2,372,425.47	3,395,057.45	5,104,607.14	4.025**
Gross margin	3,176,699.44	11,843,762.37	18,109,678.57	31.515***

***, **: significant at 1% and 5% level

Higher costs of renting land for export farmers could be due to differences in quality of land these farmers' hired for farming. This high demand for virgin farmland for pineapple production drives price for its rent. Additionally, higher labour costs can be accredited to pineapple farming being labour intensive, demanding skilled and unskilled human labour

from preliminary operations like land preparation, planting and weeding. As a result for export farmers, labour costs increase with minimal use of herbicides for weeding in order to acquire organic output. Furthermore, other costs (transportation, communication and certification) are higher for export farmers because to access the export market farmers have to get certified which is a costly yearly process, invest in telecommunication services and produce transportation to ensure output reaches markets promptly. These costs ensure that farmers keep updated with market dynamics and farm produce maintains freshness, wholesomeness, nutritional integrity and quality to meet market requirements.

Average gross margin income per acre of pineapple production was higher in the export market in contrast to the local and farm gate markets (Table 9). The result shows that there was significant difference in gross margin income across the market outlets at a 1% level of significance. This could be due to the higher (UGX 5428.57) price per pineapple head offered in the export outlet in contrast to that in the local (UGX 1618.92) and farm gate (UGX 916.75) outlets. Pineapple production and marketing generates income for farmers, but it is affected by high transportation costs, price volatility and bottlenecks farmers face when trying to access high value markets. Similar observations were made by Muthini (2015), where farmers incurred varying costs and as such gross margins were influenced by the farmer's choice of mango marketing channel and output price the channel paid.

4.2 Factors influencing the choice of pineapple market outlets

Table 10 presents results of the Multinomial Logit model on factors influencing choice of market outlets. The Chi-square value of -37.182 ($P < 0.000$) showed that likelihood ratio statistics are significant suggesting that predicators included in the model were capable of jointly predicting and explaining choice of market outlet. The pseudo-R square indicated that explanatory variables explained about 49.25% the choice of market outlets. Marginal effects were run after coefficient estimates. Coefficients provided just the direction of the effect of independent variables on the dependent variable but not actual magnitude of change of probabilities (Appendix 1).

Table 10: Marginal effects of dependent variables in the multinomial logit on choice of pineapple market outlets

Variable	Farm gate		Local market		Export market	
	δy/δx	Std error	δy/δx	Std error	δy/δx	Std error
Gender	-0.151**	0.079	0.123*	0.079	0.028***	0.011
Age	-0.002	0 .003	0.002	0.003	0.000	0.001
Household size	-0.005	0 .009	0.005	0.009	-0.000	0.003
Education Level	-0.036	0.042	0.013	0.042	0.023**	0.010
Transport ownership	-0.192***	0.054	0.173***	0.052	0.019	0.018
Off farm activities	-0.187***	0.055	0.163***	0.053	0.024	0.019
Farm size	-0.049***	0.014	0.043***	0.014	0.005**	0.003
Price per head	-0.001***	0.000	0.001***	0.000	4.52e-06	0.000
Market distance	-0.090***	0.035	0.074**	0.034	0.016**	0.007
Market information access	0.019	0.203	-0.037	0.196	0.018	0.079
Extension contact	-0.137***	0.051	0.137***	0 .050	-0.011	0.020
Contract marketing	-0.186***	0.075	0.150**	0.073	0.037***	0.014
Risk attitudes	-0.123***	0.028	0.112***	0.027	0.011	0.009
Density of membership	0.061	0.055	-0.024	0.054	-0.037**	0.019
Frequency of meeting attendance	-0.221**	0.097	0.216**	0.907	-0.012	1.611
Trust level	-0.200*	0.011	0.174***	0.045	0.026***	0.046

Number of observations = 102 Wald chi^2(26): 72.16 Prob> Chi^2 = 0.000
Pseudo R^2= 0.4925 Log likelihood = -37.182292

*, **, ***: significant at 10%, 5% and 1% level, respectively.

Gender of household head had significant influence on the likelihood of choosing farm gate, local and export market outlets at 5%, 10% and 1% significant level, respectively. Male headed households had a higher probability of selling in export and local market outlets by 2.8% and 12.3%, respectively and a lower probability of selling at farm gate by 15.1%. This could be as a result of differences in agricultural roles played by men and women, social cultural norms and family roles that restrict female mobility thus limiting their participation in off-farm markets. Conversely, the tendency of men being risk takers enables them search for markets in more distant and competitive places like export and local markets. Omoto (2003) pointed out that the 'gendered' nature of local knowledge and systems, left differences in resource bases between men and women causing them to experience different sets of social constraints even in market access. As a result, male headed households had a high probability of selling produce in markets beyond the farm gate because of their ability to engage in negotiations, possession of more marketing networks and interaction capabilities with more buyers unlike women who are restricted by household chores (Jagwe, 2011).

In terms of household head's education level, one year increase in household head's education increased the probability of choosing export market outlet by 2.3% and significantly influenced the likelihood of choosing export market outlet at 5% significance level. A probable explanation for this could be that with high level of education, farmers have more knowledge and capacity to interpret market information they acquire to suit their marketing needs. This gives them the ability to seek out better marketing opportunities, negotiate for better output prices but also meet market quality standards. Previous studies (Marenya and Barret, 2006; Jari, 2009) argued that, education enhances managerial competencies and successful implementation of improved production, processing and marketing practices. This makes it possible for farmers to meet quality standard requirements in markets.

Ownership of transportation means had significant influence on choice of farm gate and local market outlets at the 1% significance level. A unit increase in ownership of transportation means by one vehicle increased the probability of selling in the local market outlet by 17.3 % and decreased the probability of selling in the farm gate market outlet by 19.2%. This could be because ownership of means of transport ensures that households have access to convenient transportation equipment and services to move pineapple produce to markets. This reduces the problem of long distance farmers have to travel to access markets by ensuring accessible transportation to farmers and reduces transportation cost of output and inputs to and from markets, respectively. Reduced transport costs yields higher farmers' gross margins as it lowers transaction costs. Several studies (Chalwe, 2011; Panda and Sreekumar, 2012) pointed out that, availability of on-farm transport increased the likelihood of farmers transporting goods to the market, as farmers were able to access marketing centres at lower costs and within shorter time periods. Ownership of transport equipment thus lowered transaction costs farmers incurred in market access, thereby enhancing their probability for market participation which was often restricted by poor transport (Kabeto, 2014).

Participation in off-farm activities increased the probability of farmers selling in the local market by 16.3% and decreased the probability of them selling at the farm gate by 18.7%. This could be because farmers engaged in off-farm activities were able to generate more income for investment in farming, but also purchasing transport equipment to send farm output to distant markets. Additionally, farmers involved in off-farm activities are able to access information that influences choosing high value markets to sell output thus disregarding the selling of pineapples at the farm gate. Findings are consistent with Tura *et*

al. (2016) who argued that, farmers who had liquidity from on or off farm income were able to finance production and produced more marketed surplus. Therefore, off-farm income provides farming households with insurance against the risks incurred in farming, liquidity for investment and enables them to adopt new technologies (Siziba and Diagne, 2011; Fentie and Rao, 2016).

Farm size influenced respondents' choice of farm gate, local and export market outlet at the 1%, 1% and 5% significance level, respectively. A unit increase in farm size by one acre increased the likelihood of choosing to sell in local markets by 4.3% and export markets by 0.5%, with a disregard for the farm gate outlet by 4.9%. This could be so because large farm size yield large output and enable farmers benefit from economies of scale from reduced transaction costs such as certification and transportation costs incurred in marketing of pineapple output. Previous studies pointed out that, households' market participation and volume of crop sold was determined by their access to improved agricultural inputs (Martey *et al.*, 2012; Melesse, 2015). Farm size therefore enabled a household produce surplus crop for the market which influenced the level of agricultural commercialization.

Price per pineapple head was found to have a significant influence on choice of farm gate and local market outlets at a 1% level of significance. A unit increase in price per pineapple head by UGX 1 increased the probability of farmers selling in the local market by 0.1% and decreased the probability of selling at the farm gate by 0.1%. Farmers have an opportunity to earn higher profit margins when they sell in local markets than at the farm gate. Margins earned in local markets as a result of higher prices, allows farmers to make sufficient mark-up to absorb transaction costs incurred in pineapple production and marketing. According to Mailu *et al.* (2012), farmers opt for markets with high produce prices in comparison to those offering lower produce prices. However, if product prices decreased in these high value markets, farmers then opted to sell their produce in the immediate market to minimize transaction costs they incurred during market access.

With regard to distance to the nearest market, a unit increase in distance to the market by one kilometre increased the probability of selling in local and export markets by 7.4% and 1.6%, respectively. However, it decreased the probability of selling at the farm gate by 9.0%. This indicates that with increased distance to the market marginal profits earned from selling in high value markets outweighs the opportunity cost of selling output at the farm gate based on transaction costs incurred. High value markets provide high profits which enable farmers to

make profits. This finding concurs with Jagwe (2011), who observed that more remotely located farming households had greater probability of travelling to markets to sell their commodities, as their urgent need for cash revenue and benefits from market participation outweighed the opportunity cost of transaction costs and time spent in accessing markets. Farmers who live far away from markets are also more likely to have large farms, which exporters' prefer because of economies of scale (Muthini, 2015).

In terms of number of extension contacts, an increase in extension contact by one contact decreased the probability of choosing farm gate outlet by 13.7% but increased the likelihood of choosing to sell in local markets by 13.7%. This implies that information farmers got from extension officers was geared towards commercializing farmer production systems based on poverty eradication efforts in the area. The information gives farmers an edge in negotiating better prices but also facilitates informed market choice decisions by farmers. This finding is consistent with Jaleta *et al.* (2009) who argued that, to commercialize access to markets, information and risk reduction were important factors as they could strengthen linkages between farm households and markets, thus increasing technical efficiency advantage and market orientation of households.

Contract farming had a positive significant influence on choice of local and export market outlets at the 5% and 1% significance level and negatively influenced choice of farm gate outlet at the 1% significance level. Therefore, having a contractual agreement increased the probability of farmers selling in local and export markets by 15.0% and 3.7%, respectively and decreased the probability of selling at the farm gate by 18.6%.This could be because contracts guaranteed farmers with reliable market, stable produce prices and minimum costs in screening, negotiations, policing, enforcement and bargaining with transaction partners every time a transaction is to be made. Elupe and Nalukenge (2007) argued that, contract marketing provided farmers' market assurance; high prices, inputs and knowledge of new agricultural technologies enabling farmers with contractual agreements sell more pineapple produce. Contract farming is therefore an instrument that can link small-scale farmers to high value domestic and foreign markets (World Bank, 2007).

Risk attitudes had a significant influence on choice of farm gate and local market outlets at the 1% significance level. An increase in farmers' risk taking level increased the probability of farmers selling in local markets by 15.0% while it decreased the probability of a farmer selling in farm gate markets by 12.3%. This implying that producers who considered

themselves more willing to accept risks than their peers were more likely to choose local markets over farm gate. This could be because as farmers' level of taking risks increases, they are more willing to accept the uncertainty and high transaction risks that come with accessing outlets with relatively higher profit margins. Therefore, for risk seeking farmers the opportunity cost of reliable product markets, prices coupled with higher marginal returns in local markets outweighed transaction risks surrounding accessing this market outlet. Previous studies (Coble *et al.*, 2000; Franken *et al.*, 2013) argued that, risk aversion significantly decrease the proportional use of marketing contracts for producers, as producers who chose cash sales as their primary marketing technique had minimum transaction costs although they were fully exposed to price risks.

Social capital was measured using social capital dimensions of density of membership to groups, frequency of attending group meetings and trust farmers had for trading partners as described by Wambugu *et al.* (2009). Density of membership was found to significantly influence choice of export market outlet negatively at the 5% significance level. Results show that an increase in number of groups farmers belonged to by one group decreased the probability of selling pineapples in export markets by 3.7%. This could be because as group membership increases, there is increased participation in decision making which may poses difficulty in reaching consensus in decision making. This coupled with decreased commitment to groups' as they increase which may be because farmers perceive benefits they can get from such groups to be less, due to high time and resource requirement for active involvement in many group activities which could dampen group involvement and participation export markets. Kangogo *et al.* (2013) argued that, increased density of membership index was associated with a decrease in loan repayment performance because as individuals increased the number of groups in which they had active participation, their commitment to the existing group was compromised, affecting their loan repayment performance.

Regarding frequency of attendance in meetings, a unit increase in farmer group meeting attendance by one meeting increased the likelihood of selling in local markets by 21.6% however it decreased the likelihood of selling at the farm gate by 22.1%. This could be due to the fact that farmers who regularly attend group meetings are able to build networks, obtain market information and skills which could enable them access high product demand and priced local markets, but also increase their production efficiency. According to Kangogo *et*

al. (2013), farmers that frequently attend group meetings acquire better farming and business skills which lead to their higher productivity as social groups' foster better commitment and trust.

Level of trust farmers had for their transaction partners significantly influenced the probability of selling at farm gate, local and export market outlets at the 10%, 1% and 1% significance level, respectively. Having fair trust for transaction partners increased the probability of farmers selling in local and export outlets by 17.4% and 2.6%, respectively. However, it decreased the probability of selling at the farm gate market by 20.0%. This indicates that trust between transaction partners was an important aspect for farmers to access distant markets. This could be because trust reduces opportunistic behaviour between transaction partners and reduces transaction costs farmers incur when accessing markets. Therefore, trust is important for farmers to build strong and reliable personal networks and trustworthy buyer-seller relationships. According to Liu *et al.* (2008), trust was argued to reduce transaction costs in vegetable trade because as it increased negotiating contractual obligations, facilitating the circulation of reliable information about technology, market opportunities and made the exclusion of unreliable agents easier for farmers.

4.3 Impact of export market participation on household income

Logistic regression model was used to estimate propensity score of participants and non participants in the export market outlet (Table 11). Results report the estimated coefficients, their significance, standard error and goodness of fit measures for the model. Estimated coefficient results show that the probability of export market participation is positively and significantly influenced by seven explanatory variables including; education level, contract marketing, farm size, per unit price of pineapples, market distance, trust and contact with extension officers. The estimated model appeared to execute well the intended matching exercise, with a pseudo-R^2 value of 0.3514 indicating that the explanatory variables explain 35.14 percent of the probability of participating in the export market and is significant at the 1% level of significance (p=0.0036). The low pseudo R^2 value means that participating households do not have much distinct characteristics generally and therefore finding a good match between participating and non-participating households becomes easier.

Table 11: Logistic regression analysis to determine pineapple export market participation

Variable	Coefficient	Std. Error
Age	0.021	0.054
Gender	0.818	0.571
Household size	0.104	0.210
Education level	2.422***	0.782
Transport ownership	0.328	1.253
Off-farm activities	-0.252	1.098
Contract marketing	3.521***	1.533
Market distance	0.805**	0.408
Farm size	0.765**	0.233
Per unit price	0.005***	0.003
Contact with extension	0.668**	1.039
Risk attitude	-0.065	0.523
Trust index	1.859**	0.898
_Cons	-13.592***	5.544

Number of observations = 271 LR Chi^2 (8)= 22.84 Prob> Chi^2 = 0.0036
Pseudo-R^2= 0.3514 Log likelihood= -21.081897

***, **: 1% and 5%significant level respectively.

Education level of the household head significantly and positively influenced export market participation. One year increase in household head's education increases the probability of participating in the export market by 2.422 odds holding all other factors constant. This can be explained by the fact that as an individual acquires more education they are enabled to understand and interpret market information better. Producers thus have skills and knowledge to participate in high value export markets. Sigei *et al.* (2014) suggested that, higher levels of education provided producers with a greater opportunity to participate in pineapple markets, as they were empowered with marketing skills and knowledge that gave individuals incentive for market participation.

Concerning contract marketing, having a contract increased the probability of selling in the export market by 3.521 odds, other factor holding constant. A plausible explanation for this could be that contracts assured farmers with reliable market and demand for their output but also minimized transaction costs farmers incur due to market search. Therefore, contractual agreements provided buyers guarantee for constant supply of the product but also quality and for farmers reducing marketing risks as a result of market failures.

In terms of distance to the nearest market, a unit increase in market distance by one kilometre increased the probability of export market participation by 0.805 odds, holding all other factors constant. This may be because farmers farther away from markets were more likely to have large and virgin farm lands that promote production of organic pineapple output. These

farms attracted export market participation due to benefits from economies of scale and quality of farm output produced. Muthini (2015) argued that, farmers farther from tarmac roads were more likely to have large farms which exporters prefer because of economies of scale.

Farm size significantly and positively influenced export market participation. An increase in farm size by one acre increases the probability of participating in the export market by 0.765 odds, all other factors held constant. This could be because with larger farms under pineapple cultivation farmers have sufficient marketable surplus to meet the export markets' requirements and demand for quantity. Therefore, as pineapple farm size increases, export market participation also increases as these markets have high and reliable consumer demand. According to Adugna (2009), an increase amount of papaya yield augmented its market supply significantly.

Price per pineapple head had a significant and positive influence on export market participation. A unit increase in per unit price per pineapple head by UGX 1 increases likelihood of export market participation by 0.005 odds, holding all other factors constant. The probable reason for this, is that as pineapple price increases, farmers are able to increase profit margins they earn from pineapple marketing which enables them to cover both production and transaction costs incurred. Farmer will thus participate in export markets to be able to earn premium product price this market offer therefore maximizing profits.

Contact with extension officers was found to be positively and significantly influence export market participation at 5% significance level. This indicates that a unit increase in extension service contacts by one contact will increase the likelihood of export market participation by 0.668 odds. A likely explanation for this could be that through increased contact with extension service providers farmers get training, skills and knowledge in techniques of producing quality pineapples that meet export market standard requirements. Muthini (2015) pointed out that, increased contact with extension services increased farmer's likelihood of selling to the export channel relative to the broker channel by eleven percent for every extra contact with extension personnel. This was attributed to producers' ability to produce quality mangoes free from pests and diseases.

Concerning trust, results show that trust positively influences participation in the export market at a significant level of 1%. Therefore, increasing trust for market partners by one level increased the odds of export market participation by 1.859, holding all other factors

constant. A probable explanation for this could be that, trust between farmers and their transaction partners reduces opportunistic behaviour and transaction costs due to screening, enforcement and policing transaction agreements that would be incurred. This is because farmers will consider contracts made with parties they trust as reliable since whatever is agreed upon in the contract has to be enforced. Maina *et al.* (2015) argued that, farmers who had high trust in buyers were likely to spend less time screening their transacting partners or following up on payments.

4.3.1 Matching participant and non-participant households

Among participants, the predicted propensity score ranged from 0.0230 to 0.9022, with a mean of 0.5388. Among non-participants, the predicted propensity score ranged from 0.0291 to 0.7650, with a mean of 0.3431. Thus, the common support assumption is satisfied in the region of [0.0230 to 0.9022], enforcing a loss of 1 participant. The distributions of the propensity scores for participants and non-participants (Figure 7) supports this result as it shows a good overlap of the common support. The bottom half of the graph shows the propensity score distribution for the un-treated, while the upper-half refers to the treated individuals with the x-axis indicating the frequency of the propensity score distribution. This test is effective because it shows visual presentation of overlap of propensity scores between the treated and control cases. A larger proportion of overlap implies a good match of treated and control cases (Dehejia and Wahba, 2002). There is a considerable overlap of propensity scores between the treated and control cases, this implies that the match is good and balanced.

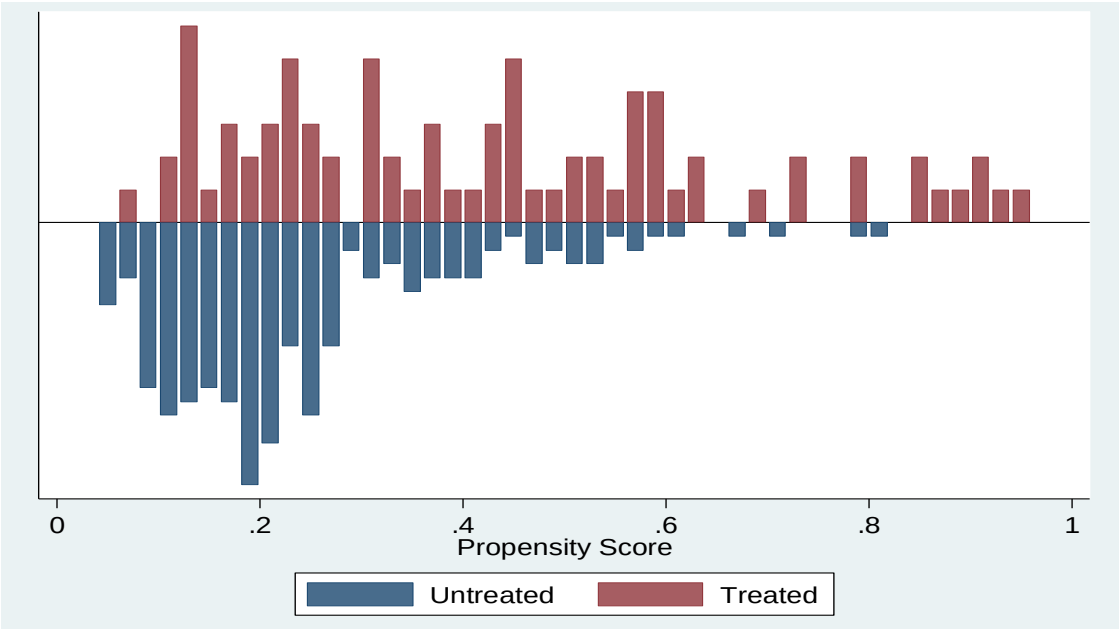

Figure 7: Common support graph

4.3.2 Testing the balance of propensity score and covariates

Checking the balancing of propensity score and covariates was done using this NN (4) matching algorithm. The main purpose of the estimation of propensity score is to balance the distributions of relevant variables in both treatment and control groups but not to obtain a precise prediction of selection into treatment. Table 11 shows the balancing tests of the covariates using this matching estimator, comparing the before and after matching algorithm significant differences.

Before matching, six variables showed statistically significant differences, while after matching the covariates are balanced, three variables are significant. Before matching, variables which were significantly different for the two groups of respondents included education level, farm size, per unit price, distance to market, trust and density of membership. However after matching significant covariates such as per unit price, trust and density of membership were conditioned to be insignificant which indicates that balance was made in terms of the covariates between participants and non-participants. These results clearly show that the matching procedure is able to balance the characteristics in the treated and the matched comparison groups.

Table 12: Balancing test of each covariate using t-test

Covariates	Before matching (N=270)			After matching (N=247)		
	Treated	Control	t-value	Treated	Control	t-value
Gender	1.000	0.905	0.85	1.000	0.920	0.72
Age	41.143	39.525	0.42	41.143	40.419	0.21
Household size	7.000	7.068	-0.06	7.000	7.440	0.69
Education level	2.286	1.460	3.27***	2.286	1.383	2.72**
Transport ownership	0.857	0.707	0.86	0.857	0.842	0.07
Farm size	7.143	2.346	6.26***	7.143	2.412	4.30***
Market distance	3.000	2.205	2.48***	3.000	2.235	2.20**
Risk attitude	2.143	1.730	1.15	2.143	1.516	1.18
Per unit price	5835.1	1136.2	17.12***	5835.1	3454.3	1.47
Trust	2.000	1.472	2.34**	2.000	1.693	1.01
Extension	0.286	0.395	-0.54	0.286	0.251	0.12
Market information	1.000	0.989	0.86	1.000	0.994	0.15
Off-farm	0.714	0.479	1.23	0.714	0.339	1.41
Group membership	0.143	0.508	-1.91*	0.143	0.293	-0.64

***, **, *: Significant at 1%, 5% and 10% level

Therefore estimated results of tests of matching quality based on the above mentioned performance criteria indicate that NN (4) matching is the best estimator for the data at hand (Appendix 2). As such these results were used to evaluate the effect of pineapple export

market participation on household income among households having similar observed characteristics.

A low pseudo-R^2 and the insignificant likelihood ratio tests support the hypothesis that both groups have the same distribution in covariates X after matching (Table 12). These results clearly show that the matching procedure is able to balance the characteristics in the treated and matched comparison groups. These results were used to evaluate the effect of the export market participation on household incomes for households having similar observed characteristics.

Table 13: Chi-square test for the joint significance of variables

Sample	Pseudo R^2	LR chi^2	p>chi^2
Unmatched	0.377	38.18	0.008
Matched	0.056	12.79	0.307

4.3.3 Impact of export market participation on household incomes

The impact of export market participation on pineapple farmers' household income was estimated using the gross margin income from pineapples and was found to be statistically significance at the 1% level. This indicates that choice of market outlet by a farmer could impact their household incomes but also standards of living. The empirical results show that on average export market participation had a significant and positive impact on household income of respondents.

To compute the ATT, four alternative matching methods (nearest neighbour matching, caliper matching, stratified and kernel matching) were used. Analysis was based on implementation of common support and caliper, so that the distributions of treated and non-treated units were located in the same domain. Export market participants had on average higher incomes UGX 23,089 than the non-participants (UGX 7,886) (Appendix 3). Treated households earned on average UGX 15,200 to UGX 9,110 more income than their counterparts that were non-participants (Table 13). The difference was statistically significant at the 1% level.

Table 14: Estimation of ATT on household income for export market outlet participation (Net pineapple income per acre in UGX '000)

Matching algorithm	Treated	Control	Difference	Standard Error[a]	t-statistic
Nearest neighbour Matching	73	199	15,200	780	19.520***
Kernel matching	73	199	15,200	864	17.627***
Radius matching	73	14	9,110	2,730	3.339***
Stratified matching	23	64	11,600	17,100	0.682

***: Significant at 1 % level

[a]Boot strapped standard error with 100 replications

This shows the impact choice of market outlet made to household's income. This could be attributed to the fact that the export market offered small-scale farmers higher and more stable output prices. This could thus enable farmers to develop input resource efficiency, produce output that can meet export standards and in turn increase the profitability of their pineapple farming enterprises. The increased household incomes could facilitate farmers meet transaction costs such as certification costs, transportation costs and packaging material purchase in order to ensure quality of the final product. These expenses mostly arise and increase with the choice of marketing in export outlet as opposed to marketing at the local or farm gate outlets.

4.3.4 The sensitivity of the evaluation results

Mhbounds was used to compute Mantel-Haenszel bounds to check sensitivity of estimated average treatment effects and critical hidden bias (Table 14). The different level of bounds tells us at which degree of unobserved positive or negative selection the effect would become significant. The Q_mh+ statistic adjusts the MH (Mantel-Haenszel) statistic upward for the case of positive (unobserved) selection while Q_mh- statistic adjusts the MH statistic downward for the case of negative (unobserved) selection.

Table 15: Mantel-Haenszel (1959) Bounds for pineapple income gross margin

Gamma	Q_mh +	Q_mh -	P_mh +	P_mh -
1	0.001	0.001	0.001	0.001
1.05	0.1	-0.060	0.1	0.524
1.1	-0.060	-0.060	0.524	0.524
1.15	0.1	-0.060	0.1	0.524
1.2	-0.060	-0.060	0.524	0.524
1.25	-0.060	-0.060	0.524	0.524
1.3	-0.060	0.1	0.524	0.1
1.35	-0.060	-0.060	0.524	0.524
1.4	-0.060	0.1	0.524	0.1
1.45	-0.060	-0.060	0.524	0.524
1.5	-0.060	0.1	0.524	0.1
1.55	0.1	-0.060	0.1	0.524
1.6	-0.060	-0.060	0.524	0.524
1.65	0.1	-0.060	0.1	0.524
1.7	-0.060	-0.060	0.524	0.524
1.75	-0.060	-0.060	0.524	0.524
1.8	-0.060	-0.060	0.524	0.524
1.85	-0.060	-0.060	0.524	0.524
1.9	0.1	-0.060	0.1	0.524
1.95	-0.060	-0.060	0.524	0.524
2	-0.060	-0.060	0.524	0.524

Gamma: odds of differential assignment due to unobserved factors; Q_mh+: Mantel-Haenszel statistic (assumption: overestimation of treatment effect); Q_mh-: Mantel-Haenszel statistic (assumption: underestimation of treatment effect); p_mh+: significance level (assumption: overestimation of treatment effect); p_mh-: significance level (assumption: underestimation of treatment effect).

From the results in Table 14, under the assumption of no hidden bias ($\Gamma = 1$), the Q_mh+ and Q_mh- test statistic gave a similar result, indicating a significant treatment effect. This was also the case for the different bound of odds of differential assignment due to unobserved factors. The negative values of Q_mh+ therefore indicated negative selection bias where the most likely pineapple export market participants tend to have lower income in the absence of participation. Therefore, this could be interpreted as downward bias in estimated treatment effects. This bias was however not significant at different bound levels both for likely underestimation of the treatment effects and overestimation of the treatment effects as indicated by P_mh + and P_mh- values. Table 14 also showed that the study was insensitive to a bias that will double or triple the odds of change in pineapple income gross margin as a result of the market outlet selected. As such it was concluded that the results were insensitive

to possible deviations emanating from the identified unconfoundedness assumption and therefore it held.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Pineapple farming has the potential to improve the income and standard of living for farmers in Luwero district due to favorable climate and soil in the area that support pineapple farming but also the potential of this sub-sector to bring quick returns to investments made. However market outlet choices farmers make are affected by socio-economic factors, risk attitudes and social capital but choice of market outlet also has effect on household income.

Results revealed that the farm gate outlet was the most predominantly used market and choice for 52% of respondents while local and export market had 21% and 27% of respondents. The outlets exhibited varying characteristics in terms of socio-economic, institutional and market factors. Risk attitude was found to negatively affect choice of the farm gate market but with a positive effect for choice of the local market, and similar effect was noted for social capital dimensions of frequency of meeting attendance and trust while for density of membership it was observed to negatively affect choosing the export market.

5.2 Conclusion

The principal objective of this study was to determine the role of risk attitudes and social capital on choice of pineapple market outlet by small-scale farmers and whether the choice of export market outlet had impact on household income of small-scale farmers in Luwero district. More specifically, the study was designed to identify the variables, which influence households' market outlet choices and note how risk attitudes and social capital dimensions affected these choices.

The study found the farm gate outlet as the predominant pineapple market choice among small scale pineapple farmers. Results indicate that most variables used in the model had significant effects on market outlet choice by small scale pineapple farmers. These include; gender, education level, transportation ownership, farm size, per unit price, market distance, risk attitudes, contact with extension and social capital dimensions of trust and density of membership significantly influenced the choice of market outlet.

Regression analysis revealed that as farmers move from being risk-averse to risk seekers, they tend to disregard farm gate market transactions and rely more on high value market transactions. This shows that as farmers risk attitudes tend towards risk seeking, they are more willing to accept higher transaction risks and uncertainties in high value markets as long

as this is associated with higher profit margins. Risk aversion is therefore, found to impede choice of lucrative and high produce priced markets, as risk-averse producers opt for cash sales marketing techniques to minimize transaction risks and costs. Conversely, empirical results show that social capital is an important aspect in influencing output market decisions made by small scale farmers. Through social capital, farmers are able to obtain reliable market demand, supply and pricing information and acquire marketing skills and knowledge through extension training.

Moreover, there was significant effect of export market participation on household income. This overall increase in income is accounted for by stable and high product prices and demand, though export market farmers incurred high costs in production, certification and marketing.

5.3 Policy Recommendations

Risk-averse farmers chose to sell pineapples at the farm gate while risk seekers opted for high value markets. Therefore, in order to encourage farmers to become more risk seeking, stakeholders should develop policies that enable farmers reduce agricultural risks and build up self insurance strategies. The study demonstrated participation in off-farm activities to increase high value market access. Consequently, in order to increase farmers' accessing high value markets, diversification into off-farm investments to build a capital asset base should be promoted. This will help farmers reduce agricultural risks by diversifying sources of household income and counterbalances variations in product supply, demand and prices in agricultural markets.

Various dimensions of social capital were demonstrated in the study to foster trust in seller-buyer transaction relationships, avail farmers with market information, knowledge and skills that advantaged accessing high value pineapple markets. Therefore, in order for farmers to build social capital, government should develop strategies that help farmers develop trust for their transaction partners such as establishing pineapple product price floor and ceiling and making this information known to farmers through extension providers and newspapers. Also through establishing reliable public market information dissemination systems through messages on mobile phones, newspapers, radio and extension officers, market information transparency between small scale farmers and pineapple buyers can be encouraged by stakeholders thus developing trust farmers have for trader which will encourage trading in high value markets.

Stakeholders can further encourage development of contractual agreement between farmers and traders. This could build good will between trade partners and improve transaction transparency, as it ensures both sellers and buyers are aware of existing market requirements, terms and conditions they are to comply with. This will reduce opportunistic behaviours due to information asymmetries but also increase level of trust in transactions partnerships.

5.4 Areas of Further Research

This study focused more on market outlet choice and the role of farmer risk attitudes and social capital in this choice. More still, the impact this choice had on household incomes was analyzed. Further research is therefore proposed on:

1. Effect of pineapple value addition on reducing post-harvest losses and market flexibility response by small-scale farmers in this study area.
2. Assessment of the pineapple value chain for improved market performance of small-scale farmers.

REFERENCES

Adebayo, O. and Olagunju, K. (2015).Impact of Agricultural innovation on improved livelihood andproductivity outcomes among smallholder farmers in Rural Nigeria. Maastricht School of management Working Paper No. 2015/07.

Adegbola, P. and Gardebroek, C. (2007). The Effect of Information Sources on Technology Adoption and Modification Decisions. *Journal of Agricultural Economics,* 37 (1): 55-65.

Adepoju, A.A. and Oni, O.A. (2012). Investigating Endogeneity Effects of Social Capital on Household Welfare in Nigeria: A Control Function Approach. *Quarterly Journal of International Agriculture,* 51 (1): 73-96.

Adoko, J. and Levine, S. (2005). A Land Market for Poverty Eradication? A case study of the impact of Uganda's Land Acts on policy hopes for development and poverty eradication, Land and Equity Movement in Uganda (LEMU).

Adugna, G. (2009). Analysis of Fruit and Vegetable Market Chains in Alamata, Southern zone of Tigray: The Case of Onion, Tomata and Papaya. Published Msc. Thesis Presented to the School of Graduate Studies of Alemaya University.

Agona, A. and Muyinza, H. (2008). An overview of horticulture in Uganda, Postharvest Programme NARO Uganda. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.535.4578&rep=rep1&type=pdf

Alene, A.D., Manyong,V.M., Omanya, G., Mignouma, H.D., Bokanga, M. and Odhiambo, G.(2008). Smallholder Market Participation under Transactions Costs: Maize Supply and Fertilizer Demand in Kenya. *Journal of Food Policy*, 33: 318–28.

Anderson, D., Sweeny, J., Williams, T., Freeman, J. and Shoesmith, E. (2007). *Statistics for Business and Economics*. London: Thomons Learning.

Antón, J. (2008). Agricultural Policies and Risk Management: A Holistic Approach. A paper prepared for presentation at the 108th EAAE Seminar 'Income stabilization in a changing agricultural world: policy and tools', Warsaw, Poland.

Barham, J.G (2007). "Linking Farmers To Markets: Assessing Planned Change Initiatives To Improve The Marketing Performance Of Smallholder Farmer Groups In Northern Tanzania." A Dissertation Presented To The Graduate School Of The University Of Florida.

Becker, S.O. and Ichino, A. (2002). Estimation of average treatment effects based on Propensity Scores. *The Stata Journal,* 2(4): 1-19.

Bryson, A., Dorsett, R. and Purdon, S. (2002). The use of propensity score matching in the evaluation of labor market policies. Working Paper No. 4. Department for Work and Pensions.

Caliendo, M. and Kopeining, S. (2005). Some Practical Guidance for the Implementation of Propensity Score Matching. Discussion paper series for schungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor IZA Discussion Paper No. 1588

Caliendo, M. and Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. IZA Discussion Paper No. 1588, University of Cologne.Cambridge: MIT Press.

Cattani, K., Dahan, E. and Schmidt, G. (2002). Spackling: Smoothing Make-to-order Production of Custom Products with Make-to-stock Production of Standard Items.Marketing Paper, 384.Anderson Graduate School of Marketing, University of California, Los Angeles.

Chalwe, S. (2011). "Factors Influencing Bean Producers' Choice of Marketing Channels inZambia." Unpublished Msc. Thesis Presented to the School of Graduate Studies of Zambia University.

Chikuvire, T.J., Moyo. M., Murewa, M., Mutenje.M.J. and Nkyakudya, I.W. (2006). HiddenOverburden of Female Headed Households in Guar Bean Production: Zimbabwean Experience. *Journal of International Women's Studies,* 8:1.

Coble, K.H., Heifner, R. and Zuniga, M. (2000). "Implications of Crop Yield and Revenue Insurance for Producer Hedging." *The Journal of Agricultural and Resource Economics* 25 (2): 432-452.

Conley, T.G. and Udry, C.R. (2010). Learning About a New Technololgy: Pineapple in Ghana. *American Economic Review*, 100 (1): 35-69

Cook, R. (2011). Fundamental Forces Affecting U.S. Fresh Produce Growers and Marketers Choices. *The Magazine of Food, Farm and Resource Issue*26.

Cunningham, L.T., Brown, B.W., Anderson, K.B. and Tostao, E. (2008). Gender Differences in Marketing Styles. *Journal of Agricultural Economics*, 38 (1): 1-7.

Dehejia, R.H. and Wahba, S. (2002). Propensity score matching methods for non-experimental causal studies. *The Review of Economics and Statistics,* 84(1):151-161.

Dufhues, T., Buchenrieder, G., Quoc, H.D. and Munkung, N. (2011). Social Capital and Loan Repayment Performance in Southeast Asia. *Journal of Socio-Economics*, 40(5): 679 – 691.

Durlauf, S. N. and Ioannid, Y.M. (2010). Social Interactions.*Annual Review of Economics*, 2(1): 451-478

Eaton, C. and Shepherd, A.W. (2001). Contract Farming: Partnerships for Growth. FAO,Agricultural Services Bulletin 145, Rome.

Eke-Göransson, C. and Rinman, M. (2012). "Attitudes towards Hedging by Diversified and Non-Diversified Farmers". An MSc. degree thesis presented to the Swedish University of Agricultural Sciences. Retrieved from http://stud.epsilon.slu.se

Elupe, G. and Nalukenge, I. (2007). Contract Farming, Smallholders and the Commercialization of Agriculture in Uganda: The Case of Sorghum, Sunflower, Rice and Poultry Contract Schemes, Uganda Programme for Trade Opportunities and Policy (UPTOP).

Estelle, B., Celia, C., Jean-François, L.C. and Laurent, L. (2004). Linking small holder farmers to markets. World Bank, Final report

FAOSTAT (Food and Agricultural Organization), (2016). Statistical Database. Retrieved from http://www.faostat.fao.org.

Food and Agriculture Organisation (FAO). 2015. Country fact sheet on food and agriculture policy trends (Vol. 25). Retrieved from www.fao.org/in-action/fapda

Fentie, D. and Rao, M.S (2016). Factors Influencing Farmers' Participation On Off Farm Activities: A Case Study in East Gojjam Zone, Ethiopia. *International Journal of Life Sciences*, 5(2): 112-119.

Flaten, O., Lien, G., Koesling, M., Valle, P.S. and Ebbesvik, M. (2005). Comparing risk attitudes and risk management in organic and conventional dairy farming: empirical results from Norway. *Elsevier Livestock Production Science*, 95: 11-25.

Frankena, J.R.V, Pennings, J.M.E and Garcia, P. (2014). Measuring the effect of risk attitude on marketing behavior. *Agricultural Economics Journal*, 45: 1–11.

Gani, B.S. and Adeoti, A.I. (2011). Analysis of Market Participation and Rural Poverty among Farmers in Northern Part of Taraba State, Nigeria. *J Economics*, 2(1): 23-36.

Greene, W.H., (2000). *Econometric Analysis* (4th edition). Prentice Hall, New Jersey.

Gregoire, M.B., Arendt, S.W. and Strohbehn, C.H. (2005). Iowa Producers Perceived Benefits and Obstacles in Marketing to Local Restaurants and Institutional Foodservice Operations.*Journal of Extension,* 43(2005).

Gujarati, D.N., (2005). *Basic econometrics*, (4th edition). New Delhi, India: Tata McGraw-Hill.

Gujarati, D.N. and Sangeetha, N. (2007). *Basics Econometrics* (4th edition). Tata Mac Graw-Hill publishing company limited, New Delhi

Guptill, A. and Wilkins, J. L. (2002). Buying into the Food System: Trends in Food Retailing in the U.S. and Implications for Local Foods.*Agriculture and Human Values*, 19:39-51.

Hanley, N., Mourato, S. and Wright, R. (2001). Choice Modeling Approaches, a Superior Alternative for Environmental Modeling. *Journal of Economic Surveys*, 15(3): 18-30.

Hardaker, J.B., Huirne, R.B.M, Anderson, J.R. and Lien, G. (2004). Coping with Risk in Agriculture. Second Edition. Cambridge, Massachusetts, CABI Publishing.

Hausman, J. and Mc-Fadden, D. (1984). Specification tests for Multinomial Logit Model. *Econometrica*, 52: 1219-1240.

Heckman, J., Ichimura, H. and Todd, P. (1998). Matching as an econometric evaluation estimator. *Review of Economic Studies*, 65: 261-294.

IFAD (International Fund for Agricultural Development), (2003). Promoting Market Access for the Rural Poor in Order to Achieve the Millennium Development Goals. Discussion Paper for the Twenty-Fifth Anniversary Session of IFAD's Governing Council. Rome, Italy.

Imbens, G.W. and Angrist, J. (1994). Identification and Estimation of Local Average Treatment Effects. *Econometrica*, 62:467–76.

Jagwe, J.N. (2011). "The Impact of Transaction Costs on the Participation of Smallholder Farmers and Intermediaries in the Banana Markets of Burundi, Democratic Republic of Congo and Rwanda." Dissertation Submitted to the Department of Agricultural Economics, Extension and Rural Development Faculty of Natural and Agricultural Sciences. University of Pretoria, South Africa.

Jaleta, M., Gebremedhin, B. and Hoekstra, D. (2009). Smallholder Commercialization: Processes, Determinants and Impact. Discussion Paper No. 18: Improving Productivity and Market Success of Ethiopian Farmers, Improving Market Opportunities, International Livestock Research Institute, Nairobi.

Jari, B. (2009). "Institutional and Technical Factors Influencing Agricultural Marketing Channel Choices amongst Smallholder and Emerging Farmers in the Kat River Valley." Master of Science in Agriculture (Agricultural Economics) Faculty of Science and Agriculture University of Fort Hare

Jari, B. and Fraser, C.G. (2009). An Analysis of Institutional and Technical Factors Influencing Agricultural Marketing amongst Smallholder Farmers in the Kat River Valley, Eastern Cape, South Africa. *African Journal of Agricultural Research*, 4 (11):1129-1137.

Jing, X.J., Alhabeeb, M.J., Hong, G.S. and Haynes, G.W. (2001). Preference toward risk and risk taking behavior of business-owning families. *The Journal of Consumer Affairs*, 35: 307-325.

Kabeto, A.J. (2014). "An analysis of factors influencing participation of smallholder farmers in red bean marketing in Halaba special district, Ethiopia." Unpublished PhD dissertation, University of Nairobi

Kahan, D. (2008). Managing risk in farming. Food and Agriculture Organization of the United Nations, Rome. Retrieved from http://www.fao.org/uploads/media/3-ManagingRiskInternLores.pdf

Kahneman, D. and Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47: 263–291.

Kangogo, D., Lagat, J. and Ithinji, G. (2013). "The Influence of Social Capital Dimensions on Household Participation in Micro-Credit Groups and Loan Repayment Performance in Uasin Gishu County, Kenya." A Thesis Submitted to the Graduate School in Partial fulfilment for the Requirements of the Master of Science Degree in Agricultural and Applied Economics of Egerton University. MPRA Paper No. 48624

Knack, S. (2002). Social capital, growth and poverty: a survey of cross-country evidence, World Bank. MPRA Paper No. 24893

Kersting, S. and Wollni, M. (2012). New institutional arrangements and standard adoption: Evidence from small-scale fruit and vegetable farmers in Thailand. *Food Policy*, 37(4): 452–462.

Kirenda, N. (2009). Higher local government statistical abstract, Luwero District.

Korir, L.K., Lagat, J. K. And Njehia, B. K. (2011). "Risk Management among Agricultural households and the role of off-farm investments in Uasin Gishu County, Kenya." Unpublished Thesis Submitted to the Graduate School in Partial fulfilment for the

Requirements of the Master of Science Degree in Agricultural and Applied Economics of Egerton University.

Kydd, J. and Dorward, A. (2001). The Washington Consensus, Poor Country Agriculture: Analysis, Prescription and institutional Gaps. *Development Policy Review*, 19(4): 467-478.

Li, Z. (2014). "Perception of Risk and Risk Management in Fruit and Vegetable Marketing in Tennessee: The Case of Product Liability Risk." A master's degree thesis submitted to the graduate school of the University of Tennessee.

Liu, J., Fritz, S., Van, W.C., Fuchs, M., You, L. and Obersteiner, M. (2008). A spatially explicit assessment of current and future hotspots of hunger in Sub-Saharan Africa in the context of global change. Glob Planetary Change, 64(3): 222-235.

Liu, E. (2013). Time to Change What to Sow: Risk Attitudes and Technology Adoption Decisions of Cotton Farmers in China. *The Review of Economics and Statistics*, 95(4): 1386–1403

Lu, H., Trienekens, J.H., Omta, S.W.F. and Feng, S. (2008). Influence of guanxi, trust and farmer-specific factors on participation in emerging vegetable markets in China. *Wageningen Journal of Life Sciences*,56(1–2): 21-38

Lundy, M., Ostertag, C. and Best, R. (2002). Value adding, agro-enterprise and poverty reduction: A territorial approach for rural business development. Rural agro-enterprise development project paper. Cali, Colombia: International Center for Tropical Agriculture.

Lumby, S. and Jones, C. (2003). *Corporate Finance – theory and practice 7th edition,* London: Cengage Learning EMEA. (ISBN 1-86152-926-0)

Mailu S.K., Wachira M.A., Munyasi J.W., Nzioka M., Kibiru S.K., Mwangi D.M., Kaguthi P. And Kithome J. (2012). Influence of Prices on Market Participation Decisions of Indigenous Poultry Farmers In Four Districts of Eastern Province, Kenya. *Journal of Agriculture and Social Research (JASR),*12:1.

Maina C.M., Lagat J.K. and Mutai B.K. (2015). Effect of transaction costs on choice of mango marketing channel: the case of small scale farmers in Makueni County, Kenya.*IOSR Journal of Agriculture and Veterinary Science*(ISSN: 2319-2380), 8(4): 54-62.

Makhura, M. T. (2001). "Overcoming Transaction Costs Barriers to Market Participation of Smallholder Farmers in the Northern Province of South Africa." A PhD Dissertation

Submitted to the Department of Agricultural Economics, Extension and Rural Development Faculty of Natural and Agricultural Sciences of University of Pretoria, Pretoria: 182.

Makhura, M., Kirsten, J. and Delgado, C. (2001). Transaction Costs and Smallholder Participation in the Maize Market in the Northern Province of South Africa. Seventh Eastern and Southern Africa Regional Maize Conference, 11-15 February, Pretoria, South Africa

Malunda, D. (2011). "Commodity Markets, Risk and Poverty: A Case of Uganda". A dissertation submitted to the doctoral school of economics and management, University of Trento Cifrem.

Marenya, P. P. and Barrett, C. B. (2006). Household-level determinants of adoption of improved natural resources management practices among smallholder farmers in western Kenya. Food Policy, 32(1): 515-536.

Martey, E., Annin, K., Nimo, A.W. and Attoh, C. (2012). Does Access to Market Information Determine the Choice of Marketing Channel among Smallholder Yam Farmers in the Brong Ahafo Region of Ghana? A Multinomial Logit Regression Analysis. *Journal of Economics and Sustainable Development*, Vol. 3, No. 12

McCulloch, N. and Ota, M. (2002). Export Horticulture and Poverty in Kenya. Institute of Development Studies, University of Sussex, Brighton. Working Paper No. 174.

Melesse, T.M. (2015). Agricultural Technology Adoption and Market Participation under Learning Externality: Impact Evaluation on Small-scale Agriculture from Rural Ethiopia. Maastricht School of Management Working Paper No. 2015/06.

Melyukhina, O. (2011). Risk Management in Agriculture in the Netherlands. OECD Food, Agriculture and Fisheries Papers No. 41, OECD Publishing.

Meuwissen, M.P.M., Huirne, R.B.M and Hardaker, J.B. (2000). Risk and risk management: an empirical analysis of Dutch livestock farmers. *Elsevier Livestock production Science*, 69: 43-53.

Miller, A., Dobbins, C., Pritchett, J., Boehlje, M. and Ehmke, C. (2004). Risk Management for Farmers. Staff Paper 04-11.Department of Agricultural Economics, West Lafayette, Indiana 47907-1145.

Minot, N. (1999). Effect of Transaction Cost on Supply Response and Market Surplus: Simulation using Non-Separable Household Models. MSSD Discussion Paper No. 36. Washington, DC: International food Policy Research Institute.

Mishra, A.K. and El-Osta, H.S. (2002). Managing Risk in Agriculture through Hedging and Crop Insurance: What Does a National Survey Reveal? *Agricultural Finance Review,* 62:135–148.

Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). 2010. Agriculture for food and income security. Agriculture sector development strategy and investment plan: 2010/11-2014/15.

Ministry of Finance, Planning and Economic Development (MoFPED). 2010. Strategic priorities to accelerate growth, employment and socio-economic transformation for prosperity. Background to Uganda budget for 2010-2011, Kampala, Uganda.

Ministry of Finance, Planning and Economic Development (MoFPED). 2015. Annual budget performance report Fy 2014/15. Kampala, Uganda. Retrieved from www.finance.go.ug

Ministry of Finance, Planning and Economic Development (MoFPED). 2016a. Background to the budget Fiscal Year 2016/17 (Enhanced Productivity for Job Creation). Kampala, Uganda. Retrieved from www.finance.go.ug

Ministry of Finance, Planning and Economic Development (MoFPED). 2016b. Budget at a glance for Fy 2015 / 16. Kampala, Uganda Retrieved from www.finance.go.ug

Montshwe, B.D., Jooste, A. and Alemu, Z.G. (2006). "Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa." A thesis submitted in partial fulfilment of the requirements for the degree of MSc (Agric) in the Department of Agricultural Economics Faculty of Natural and Agricultural Sciences University of Free State Bloemfontein

Moschini, G. and Hennessy, D. (2001). *Uncertainty, risk aversion, and risk management for agricultural producers.* Handbook of Agricultural Economics, 1(2): 88-153 *Elsevier*.

Msabeni A., Masinde G., Matoke S. and Gathaara V. (2010). Sweetening the Mango, Strengthening the Value Chain, an Analysis of the Organizational Linkages along and Within the Mango Value Chain in Mbeere District, Eastern Province, Kenya. International Centre for development oriented Research in Agriculture (ICRA) Working Document 136.

Muthini, D.N. (2015). "An Assessment of Mango Farmers' Choice of Marketing Channels in Makueni, Kenya." A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Agricultural and Applied Economics of the University of Nairobi

National Planning Authority, (2010). Growth, employment and socio-economic transformation for prosperity. National Development Plan (2010/11-2014/15) for the Republic of Uganda, Kampala, Uganda.

Neven, D., Odera, M. M., Reardon, T. and Wang, H. (2009). Kenyan Supermarkets, Emerging Middle-class Horticultural Farmers, and Employment Impacts on the Rural Poor. World Development, 37(11): 1802–1811.

Nkhori, P.A. (2004). "The Impact of Transaction Costs on the Choice of Cattle Market in Mahalapye District, Botswana." Unpublished MSc. thesis, University of Pretoria.

Okunmadewa, Y., Yusuf, A. and Omonona, T. (2007). Effects of Social Capital on Rural Poverty in Nigeria. *Pakistan Journal of Social Science,* 4: 331–339.

Omiti, J., Otieno, D., Nyanamba, T. and McCullough, E. (2009). Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya. *African Journal of Agricultural and Resource Economics, 3*(1): 57-82.

Omoto, R. (2003). The context of gendered knowledge: a comprehensive minimum dataset on women in coastal communities. SPC Traditional Marine Resource Management and Knowledge Information Bulletin No.16

Osborn, D., Cutter, A. and Ullah, F. (2015). Universal Sustainable Development Goals. Understanding the Transformational Challenge for Developed Countries. Report of a study by stakeholder forum.

Panda, R. and Sreekumar. (2012). Marketing Channel Choice and Marketing Efficiency Assessment in Agribusiness. *Journal of International Food and Agribusiness Marketing*, 24(3): 213-230.

Pennings, J.M.E. and Garcia, P. (2001). Measuring Producers Risk Attitudes: A Global Risk-Preference Construct. *American Journal of Agricultural Economics,* 83(2001): 993-1009.

Pennings, J.M.E. and Leuthold, R.M. (2000). The Role of Farmers' Behavioral Attitudes and Heterogeneity in Futures Contracts Usage. *American Journal of Agricultural Economics,* 82 (4): 908-919.

Pindyck, R., Rubinfeld, D. (2005). *Microeconomics* 6th edition. (ISBN 0131912070).

Poulton, C., Kydd, J. and Doward, A. (2006). Overcoming Market Constraints on Pro-Poor Agricultural Growth in Sub-Saharan Africa. Development Policy Review, 24 (3): 243-277

Rahelizatovo, N.C. (2002). "Adoption of Best Management Practices in the Louisiana Dairy Industry." A PhD Thesis submitted to the Louisiana State University, USA.

Reardon, T. and Gulati, A. (2008). The Supermarket Revolution in Developing Countries. IFPRI Policy Brief, Michigan State University.

Rosenbaum, P. R and Rubin, D. B. (1983). Central role of the propensity score in observational studies for causal effects. *Biometrica,* 70 (1): 41-55.

Sall, S., Norman, D. and Featherstone, A.M. (2000). Quantitative assessment of improved rice variety adoption: The farmer's perspective. Agric Syst, 66 (2): 129–144

Shapira, Z., (1997). Organizational Decision Making. Cambridge University Press, New York.

Shipman, D. (2009). Setting the Stage: Local Foods Issues and Policies, presentation at Local Food Systems: Emerging Research and Policy Issues. Paper presented at USDA Conference on Local Foods, Economic Research Service, Washington, DC.

Sigei, G., Bett, H and Kibet, L. (2014). "Determinants of Market Participation among Small-scale Pineapple Farmers in Kericho County, Kenya." A Thesis Submitted to the Graduate School in Partial fulfilment for the Requirements of the Master of Science Degree in Agricultural and Applied Economics of Egerton University. MPRA Paper No. 56149.

Siziba, S., Nyikahadzoi, K., Diagne, A., Fatunbi, A.O. and Adekunle, A.A. (2011). Determinants of cereal market participation by sub-Saharan Africa smallholder farmer. *Learning Publics Journal of Agriculture and Environmental Studies* (ISSN-L: 2026-5654), 2(1): 180-193

Sonko, S., Njue E., James M. and A. Jager, (2005). Pro-Poor Horticulture in East Africa and South East Asia, the Horticultural Sector in Uganda, EAST AFRICA.

Ssemwanga Consulting, (2007). Study for fruits sub-sector (Pineapples, Passion Fruits and Mangoes). Final report fruits sub-sector study – FIT Uganda Ltd

Takele, A. (2010). "Analysis of Rice Profitability and Marketing Chain: The Case of Fogera Woreda, South Gondar Zone, Amhara National Regional State, Ethiopia". An MSc. Thesis Submitted To The College Of Agriculture Department Of Agricultural Economics, School Of Graduate Studies Haramaya University (Agricultural Economics).

Tura, E.G., Goshu, D., Demisie, T. and Kenea, T. (2016).Determinants of market participation and intensity of marketed surplus of teff producers in Bacho and Dawo

districts of Oromia State, Ethiopia. *Journal of Agricultural Economics and Development* (ISSN 2327-3151), 5(2): 020-032.

Udo, B., Peter, W. and Kit Pong, W. (2013). Price Risk and Risk Management in Agriculture. Contemporary Economics Article (ISSN 2084-0845), 7(2): 17-20.

Uganda Bureau of Statistics (2004). National Household Surveys. Available at: www.ubos.org/survey.

Uganda Bureau of Statistics (UBOS). 2015. Statistical Abstract. Kampala, Uganda

Uganda Bureau of Statistics (UBOS). 2016. Key economic indicators FY 2015/16. Kampala Uganda

Ugwamba C.O.A. and Chukwuji C.O. (2010). The economics of catfish production in Anambra State, Nigeria: A profit function approach. *J.Agric.Soc.Sci.*,6:105-109

Wambugu, S. N, Okello, J. J., Nyikal, R. and Shiferaw, B. (2009). Effect of Social Capital on Performance of Smallholder Producer Organizations: The Case of Groundnut Growers in Western Kenya. Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China.

Wissink, S. (2013). "Risk attitude of Livestock Farmers. Explaining farmer's willingness to take risk." A Master's thesis presented to the University of Twente.

World Bank (2007). *World Development Report 2008: Agriculture for Development*. Washington, DC: World Bank.

Wooldridge, J.M. (2002). Econometric Analysis of Cross Section and Panel Data.

Yu, X., Hailu, G. and Cao, J. (2014). Risk Attitudes, Social Interactions and the Adoption of Genotyping in Dairy Production. Paper Presented at Agricultural and Applied Economics Association's.

Yusuf, A. (2008). Social Capital and Household Welfare in Kwara State, Nigeria. *Journal of Human Ecology*, 23(3): 219-229.

APPEDICES

Appendix 1: MNL parameter estimates for determinants of choice of market outlet (Farm gate used as base outcome)

	Local market		Export market	
Variable	**Coef**	**Std. Error**	**Coef**	**Std. Error**
Gender	0.771	0.564	2.256	0.651
Age	0.107	0.014	0.018	0.037
Household size	0.024	0.044	0.002	0.130
Education Level	0.096	0.208	2.390***	0.742
Ownership of transport	1.027	0.349	1.176	1.091
Farm size	0.226***	0.068	0.642***	0.136
Market distance	0.400**	0.174	0.864***	0.316
Off-farm	0.882***	0.283	1.244*	5.850
Per unit price	0.005***	0.001	0.007***	0.001
Risk attitude	0.599***	0.146	0.622*	0.402
Extension	0.632***	0.227	-0.313	0.836
Contracts	0.807**	0.371	2.668***	0.740
Trust	-2.378	0.397	1.619***	0.595
Density of membership	-0.422	0.511	-1.886*	1.090

***, **, *: Significant at the 1%, 5% and 10% level of significance

Appendix 2: Performance of matching estimators before and after matching

	Pseudo R^2	Matched sample size	Balancing test[1]
Before matching	0.351	270	8
After matching			
Matching estimator			
NN			
NN (1)	0.416	247	12
NN (2)	0.397	247	5
NN (3)	0.318	247	8
NN (4)	0.262	247	11
Kernel			
No width	0.408	247	5
0.01	0.455	247	5
0.1	0.393	247	6
0.25	0.421	247	11
Caliper			
0.1	0.338	247	8
0.25	0.321	247	8
0.50	0.321	247	8

[1]Number of explanatory variables with no statistically significant mean differences between the matched groups of participant and non-participant households

Appendix 3: Average Impact Estimates of Propensity Score Matching of export market participation on household pineapple incomes per acre (in UGX '000)

	Nearest neighbor matching	Kernel matching	Caliper matching
ATT	15,200***	15,200***	9,110***
Standard error	11,674	11,346	11,679
Treated	23,086	23,329	16,996
Control	7,886	8,129	7,886

***: Significant at 1 % level

Appendix 4: Questionnaire

Questionnaire

This study will investigate the role of risk attitudes and social networks in pineapple marketing among small-scale farmers in Luwero district, Uganda. The information provided will assist in articulating objectives, policies and programs that will improve pineapple marketing in the district. The information provided will be treated with strict confidentiality.

Questionnaire Identification

Date (day/month/year) ____/___/2016

Questionnaire number_____

Sub-county_____

Village_____

Name of enumerator_____

Name of farmer_____

Section 1: Demographic Details

1.1. Gender/sex: ***Codes:*** *0= Female, 1= Male*

1.2. What is your relation to household head? ***Codes:*** *1= Head, 2= Wife, 3= Sibling, 4= Others*

1.3. What is the age of the household head? ___ Years

1.4. How many people are living and eating together (household size)?

1.5. What is the household head's highest level of education? ***Codes:*** *0= No formal education 1= Primary, 2= Secondary, 3= Tertiary*

1.6. Do you own transport equipment? ***Codes:*** *1= Yes, 0= No*

Section 2: Group Membership and Marketing

2.1. Are you are member of any group(s)? ***Codes:*** *0= No, 1=Yes*

2.2. If Yes, how many groups are you a member of?

2.3. How often do you attend group meetings? ***Codes:*** *1= Always, 2= Sometimes or 3= Never*

2.4. How many years have you been marketing pineapples?

2.5. Do you have contractual agreements (ready market) with any agribusiness outlet e.g. schools, supermarkets, company? ***Codes:*** *0= No, 1= Yes*

2.6. Which is your main pineapple market outlet? ***Codes:*** *1= Farm gate, 2= Local market, 3= Export market*

2.9. How many pineapples on average do you sell in your main market outlet in a season?

2.10. At what price do you sell your pineapples in your main market outlet (per pineapple head)?

2.11. How far is the nearest pineapple market from your farm? ____ (Time in walking minutes from farm to market)

Section 3: Risk Attitudes

3.1. If you are offered a choice between playing a lottery or receive a certain amount of money. Each time the lottery is the same, but the amount of money is different. If you prefer the money, you will get paid UGX 500,000. If you prefer the lottery, you will play the lottery with a 50% probability that you will win UGX 700,000 and a 50 % probability you will receive nothing. Which will you prefer? ***Codes:*** *1= prefer the money, 2= prefer neither money nor lottery, 3= prefer the lottery*

Section 4: Crop production and Sale

4.1. **Pineapple production**

Tenure of field	**Quantity of seed used and cost per season**		**Cost for fertilizer**		**Cost for wedding**		**Cost of harvesting in a season**		**Quantity sold**	
	Qty	Ucost	Qty	Ucost	Qty	Ucost	Qty	Ucost	Qty	Ucost

4.2. **Farm inputs.** Please indicate details on all inputs used within a season.

Input type (see code a. below)	**Quantity used (see code b. below)**	**Cost per unit**	**Total Cost**
Seed			
Fertilizer			
Herbicide			
Transport			
Airtime			
Land rent			

4.3. **Farm Labor.** Please tell us about the labor allocated to the different pineapple farming activities in your farm for a season.

Activity	**Type of labor (1= Family, 2= Casual, 3= Permanent, 4= Gang labor)**	**Number of laborers**	**Number of days**	**Average pay per day**
Land preparation				
Planting				
Weeding				
Pruning				
Harvesting				

4.4. In case you have a salaried worker, how much do you pay them per month?

4.5. Do you participate in any off-farm activities? ***Codes:*** *0= No, 1= Yes*

Section 5: Social Capital

5.1. Do you discuss pineapple marketing in your farmer group? ***Codes:*** *0= No, 1= Yes*

5.2. How often in a month do you meet with fellow farmers to discuss pineapple farming practices and marketing? ***Codes:*** *1= Weekly, 2= Every two weeks, 3= Once a month*

5.3. To what level do you trust pineapple marketing companies and middle men? ***Codes:*** *1= Low, 2= Fair, 3= High*

Section 6: Extension Service

6.1. Do you have contact with extension officers? ***Codes:*** *0= No, 1= Yes*

6.2. If Yes, how many times do you receive extension services in a month?

Section 7: Market Infrastructure

7.1. What type of road do you use to access the market? ***Codes:*** *1= Tarmac, 2= Marram, 3= Both*

7.2. In your opinion, how would do you rate this road? ***Codes:*** *1= Good, 2= Fair, 3= Bad*

Section 8: Market Information

8.1. Do you have access to market information? ***Codes:*** *0= No, 1= Yes*

8.2. What are your sources of market information? ***Codes:*** *1= Traders, 2= Extension officers and Producer organizations, 3= Friends and family, 4= Co-farmers and 5= Media*

THANK YOU VERY MUCH FOR YOUR TIME AND CO-OPERATION