Determinants of Market Participation among Small-scale Pineapple Farmers in Kericho County, Kenya

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DETERMINANTS OF MARKET PARTICIPATION AMONG SMALL-SCALE PINEAPPLE FARMERS IN KERICHO COUNTY, KENYA

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To my loving mother, Mary Ketutury, brothers and sisters, Benard, Jeremia, Rose, Gladys and Beatrice, who have always, give me moral support to study.

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ABSTRACT

Marketing agricultural produce is important amongst smallholder farmers because they derive benefits such as income and rural employment. In developing countries like Kenya, most smallholder farmers are characterized by poor market participation because they lack market information on pineapple marketing. In Bureti district; pineapples have been perceived to have high market value, resulting in trade-offs with staple food. Despite pineapples market value, its market participation has not been fully studied and quantified results in poor prices among small-scale farmers. The objectives of the study were: to describe socio-economic characteristics of small-scale pineapple farmers, institutional and market characteristics in Bureti district; to determine the factors influencing market participation and its extent, and; to determine the factors influencing the choice of pineapple marketing outlet in Bureti district. The study was conducted in five locations (Kapkisiara, Kisiara, Tulwet, Getarwet and Tebesonik). Multistage sampling procedure was employed to contact 150 respondents. Semi-structured questionnaires were used to collect data from small-scale pineapple farmers through face to face interview. The data was analyzed using the descriptive statistics, Heckman two-stage selection model and Multinomial Logit model. SPSS and STATA computer programs were used to process the data. The results showed that age, gender, education level and pineapple yields significantly influenced the decision to participate in pineapple marketing. Gender, price information, group marketing, marketing experience, vehicle ownership and marketing under contract significantly influenced the extent of market participation. Further, gender, group marketing, pineapple yield, price information, marketing under contract and vehicle ownership significantly influenced the choice of pineapple marketing outlets. The study recommends that, for holistic market participation among pineapple farmers, proper market infrastructure like pineapple hub must be put in place. The government and other policy makers should increase the marketing information and ability of pineapple farmers through avenues like mass media, extension service, and other means of capacity building.

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LIST OF ACRONYMS AND ABBREVIATIONS

CBS	Central Bureau of Statistics
FAO	Food and Agriculture Organisation
Freq	Frequency
GDP	Gross Domestic Product
GoK	Government of Kenya
HCDA	Horticulture Crop Development Authority
ILRI	International Livestock Research Institute
IMR	Inverse Mills Ratio
Kgs	Kilograms
Kshs	Kenya shillings
Kms	Kilometres
MoA	Ministry of Agriculture
MNL	Multinomial Logit model
OLS	Ordinary Least Square
SPSS	Statistical Package for Social Science
SSA	Sub-Saharan Africa

CHAPTER ONE

INTRODUCTION

1.1 Background information

Agriculture is the most important sector in the economy of Kenya. It represents 24% of the Country's GDP, 65% of the Country's export and 18% of the total formal employment (GoK, 2007). It is for this reason that the Kenyan government has identified agriculture as one of the key sectors that is expected to provide the growth necessary for the achievement of the Kenya Vision 2030.

Agriculture sector in Kenya is characterized by the existence of both large scale and smallholder farmers. There are currently more than 5 million smallholder farmers who account for about 75% of the total agricultural production in the country (GoK, 2007). Smallholder agricultural production is largely characterized by growing of staple food like maize and beans, which are primarily targeted for own consumption with little marketable surplus. In Kenya, land holdings have become smaller due to population pressure, hence farmers have transformed from staple crop production to highly market-oriented crops. This agricultural transformation has been a vital development tool for achieving the Millennium Development Goal that calls for reducing of the share of people suffering from extreme poverty and hunger by 50% (Cervantes-Godoy and Dewbre, 2010).

Horticultural crops are gaining popularity among smallholders' farmers in Kenya. Pineapples are among such horticultural crops adopted and several farmers are practicing crop trade-off. Anderson (2003) argued that horticultural crops have high market value and yields more and regularly and hence suit the needs of smallholder farmers who face resource constraint and have no marketable surplus. Horticulture is an important source of income for the smallholders, which accounts for over 70% of their total production (McCulloch and Ota, 2002). According to Minot and Ngigi (2003), horticultural crop like pineapple was perceived to have higher returns than most of the cash crop like tea and is suitable for production on the currently declining farm sizes in varying agro-ecological zones.

Kenya is among the world's leading producer of pineapples. According to FAO (2012), Kenya was ranked 15th in the world with the total production of 371,310 metric tonnes. Del Monte's large-scale farm in Thika contributes a significant amount of pineapple in Kenya, also small-scale growers are increasing their production for the local market. In Bureti district, pineapples are produced by small-scale farmers for both home consumption and commercial purpose. In 2010, pineapple farmers in the region produced 56,000 tonnes of

the crop, earning them more than US$7.2 million with the bulk of the crop sold locally (MoA, 2011). Table 1 shows pineapple production in Bureti district.

Table 1: Pineapple production in Bureti district

Division	Location	Area under pineapple plantation (Hectares)	Farm families with pineapple
Roret	Kapkisiara	651	1984
	Kisiara	558	1770
	Tulwet	465	1030
	Getarwet	177	120
	Kabartegan	7	31
	Chemosot	2	6
Cheborgei	Tebesonik	21	92
	Cheborgei	4	38
	Kipbugat	3	26
	Cheboin	2	17
	Total	1890	5014

Source: MoA (2012)

Markets act as a pivotal point in the agricultural transformation process. Recognition of the potential of markets to unlock economic growth and agricultural development gave rise to market-led rural development paradigm during the 1980s (Readon and Timmer, 2007). In Sub-Saharan African countries like Kenya, the government previously used to play a role in assisting farmers with marketing of agricultural produce. However, the problem of poor market participation, which manifests as little marketable surplus has been previously seen as largely caused by poor pricing policies, this led to market and price liberalization in the 1980s. In the 1980s and 1990s, there were major reforms in these countries on market liberalization in an effort to create open market-led exchange, aimed at boosting economic growth (Dorward *et al.*, 2005).

Major reforms like improving market infrastructure by providing more and better markets and making it easier for farmers to access them is deemed necessary for increasing the level of commercialization, especially in the developing countries (Shilpi and Umali-Deininger, 2008). The majority of the smallholders' farmers are located in remote areas with poor transport and poor market infrastructures, contributing to the high transaction costs

faced. Transaction costs have been secluded to be the key reasons for smallholder farmers' failure to participate in the markets (Makhura *et al.*, 2001). These transaction costs include costs of searching for a trading partners, of bargaining, monitoring, enforcement and eventually, transferring the product to its destination (Delgado, 1999).The study has investigated the determinants of pineapples' market participation, linked to transaction costs, which were used as critical measures in determining why some farmers opted not to participate in markets, while others opted to participate as a seller. The findings have aided in identification and generation of appropriate intervention measures that have enabled the rural population to benefit from pineapple markets.

1.2 Statement of problem

The majority of small-scale farmers in Kenya have ventured into horticultural crops due to the high market value associated with the crops (Anderson, 2003). In Bureti district, horticultural crop (pineapple) is largely grown by small-scale farmers. Despite high pineapple market value, the farmers in the study area are faced with the marketing problem evidenced by low farm-gate prices. These poor prices among small-scale pineapple farmers have led to low household income. This study, therefore, filled that knowledge gap by clarifying underpinning drivers of market participation among small-scale pineapple farmers in Bureti district.

1.3 Objectives

1.3.1 General objective

The general objective of this study was to provide an insight on determinants of market participation among the small-scale pineapple farmers in Bureti district, Kenya.

1.3.2 Specific objectives

1. To describe the socio-economic characteristics of small-scale pineapple farmers, institutional and market characteristics in Bureti district.
2. To determine the factors influencing participation and extent of participation in marketing of pineapple in Bureti district.
3. To determine the factors influencing the choice of pineapple marketing outlet in Bureti district.

1.4 Research questions

1. What are the socio-economic characteristics of small-scale pineapple farmers, institutional and market characteristics in Bureti district?

2. What are the factors influencing participation and extent of participation in marketing of pineapple in Bureti district?

3. What are the factors influencing the choice of pineapple marketing outlet in Bureti district?

1.5 Justification

The smallholder farmers who have engaged in subsistence and semi-subsistence agriculture have a lower marketable surplus (low return) causing them to be in a low equilibrium poverty trap (Barret, 2009). A leap that smallholder farmers need to make to reduce poverty and hunger is to transform from the low marketability semi-subsistence farming to high level market-oriented farming. Ngqangweni (2000) argued that marketing agricultural produce is important amongst smallholder's farmers because human derive benefits such as income and rural employment through it. Markets have been recognized for their potential to unlock economic growth and development. According to Barret (2008), market access has been identified as one of the critical factors influencing the performance of smallholders' agriculture in developing countries, and in particular, least developed countries. Enhancing returns from agricultural production through improved access to market can therefore be a vital element of poverty alleviation strategies and livelihood improvement. It has been argued that market-oriented production can achieve the welfare gain through specialization and comparative advantage, economies of scale and regular interaction and exchange of ideas. Unfortunately, most small-scale farmers who need this kind of welfare boast have been constrained by several factors in their quest to participate in the market for their goods and services. Most pineapple farmers in Bureti district are small-scale this has resulted from land fragmentation due to population pressure. Altshul *et al*. (1998) stated that analyzing factors influencing market participation plays a critical role in meeting the overall goals for food security, poverty alleviation, and sustainable agriculture, particularly among smallholder farmers in developing countries. This study, therefore, offered a better insight to enrich the stock of knowledge limited in literatures regarding small-scale farmer's participation in pineapples marketing and can also serve as an input for policy makers and researchers who wish to work in this area.

1.6 Scope and limitation of the study

The study was confined to Bureti district in Kericho County, focusing only on small-scale pineapple farmers. Information on socio-economic, institutional and marketing factors was collected by using a structured questionnaire. Due to lack of farm records among farmers, this study mainly relied on the farmer's memory in the collection of the data

1.7 Definitions of terms

Market participation - refers to any market related activity which promotes the sale of produce (Key *et al*., 2000).

Socioeconomic factors- factors that influence both the social and economic wellbeing of an individual.

Institutional factors– are formal and informal rules that govern transaction activities between individual or among groups of people.

Market factors–any external factors that affect the demand for or the price of a good or service.

Transaction cost–are observable and non-observable cost associated with enforcing and transferring property rights from one person to another (Eggertson, 1990).

Smallholder farmers – are pineapple farmers who are characterized by landholding less than five acres.

Horticulture – is the science or art of growing vegetables, flowers, and fruits. In this case pineapple farming is an example of horticultural production.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature in an effort to explore the determinants of market participation among small scale pineapple farmers. In general, the small scale pineapple farmers experience poor prices in the study area resulting into low household income. This chapter therefore presents a literature review on the importance of farmers' participation in the market, factors influencing market participation and choice of marketing outlets, strategies for improving market participation and econometric approach in modelling market participation.

2.2 Importance of farmer participation in markets

Market participation by farmer plays a crucial role in that human derives benefit such as income and rural employment in the farming (Ngqangweni, 2000). The rural employment derives from market participation includes sorting, grading, transportation among other activities. Market participation has motivated the farmers to move from subsistence farming to commercial farming (Makhura, 2001). Commercial farming increases farm's output, hence enabling the farmer to earn more income. Horticulture is an important source of income for the most smallholder farmers in Kenya. According to Minot and Ngigi (2003) they described horticulture to be of higher returns than most of the cash crops and are suitable for production on the current declining farm sizes.

Jari (2009) noted that farmer's market participation is very vital for sustaining economic growth, food security and poverty alleviation. Market participation has led to the rural road development, rural electrification, industrialization in the rural among others related-development activities. Most farmers who participated in the market tend to be food secure because the income they derives from the sale of their output has enabled them to purchase the staple food.

Economic liberalization has given opportunities for smallholder farmers to diversify their products and take their surplus to nearby markets (Asfaw *et al*., 2010). Removing trade barriers and discouraging local monopoly has helped smallholder farmers to choose their markets for both inputs and harvested products (Shiferaw and Teklewold, 2007). In summary, marketing plays a crucial role in meeting the overall goal of food security, poverty alleviation and sustainable agriculture, especially among smallholder farmers in developing countries (Lyster, 1990 as cited in Jari, 2009).

2.3 Factors influencing market participation

Market participation of smallholder farmers is affected by numerous factors, including socioeconomic factors, institutional factors, market factors and external factors such as political stability of the nation, natural disaster and calamities. These factors could have negative and positive effects, which could either improve or cause a decline in the welfare of the actors. Social-economic factors include: age, gender, education, experience, household size and land size.

Age of the household head may have a negative or positive impact on market participation. The positive impact resulting from the fact that older farmers may take their decision more easily than the young farmers, because the older people might have accumulated capital or a long term relationship with their clients or might have preferential access to credit due to their age, availability of land, or family size (Sall *et al.*, 2000; Adegbola and Gardebroek, 2007). The age impact negatively in that young people might have a longer planning horizon and might be willing to take risks (Zegeye *et al.*, 2001). The older households tend to have more dependants causing more consumption, hence lowering marketable surplus (Ehui *et al.*, 2009).

The gender of the head of the household has a significant impact in the market participation decision. Male headed household are expected to have a positive impact on market participation because they are of resource endowed than their counterpart female. Jagwe *et al.* (2010) found that, female headed households are more negatively affected by the transaction costs of searching for buyers, contracting and enforcing a sale transaction as opposed to the male headed households. Likewise, female headed household is more likely to be resource constrained hence affecting production of marketable surplus (Guiterrez, 2003).

Education has a positive effect on market participation because it enhances the skill and ability to utilize better on market information, which may in turn reduces marketing costs and make it more profitable to participate in the market. The household size explains the family labor supply for production and household consumption levels (Alene *et al.*, 2008). Positive sign insinuates that a larger household provides cheaper labor and produce more output in absolute terms such that the proportion sold remains higher than the proportion consumed. A negative sign on the other hand means that a larger household is likely to consume more output, leaving smaller and decreasing proportion for sale. Key *et al.* (2000) postulated that land holding is directly linked to the ability to produce a marketable surplus. This can be explained by the fact that a farmer produces more output when the land is larger than when it is small.

Institutional factors like membership in the group, extension service, and infrastructure have an influence on market participation. Poor infrastructure has a negative effect on market participation because the majority of smallholder farmers in developing countries is located in remote areas with poor infrastructure and often fail to participate in the market due to the high transaction cost involved (Goetz, 1992; Makhura *et al*., 2001; Key *et al*., 2002). Membership to the group has both positive and negative impact on market participants. It positively impacts on market participation because it increases household's access to information vital to production and marketing decisions (Olwande and Mathenge, 2012). On the other hand, it can negatively impact market participation in case disagreement emerges among group members, distorting marketing decision. Extension service is expected to impact positively on market participation because it is through extension services that farmers are able to acquire better skill and knowledge on marketing.

Physical resource endowments like ownership of transport and communication equipments have an impact on market participants. Ownership of communication equipments such as mobiles, radios and televisions have a positive impact on the market participation by facilitating marketing information to the farmers. Ownership of transport equipment such as bicycles, motorcycles and truck have a positive impact on market participation by reducing the cost of transporting output from the farm to the market (Key *et al*., 2000).

Market factors have been found to positively and negatively influence market participation. Jari (2009) stated that availability of market information boosts confidence of household who are willing to participate in the market. Poor access to market information result in information-related problem, namely moral hazard and adverse selection which in turn increase transaction costs and hence discourages participation in the market by some farmers (Fatchamp and Hill, 2005; Shiferaw *et al*., 2009). Distance from the farm to point of sale, and market information were found in a couple of studies to be a major constraint to intensity of market participation (Goetz, 1992; Montshwe, 2006; Bahta and Bauer, 2007; Omiti *et al*., 2009). Price factor positively influences market participation. Alene *et al*. (2008) argue that output price is an incentive for sellers to supply more in the market.

2.4 Factors influencing the choice of marketing outlets

Choice for the marketing outlet is the farmers' decision on where to or not to sell their farm produces. The choice of market outlet is determined by the price the farmers receive from the sale of producers. The farmer is likely to choose the one which gives higher benefits. In addition, the investigation of determinants of market outlet for mango producers

in Costa Rica (Zuniga-Aria and Ruben, 2007), showed four major factors in their analytical framework. The first factor was related to the farm household (including farmer's experience, an outlet which is profitable. Attitude toward risk positively and negatively influences the choice attitude toward risk); the second factor dealt with production system (farm size and production scale); the third determinant was price attributes; and the last was market context (having or not a written contract, geographical location and distance to urban market).

Farmer's experience, especially for marketing has influenced the farmer to choose the market of marketing outlet. Those who are risk taker are willing to transport their farm produces to distant places while risk averse, always resort to sell at farm-gate. Montshwe (2006) stated that the farm gate sale tends to reduce farmers' revenue since the prices are relatively low. Farm size is a proxy to production scale. When the land size is large the production scale is also large and vice versa. Large production scale positively influences the farmer to sell their produce at market place mainly because of economies of scale which lower transaction cost.

Price attitude has an influence on the choice of marketing outlet. A higher price provides an incentive to the selling point. When the farm-gate or the market place price is higher, the farmers tend to sell at that point. Contract arrangement has an influence on the choice of marketing outlet. Contract arrangement guarantees the farmers a ready market. The farmers tend to choose the outlets that have a ready market either farm gate or market place. In most cases, the farmer chooses farm gate because it incurs no transaction cost. Distance to market place negatively influences the choice of marketing outlet. In an early study on infrastructure and market access in Madagascar, Minot (1999) showed that the choice of marketing outlet among trader is negatively related to the distance to the market site. Therefore, farmers tend to sell their outputs at farm gate because there is no transaction cost to be incurred.

2.5 Strategies for improving market participation among small-holder farmers

Market participation should be enhanced to increase the marketable surplus. Barret (2008), argued that technology affects market participation directly. A household's production technology choice affects its market participation choice by affecting its productivity. Wilson *et al*. (1995) suggested that due to lack of storage facilities, most smallholder producers are keen to sell produce almost immediately after harvest in order to ease congestion, leading them to sell their produce at lower prices.

Market infrastructure such as sheds and stalls in the spot market is crucial in maintaining freshness of agricultural producers (Wilson *et al*., 1995). Also, improved market access result in the production of marketable surplus and hence gain in income from agriculture and higher revenues, saving and hence investment in productivity enhancing technologies. According to Matungul *et al*. (2002), investment in public goods such as telecommunication, a road, an efficient legal system, and farmer support service (extension, marketing information, and research) would raise farm and non-farm income by reducing transaction costs.

Contract system is another strategy to enhance market participation. Contract farming provides the basis for sharing values, risks and decision-making power between farmers and processors in a way that is mutually beneficial (Eaton and Shepherd, 2001). Across many developing counties, contract farming has been found to play an important role in the commercialization of smallholder agriculture through the provision of an assured market, high prices, critical inputs and knowledge of new agricultural technologies for farmers as a driver of a rural development strategy (Elupe and Nalukenge, 2007). As cited by Kherallah and Kirsten (2001), collective action is also an important strategy in agricultural marketing because it contributes towards reduced transaction costs and it strengthens the farmers' bargaining and lobbying power.

2.6 Econometric approaches to modelling market participation

Heckman two-stage models, Double-hurdle model, and Tobit model have been used to examine crop market participation (Komarek, 2010). Tobit model is a statistical model proposed by James Tobin (1958) to describe the relationship between non-negative dependent variable and independent variable. Hobbs (1997) and Holloway *et al*. (2004) used Tobit model to model farmers' market participation behavior. The Tobit (Tobin, 1958) modelling approach presumes that the participation and sales volume decisions are made simultaneously and hence factors that affect the participation decision and the sales volume decision are the same. Hence, this model is prone with the limitation that it assumes that the same set of parameter and variables determine both the probability of market participation and the level of transaction. Tobit model also assumes that zero values traded are because of rational choice, although it may be a prohibitive entry barrier that is limiting market entry (Komarek, 2010). Tobit model is 'limited' in the sense that we observe it only if it is above or below some cut off level hence it underestimates the intercept and overestimate the slope. Tobit seems also to conceal some information on that, it tends to combine both the direct and

partial effects of the explanatory variables on the dependent variables (Makhura, 2001).This study will not adopt this model because recent empirical studies have shown the inadequacy of the Tobit model in cross-sectional, stressing the relevance of alternative approaches.

A two-step model relaxes the Tobit model assumption by allowing different mechanisms to determine the discrete probability of participation and level of participation. These models allow for separation between the initial decision to participate and the extent of participation. These studies have used either the sample selection model of Heckman (1979) or the two hurdle models (Omiti, *et al.*, 2009). A most commonly used two-tier model is the double-hurdle of Craig (1971). In this model, an input market decision is a two-step decision process. This is based on the assumption that household makes two separate decisions; one involves the decision to participate in the market or not and secondly the extent of participation. The model estimation involves a Probit regression to identify factors affecting the decision to participate in marketing using all sample populations in the first stage, and a truncated regression model on the participating households to analyze the extent of participation, in the second stage. According to Burke (2009), the double hurdle model is useful because it allows a subset of the data to pile-up at some value without causing a bias in estimating the determinants of the continuous dependent variable in the second stage, hence you can obtain all the data in the remaining sample for the participants. Thus, in double models, there are no restrictions regarding the elements of explanatory variable in each decision stage. This model is not appropriate in this study because of sample selection problems, and more precisely in the case of incidental truncation, some part of the dependent variable is not observed because of the outcome of another variable.

Heckman two-stage model was developed by Heckman (1979) and has been used extensively to correct for biases arising from sample selection. The Heckman procedure provides consistent and asymptotically efficient estimates for all the parameters (Heckman, 1979; Maddala, 1983; Amemiya, 1985). This model assumes that the missing value of dependent variable implies that the dependent variable is unobserved (not selected). Heckman's model first uses a Probit regression with all variable data to estimate the probability of market participation. Then the inverse Mills ratio, computed from the Probit regression, is used with other explanatory variables to help explain variances to the continuous, non-zero dependent. To cater for the problem of selectivity bias and to relax the assumptions in the Tobit model, the study will therefore utilize a Heckman two-step procedure.

To analyze the choice of pineapple market outlets, the multinomial Logit model is suitable. Multinomial logistic regression is useful in analyzing data where the researcher is interested in finding the likelihood of a certain event occurring. In other words, using data from relevant independent variables, multinomial logistic regression is used to predict the probability (p) of occurrence, not necessarily getting a numerical value for a dependent variable (Gujarati, 1992). Dougherty (1992) explained that the procedure for formulating a multinomial logistic regression is the same as for a binary logistic regression. Whereas in binary logistic regression, the dependent variable has two categories, in multinomial logistic regression, it has more than two categories. Thus, multinomial logistic regression is an extension of binary logistic regression. OLS cannot be used because it violates the fact that the probability has to lie between 0 and 1, if there are no restriction on the values of the independent variables hence the multinomial logistic regression guarantees that probabilities estimated from the Logit model will always lie within the logical bounds of 0 and 1 (Gujarati, 1992). The multinomial Logit model is therefore used to model choices in this study because it relies on the assumption of independent of irrelevant alternative (IIA) which is not always desirable. Thus assumption state that the odds of preferring one class over another do not depend on the presence or absence of other "irrelevant" alternatives. It also assumes that data are case specific that is each independent variable has as a single value for each case. The advantage of the Multinomial Logit model is that it permits the analysis of decisions across more than two categories, allowing the determination of choice probabilities for different categories (Woodridge, 2002). On the contrary, the binary Logit models are limited to the maximum of two choice categories (Maddala, 1983).

2.7 Theoretical framework

This study was built on two utility theories: utility of random utility and utility maximization theory.

2.7.1 Utility maximization theory

The decision to participate in the pineapple market or not was a binary choice. This was because of the dichotomous nature of the dependent variables, that was, to participate or not to participate in pineapple market. The decision on whether or not to participate was considered under the general framework of utility or profit maximization (Norris and Batie, 1987; Pryanishnikov and Katarina, 2003). Within this framework, economic agents were small-scale pineapple farmers whose participation decisions were measured by perceived

utility or net benefit from any option. Although utility was not directly observed, the actions of economic agents were observed through the choices they made. Suppose that U_j and U_k represent a household's utility for two choices, which are, correspondingly, denoted by Y_j and Y_k. The linear random utility model could then be specified as in equation 1

$$U_{ij}(\beta_j X_i + e_j) > U_{ik}(\beta_j X_i + e_j), k \neq \forall_i \tag{1}$$

Where U_j and U_k are perceived utilities of pineapple market participation and non-pineapple market participation choices j and k, respectively, X_i the vector of explanatory variables that influence the perceived desirability of each choice, β_j and U_k utility shifters, and e_j and e_k are error terms assumed to be independently and identically distributed (iid) (Greene, 2000). In the case of pineapple market participation, if a household decides to use option j, it follows that the perceived utility or benefit from option j is greater than the utility from other options (say k) depicted as in equation 2;

$$U_{ij}(\beta_j X_i + e_j) > U_{ik}(\beta_j X_i + e_j), k \neq \forall_i \tag{2}$$

The probability that a household will choose to participate, i.e., choose method j instead of k could then be defined as:

P (Y = 1/X) = P ($U_{ij} > U_{ik}$)

P ($\beta_j X_i + e_j - \beta_k X_i - e_k > 0 | X$)

P ($\beta_j X_i - \beta_k X_i + e_j - e_k > 0 | X$)

$$P (X^* X_i + e^* > 0 | X = F(\beta^* X_i \tag{3}$$

Where P is a probability function U_{ij}, U_{ik} and X_i are as defined above,

$e^* = e_j - e_k$ A random disturbance term,

$\beta_j^* = (\beta_j - \beta_k)$ a vector of unknown parameters that can be interpreted as a net influence of the vector of independent variables influencing participation, and $F(\beta^* X_i)$ cumulative distribution function of e^* evaluated at $\beta^* K_i$ The exact distribution of F depends on the distribution of the random disturbance term, e^*. Depending on the assumed distribution that the random disturbance term follows, several qualitative choice models can be estimated

(Greene, 2000). Any household decision concerning alternatives is underpinned by this theoretical framework, the realization of which can be implemented by a critically thought out conceptual framework.

2.7.2 Random utility theory

Every farmer is a rational decision maker maximizing utility relative to his choices. It is assumed that given farmer i in making a decision considering exclusive alternatives that constituted the choice set I^i of pineapple marketing outlet, the choice set may differ according to the decision maker. The farmer i assigns each alternative j in his choice set of perceived utility U^i_j and selects the marketing outlet that maximizes his utility. The utility assigned to each choice alternative depends on a number of measurable attributes of the alternative itself and the farmer who is the decision maker.

$$U^i_j = U^i X^i_j \tag{4}$$

In equation 4, U^i is the perceived utility and X^i_j is a vector of attributes relative to alternative j and to decision maker i, utility is not known with certainty and it must be represented in general by a random variable. The probability that the farmer will select alternative j conditional of his choice set I^i will be given by;

$$P^i(j/I^i) = P^i(U^i_j > U^i_k), \forall k \neq j, k \in I^i \tag{5}$$

The perceived utility U^i_j can be expressed as the sum of two terms: a systematic utility and a random residual. Systematic utility V^i_j represents mean of all farmers having the same choice context as decision maker i. ε^i_j captures the combined effects of the various factors that introduce uncertainty in choice modelling, it is expressed as,

$$U^i_j = V^i_j + \varepsilon^i_j \ \forall j \in I^i \tag{6}$$

With $V^i_j = E(U^i_j)$, then $E(V^i_j) = V^i_j$, $var(V^i_j) = 0$ and $E(\varepsilon^i_j) = 0$, $var(U^i_j) = \sigma^2_{ij}$ and this yields,

$$P^i(j/I^i) = \mathrm{Prob}(^iV^i_j - V^i_k > \varepsilon^i_k - \varepsilon^i_j) \ \forall k \neq j \ k \in I^i \tag{7}$$

Where P^i is the choice probability. Equation 7 gives the probability of farmers selecting alternative j and it suggests that the choice of a given alternative depends on the systematic

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utilities of all competing alternatives and on the law of the joint probability of random residuals ε_j. A farmer is likely to choose the option that gives a higher utility among the alternatives.

2.8 Conceptual framework

The conceptual framework in Figure 1 illustrates the interrelationships in the study, the key variables involved and how they are interrelated. Socioeconomic characteristics are the background factors like (age, education level, gender, household income, occupation, household income, and vehicle ownership), institutional factors like (group marketing, access to extension service, contract marketing, and road infrastructure) and market factors like (prices of output, price information, marketing experience, and distance to the market) had an influence on market participation. The participation leads to the extent of participation and choice of marketing outlets. The extent of participation (amount of pineapples sales) in turn increased the household income.

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          ┌─────────────────────────┐
          │  Socio-economic factors │
          │                         │
          │  Age, Education level,  │
          │  Gender, Household      │
          │  income, Occupation,    │      ┌────────────────────────┐
          │  household income,      │      │  Institutional factor  │
          │  vehicle ownership      │      │                        │
          └─────────────────────────┘      │  Access to extension   │
┌────────────────────────┐                 │  service, contract     │
│  Market factors        │                 │  marketing, group      │
│                        │                 │  marketing, road       │
│  Distance to market,   │                 │  infrastructure        │
│  Price of outputs,     │                 └────────────────────────┘
│  Price information,    │     ┌───────────────────────────┐
│  marketing             │────▶│   Market participation    │◀──
│  experience            │     └───────────────────────────┘
└────────────────────────┘              │            ╲
                                        ▼             ╲
                          ┌──────────────────────┐  ┌──────────────────┐
                          │ Extent of participation│◀─│   Choice of      │
                          └──────────────────────┘  │ marketing outlets │
                                     │              └──────────────────┘
                                     ▼
                          ┌──────────────────────────┐
                          │ Increased household income│
                          └──────────────────────────┘
```

Socio-economic factors

Age, Education level, Gender, Household income, Occupation, household income, vehicle ownership

Institutional factor

Access to extension service, contract marketing, group marketing, road infrastructure

Market factors

Distance to market, Price of outputs, Price information, marketing experience

Market participation

Extent of participation

Choice of marketing outlets

Increased household income

⟶ Direction of influence

Figure 1: Diagrammatic representation of the conceptual framework.

Source: own conceptualization

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter gives an account of the study area where the research was conducted. It also explains the sampling procedure and determines the sample size of the target population. The section on 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.

3.2 The study area

Bureti district is one of the districts in Kericho County. The district is located in 0.5^0S and 35.25^0 E. Its borders Kericho district to the North, Konoin district to the East, Sotik to the South and Nyamira to the South West. The district occupies a total area of 955 km^2. Administratively, the district has three divisions: Roret; Cheborge, and Buret, which are further, divided into Locations and sub-Locations. The district headquarters is in Litein town. Bureti district borders. Economic activities in Bureti district include tea growing and processing; dairy farming; commercial businesses. Other agricultural products include pineapple, maize, beans, potatoes, vegetables, coffee, and tea. The change in altitude factors causes the temperature to vary from 20-28º C. The mean annual rainfall varies from 1400 mm to 1800 mm.The district has a population of 316,882 people (GoK, 2010). The study area is shown in Figure 2.
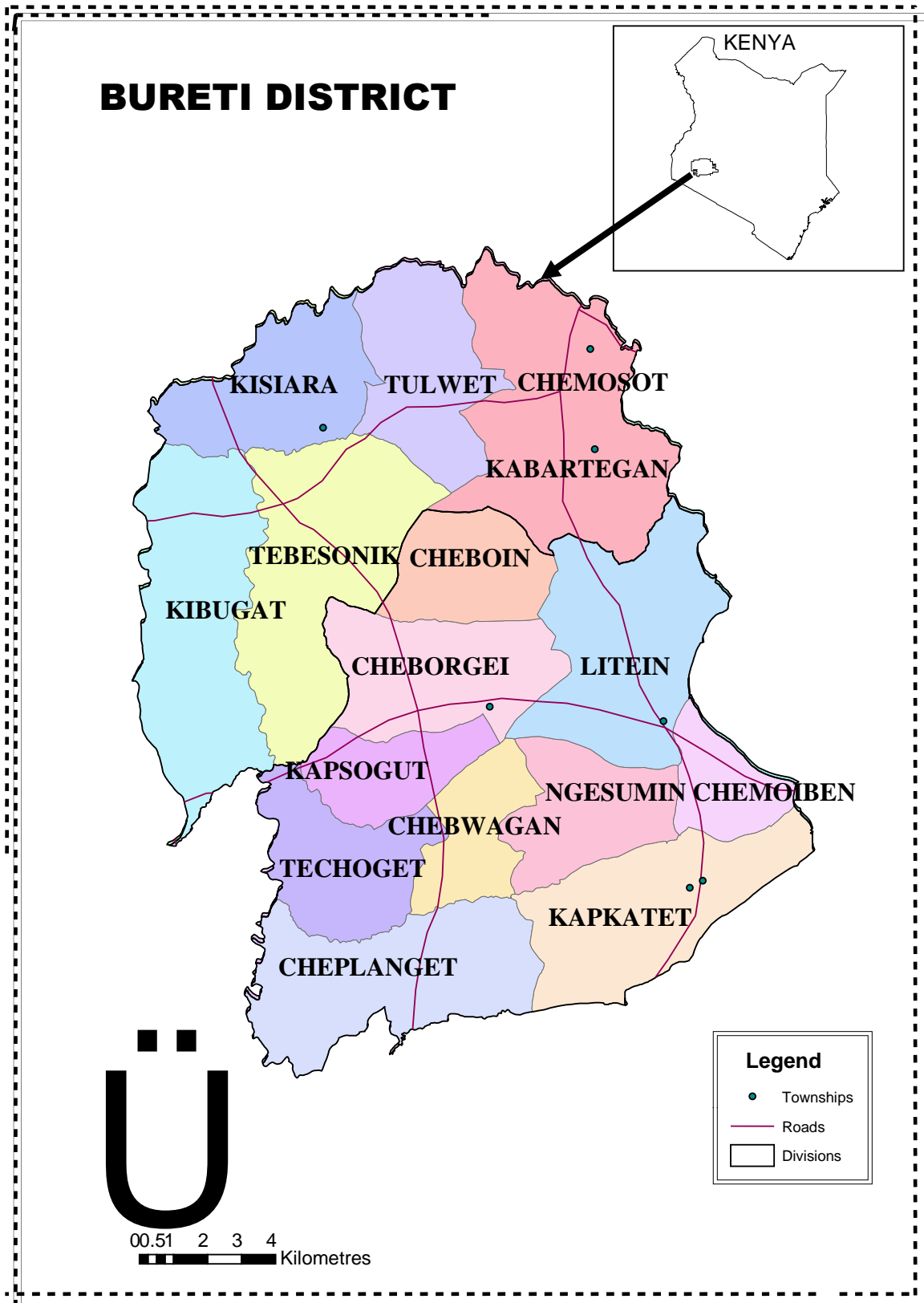
Figure 2: Map of Bureti district in Kericho County showing the study area.

Source: ILRI (2008)

3.3 Sampling procedure

The target population of the study was the small-scale pineapple farmers in Bureti district. Multi-stage sampling procedure was used in the selection of representative sample. The first step involved purposive selection of Roret and Cheborgei divisions among the three divisions in Bureti district. Roret and Cheborgei division were selected mainly because they were the main pineapple growing divisions in Bureti district. Secondly, five locations (Kapkisiara, Kisiara, Tulwet, Getarwet, and Tebesonik) were selected purposively because the large number of small scale pineapple farmers in Bureti district. Finally, 30 farmers in each location were selected randomly using simple random sampling to give a total sample of 150 farmers who were ultimately interviewed. The required sample size was determined by Cochran's proportionate to size sampling methodology (Mugenda and Mugenda, 2003).

$$n = \frac{Z^2 qp}{e^2} \tag{8}$$

Where; n = Sample size; Z= confidence level ($\alpha = 0.05$); p = proportion of the population containing the major interest, $q = 1\text{-}p$ and e = allowable error. Hence, $Z = 1.96$;

$p = 0.11 = (\frac{35098}{316882})$, $q = 0.89$ and $e = 0.05$. This resulted in a sample population of 150

respondents. $\dfrac{1.96^2 \times 0.11 \times 0.89}{0.05^2} = 150.4$ $\tag{9}$

3.4 Data collection method

Before the data was collected, the questionnaire was pre-tested on selected farmers to evaluate the appropriateness of the design, clarity, and relevance of the questions. The appropriate modification was made on the pre-tested questionnaire in order capture the relevant information related to the study objectives. Five enumerators were recruited and trained on the content of the questionnaire and interviewing process. Primary data were collected through the administration of semi-structured questionnaire by a team of five trained enumerators to 150 small-scale pineapple farmers.

3.5 Data analysis

Data from the field was edited, coded, and cleaned to ensure consistency, uniformity, and accuracy. Data was entered into computer software for analysis. Both SPSS and STATA computer programs were used to process the data. Two types of analysis, namely: descriptive and econometric were used for analyzing the collected data.

3.5.1 Descriptive analysis

In order to achieve objective one, descriptive statistics such as means, minimum and maximum values, frequencies, percentages and standard deviations were used to describe and examine the socio-economic characteristics of small-scale pineapple farmers, institutional and market characteristics of pineapple marketing in Bureti district.

3.5.2 Econometric analysis

Objective two and three were analyzed using Heckman two-stage model and Multinomial Logit model, respectively.

3.5.2.1 Heckman two-stage model

To determine the factors influencing participation and extent of participation in pineapple marketing, the Heckman two-stage selection model was used. The decision to either participates in the market or not and level of participation was dependent variables and was estimated independently. Heckman two-step procedure was identified as an appropriate model for such independent estimation. Heckman two-step model involved estimation of two equations: First, is whether a household participated in the pineapple market or not, and the second is the extent of market participation (proportion of pineapple sales). The proportion of pineapple sales were conditional on the decision to participate in the market. Heckman procedure is a relatively simple procedure for correcting sample selection bias with the popular usage of (Hoffman and Kassouf, 2005).

The model consisted of two steps; firstly, selection equation was estimated using a probit model and secondly, an outcome equation was estimated using OLS regression. A Probit model predicts the probability of whether an individual household participated in the pineapple market or not as shown.

$$pr(Z_i = 1 \mid w_{i,}\alpha) = \Phi\left(h(w_{i,}\alpha)\right) + \varepsilon_i \tag{10}$$

Where Z_i is an indicator variable equal to unity for small-scale pineapple farmers that participated in the marketing, Φ is the standard normal cumulative distribution function, w_ia is the vector of factors affecting the decision to participate in pineapple market, α is the vector of coefficients to be estimated, and ε_i *is* the error term assumed to be distributed normally with a mean of zero and a variance σ^2. The variable Z_i takes the value of 1 if the marginal utility the household i get from participating in marketing of pineapple is greater than zero, and zero otherwise. This is shown as follows,

$$Z_i^* = \alpha w_i + u_i \tag{11}$$

Where Z_I^* is the latent level of utility the small scale pineapple farmers get from participating in the market, $u_i \sim N(0, 1)$ and,

$$Z_i = 1 \; if \; Z_i^* > 0 \tag{12}$$

$$Z_i = 0 \; if \; Z_i^* \leq 0 \tag{13}$$

In the second step, an additional regressor in the sales equation will be included to correct for potential selection bias. This regressor is Inverse Mills Ratio (IMR). The IMR is computed as:

$$\frac{\varphi(h(w_i, \tilde{a}))}{\varphi(w_i, \tilde{a})} \tag{14}$$

Where φ is the normal probability density function? The second-stage equation is given by:

$$E = (Y_i | Z = 1) = f(x_i, \beta) + \lambda \frac{\varphi(h(w_i, \tilde{a}))}{\varphi(w_i, \tilde{a})} \tag{15}$$

Where E is the expectation operator, Y is the (continuous) proportion of pineapple sold, x is a vector of independent variables affecting the quantity of pineapple sold, and β is the vector of the corresponding coefficients to be estimated. Therefore, Y_i can be expressed as follows:

$$Y_i^* = \beta' x_i + \gamma \lambda_i + u_i \tag{16}$$

$Y_i{}^*$ is only observed for those pineapple farmers who participates in the marketing Where $u_i \sim N(0, \sigma_u)$. ($Z_i = 1$), in which case $Y_i = Y_i{}^*$.

The model can thus be estimated as follows; in the first step of deciding whether to participate in pineapple marketing or not. This can be specified as:

$$P_{(0,1)} = \beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots \beta_n X_n + e$$

Where participation is denoted by 1 and non- participation is denoted by 0, β_0 is a constant, $\beta_{1\ldots n}$ are parameters to be estimated X_{is} are vector of explanatory variables.

The Second step which involves a decision on the extent of pineapple marketing is estimated by use of an OLS as follows;

$$Y = \beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots \beta_n X_n + e \qquad (17)$$

Where Y denotes the proportion of pineapple sales, β_0 is a constant, $\beta_{1\ldots n}$ are parameters to be estimated X_{is} are vector of explanatory variables.

Model specification

Heckman two-step procedure

Heckman (1979) proposed a two-step procedure which only involves the estimation of a standard probit and a linear regression model. The two equations for the two steps are specified as follows: The variables to be used in Heckman two stages are shown in Table 2.

Step 1. (Selection equation)

$$P_i(0,1) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_n X_n + \varepsilon$$

$$P_i(0,1) = \beta_0 + \beta_1 age + \beta_2 gend + \beta_3 Educ + \beta_4 Hsize + \beta_5 Occup + \beta_6 HsInc + \beta_7 VehOwn + \beta_8 PinOutcm + \varepsilon_i \qquad (18)$$

Step 2. (Outcome equation) $Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_n X_n + \varepsilon$

Proportion of pineapple sales (Y_i) $= \beta_0 + \beta_1 age + \beta_2 gend + \beta_3 Educ + \beta_4 Hsize + \beta_5 Occup + \beta_6 HsInc + \beta_7 VehOwn + \beta_8 Distmkt + \beta_9 Pric + \beta_{10} PineOutcm + \beta_{11} MktGrp + \beta_{12} Contr + \beta_{13} Pricinfr + \beta_{14} MktExpr + \beta_{15} IMR + \varepsilon_i \qquad (19)$

Table 2: Variables in Heckman Two Stage model

Variable code	Variable	Measurement of the variables	Expected sign
Dependent variable			
TypHsld	Type of household (market participant/non-market participant)	Dummy (1= market participant, 0 = Non-Market participant)	±
ExtParti	Extent of participation	Proportion of pineapple sale	±
Independent variables			
Age	Age in years	In years (continuous)	±
Gnd	Gender	Dummy (1 =Male, 0= Female)	±
Educ	Education	(1 = No education, 2 = Primary, 3 = Secondary, 4 = Tertiary)	±
Hsize	Household size	Size of the household (continuous)	+
Occup	Occupation	(1 = Farmer, 2 = Businessman, 3= employed)	±
HsInc	Household Income	In shilling (Continuous)	+
VehOwn	Vehicle ownership	Dummy (1 = yes, 0 = No)	±
Distmkt	Distance to the market	In Kms (continuous)	
PineOutcm	Pineapple outcome	In kilograms(continuous)	+
PricInfr	Price information	Dummy(1 = Yes, 0 = No)	±
Price	Price of output	In shilling (continuous)	+
Contr	Contract Arrangement	Dummy(1= present, 0 = Absent)	±
MktGrp	Marketing in groups	Dummy (1= yes, 0 = No)	±
MktExpr	Marketing experience	In years (Continuos)	

3.5.2.1 Multinomial Logit model

To determine the factors influencing the choice of pineapple marketing outlet in Bureti district, the multinomial Logit model was used. The choice of a given marketing outlet is discrete because it is chosen among other alternative outlet. Let P_{ij} represent the probability of choice of any given market outlet by pineapple farmers, then equation representing this will be,

$$P_{ij} = \beta_0 + \beta_1 X_1 + ... + \beta_k X_k + e \tag{20}$$

Where i takes values (1, 2, 3), each representing the choice of marketing outlet (farm gate =1, local market =2, urban market =3). X_1 are factors affecting choice of a market outlet, β are parameters to be estimated and e is randomized error. With j alternative choices, the probability of choosing outlet j is given by,

$$Prob\ (Y_i = j) = \frac{e_{z_j}}{\sum_{k=0}^{j} e_{z_k}} \tag{21}$$

Where Z_j is a choice and Z_k is alternative choice that could be chosen (Greene, 2000). The model estimates are 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 is computed as,

$$\ln(\frac{p_{ij}}{p_{ij^*}}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k + e_i \tag{22}$$

P_{ij} and P_{ik} are probabilities that a farmer will choose a given outlet and alternative outlet respectively. $ln(\frac{P_{ij}}{P_{ik}})$ 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 parameter estimates of the Multinomial Logit model provide only the direction of the effect of the independent variable on the dependent (response) variable but do not represent either the actual magnitude of change nor probabilities. The marginal effects or marginal probabilities are functions of the probability itself and measure the expected change in the probability of a particular choice being made with respect to a unit change in an independent variable from the mean (Green, 2000).

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Marginal effects of the attributes on choice are determined by getting the differential of probability of a choice and it is given by,

$$(\delta) = \frac{\partial P_i}{\partial X_i} = pi(\beta_j - \sum_{k=0}^{j} P_k \beta_k) = P_i(\beta_j - \beta) \tag{23}$$

The multinomial Logit model is given below;

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

Choice of market outlet $(P_{ij}) = \beta_0 + \beta_1 age + \beta_2 gnd + \beta_3 Educ + \beta_4 PineOutcm + \beta_5 VehOwn + \beta_6 MktGrp + \beta_7 PricInfr + \beta_8 Contr + \beta_9 MktExpr + \varepsilon_i \tag{24}$

Table 3: Variable used in the Multinomial Logit

Variable code	Variable	Measurement of the variables	Expected sign
Dependent variable			
MktOutlets	Household choice of pineapple marketing outlets	(Farm gate =1, Local market =2, Urban market=3,)	+
Independent variables			
Age	Age in years	In years (continuous)	+
Gnd	Gender	Dummy (1 =Male, 0= Female)	±
Educ	Education	(1 = No education, 2 = Primary, 3 = Secondary, 4= Tertiary)	+
PineOutcm	Pineapple outcome	In kilograms (continuous)	+
VehOwn	Vehicle ownership	Dummy (1 = Yes, 0 = No)	±
MktGrp	Marketing in groups	Dummy (1= yes, 0 = No)	±
MktExpr	Marketing experience	In years (continuous)	+
PrInfr	Price information	Dummy (1= Yes, 0 = No)	±
Contr	Contract Arrangement	Dummy (1= Yes, 0 = No)	±

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents descriptive results of socio-economic, institutional and market characteristics in relation to market participation and choice of marketing outlets. It also presents empirical results of the Heckman two-stage model and multinomial Logit model, providing an in-depth explanation of significant variables.

4.2 Descriptive results

4.2.1 Socio-economic characteristic in relation to market participation

The results in Table 4 show that the youngest market participant was 24 years old while the oldest was 70 years old. On the other hand, the youngest non-market participant was 30 years old while the oldest was 72 years old. In terms of household size, the smallest household size among market participants was found to be 2 members while the highest was found to be 10 members. Among non-market participants, the smallest household size was found to be 3 members while the highest was found to be 10 members. In terms of pineapple yield, the smallest amount produces by market participant on a weekly basis was found to be 100 kilograms while the highest amount was found to be 360 kilograms. Among non-market participants the smallest amount produces on a weekly basis was found to be 40 kilograms and the highest amount was found to be 180 kilograms.

Table 4: Age, household size and pineapple yield characteristics of the household heads

Type of the farmer	Characteristics	N	Min	Max	Mean	Std
Market participants	Age	100	24	70	46.93	1.332
	Household size	100	2	10	5.75	0.165
	Pineapple yield	100	100	360	201.60	5.325
Non- market participants	Age	50	30	72	51.02	1.297
	Household size	50	3	10	5.76	0.218
	Pineapple yield	50	40	180	107.80	3.324

Source: Survey data (2013)

Table 5 indicates that the mean age of market participants was about 45 years while that for non-market participants was about 51 years. The overall mean age of the pineapple farmers was found to be 46.93 years old. The result of the two tailed tests showed that the age was statistically significant at 1%, signifying that the mean age of market participants was less than that of non-market participants. The result is consistent with argument by Arega *et al.* (2007) who stated that market participation declines with age because the older people are perceived to be risk averse and reluctant to adopt technology. Barret *et al.* (2007) also concluded that young people participated more in the market because they are more receptive to new ideas and are less risk averse than the older people.

In terms of household size, the results indicate that the mean of the household size for the market participants was found to be 5.75 members, while that for non-market participants was found to be 5.76 members. The overall household size mean was found to be 5.75 members which are nearly the same as that of Kenya's national mean of 5 members per household (CBS, 2005). The two tailed test results showed that household size was statistically insignificant meaning the household size between the market participants and non-market participants were almost equal.

In terms of pineapple yield, the means of pineapple yields for market participants per week was found to be 201.60 kilograms while that for non-market participant was found to be 107.80 kilograms. The mean of overall pineapple yield was found to be 170.33 kilograms. The result of the two tailed tests showed that the pineapple yield was statistically significant at 1% indicating that the market participants had more pineapple yields than non-market participants. The result is consistent with the findings of Omiti et al. (2009) and Astewel (2010) who confirmed that increasing the volume of production increase market participation.

Table 5: *t*-test for equality of means for age, household size and pineapple yield

Characteristics	Mean		Overall	*t*-ratio	Sig
	Market participant	Non-market participant			
Age	44.890	51.020	46.93	-21.153***	0.000
Household size	5.750	5.760	5.75	-1.256	0.106
Pineapple yield	201.600	107.800	170.33	235.282***	0.000

***: significant at 1% level.

Source: Survey data (2013)

The results in Table 6 show that 69% of market participants were male, while 31% were female. On the other hand, 18% of non-market participants were male, while 82% were female. The *chi*-square result showed that gender was statistically significant at 1% indicating that the male households who participate in the pineapple market were more than those who did not participate. The explanation for this is that women in SSA are disadvantaged in marketing because of unequal distribution of resources as well as cultural barriers (Chikuvire *et al*, 2006).

Table 6: Gender of the household heads

Gender	Market participants		Non-market participants		Overall	χ^2	Sig
	Freq	%	Freq	%	Freq		
Male	69	69	9	18	78	34.735***	0.000
Female	31	31	41	82	72		
Total	100	100	50	100	150		

***: significant at 1% level.

Source: Survey data (2013)

The results in Table 7 show that among market participants, 74% were farming only, 11% were farming with business and 15% were farming with employment. Among non-market participants, 76% were farming only, 14% were farming with business and 10% were farming with employment. The result of *chi*-square shows that occupational status of household head was statistically insignificant indicating that market participants and non-market participants were almost equally distributed in terms of occupation. This implies that the occupation status of the household heads has no influences on market participation.

Table 7: Occupation status of the household heads

Occupation status	Market participants		Non-market participants		Overall	χ^2	Sig
	Freq	%	Freq	%	Freq		
Farming only	74	74	38	76	112	0.893	0.640
Farming with the business	11	11	7	14	18		
Farming with employment	15	15	5	10	20		
Total	100	100	50	100	150		

Source: Survey data, (2013)

Table 8 shows the educational status of the household heads. The results indicate that 14% of market participants had no formal education, 47% attained primary level, 26% attained secondary level and 13% attained tertiary level. On the other hand, 50% of non-market participants had no formal education, 42% attained primary level, 8% attained secondary level and none attained tertiary level. The result of the *chi*-square shows that education level was statistically significant at 1% indicating that the educational level of market participants were higher than those of non-market participants. Formal education has been found to enhance managerial competence and successful implementation of improved production, processing and marketing practices (Marenya and Barret, 2006). The finding is consistent with the argument of Makhura *et al*. (2001) who stated that human capital represented by the household head's formal education is posited to increase a household understanding of market dynamics and therefore improve decision about the amount of output sold, inter alia.

Table 8: Educational status of the household heads

Education level	Market participants		Non-market participants		Overall	χ^2	Sig
	Freq	%	Freq	%	Freq		
No education	14	14	25	50	69	28.699***	0.000
Primary	47	47	21	42	68		
Secondary	26	26	4	8	30		
Tertiary	13	13	0	0	13		
Total	100	100	50	100	150		

***: significant at 1% level.

Source: Survey data (2013)

The results in Table 9 show that 47% of market participants own vehicles while 53% did not own. On the other hand, 22% of non-market participants own vehicles while 78% did not own. The *chi*-square result shows that the vehicle ownership was statistically significant at 1% indicating that more of market participants owned vehicles than non-market participants. The vehicle ownership greatly boosts the morale of the farmer to participate in the market because it convenient the farmers on the place of marketing and the time. A study on market access by Key *et al*. (2000) shows that ownership of some mean of transport such as ox-cart and van is positively related to market participation.

Table 9: Vehicle ownership status of the household heads

Vehicle ownership	Market participants		Non-market participants		Overall	χ^2	Sig
	Freq	%	Freq	%	Freq		
Yes	47	47	11	22	58	8.784***	0.000
No	53	53	39	78	92		
Total	100	100	50	100	150		

***: significant at 1% level.

Source: survey data (2013)

The results in Table 10 shows that among the market participants 59% had an income of 1,000 - 10,000 per month, 26% had 10,000 - 20,000, 8% had 20,000 - 30,000 and 7% had 30,000 - 40,000. Among non-market participants, 64% had an income of 1,000 to 10,000 per month, 22% had 10,000 - 20,000, 10% had 20,000 - 30,000 and 4% had 30,000 - 40,000. The result of the *chi*-square shows that the household income was statistically insignificant indicating that the income distribution between market participants and non-market participants were almost similar.

Table 10: Income status of the household heads

Household income	Market participants		Non-market participants		Overall	χ^2	Sig
	Freq	%	Freq	%	Freq		
1,000 - 10,000	59	59	32	64	91	5.67	0.339
10,000 - 20,000	26	26	11	22	37		
20,000 - 30,000	8	8	5	10	13		
30,000 - 40,000	7	7	2	4	9		
Total	100	100	50	100	150		

Source: Survey data (2013)

4.2.2 Institutional characteristics in relation to market participation

The results in Table 11 indicate that 32% of the market participants were in group marketing while 68% were not in the group. This implies that group marketing in the study area is still low. Marketing in a group is essential because it facilitates information exchange among the members which reduces the transaction cost and hence increases the extent of the market participation. Poulton *et al*. (2006) argued that belonging to a group, empower farmers to bargain and negotiate for better trading terms. In terms of contract marketing, the results show that 53% of the market participants were under market contract while 47% were not under contract. Marketing under contract have been perceived to increase market participation because the farmers are assured of the ready market for their produce. In terms of access to extension services, the result shows that 5% of market participants had an access to extend service while 95% did not access. This implies that the majority of the market participants did not have an access to extend the service. An access of extension service through extension officers plays an imperative role of empowering the farmers with marketing information and ability.

Table 11: Institutional characteristics in relation to market participation

Variable		Frequent	Percentage
Group marketing	Yes	32	32
	No	68	68
	Total	100	100
Contract marketing	Yes	53	53
	No	47	47
	Total	100	100
Access to extension service	Yes	5	5
	No	95	95
	Total	100	100

Source: Survey data (2013)

Figure 3 shows the types of the road infrastructure used in pineapple marketing. The results indicate that 64% of road infrastructure used by market participants was made of earth surface, 34% of road infrastructure were a combination of tarmac and earth's surface, and 2% were of the pure tarmac road. This implies that the road infrastructure in the study

area still poor. Poor roads are perceived to increase the transport cost which discourages farmers from participating in the pineapple market.
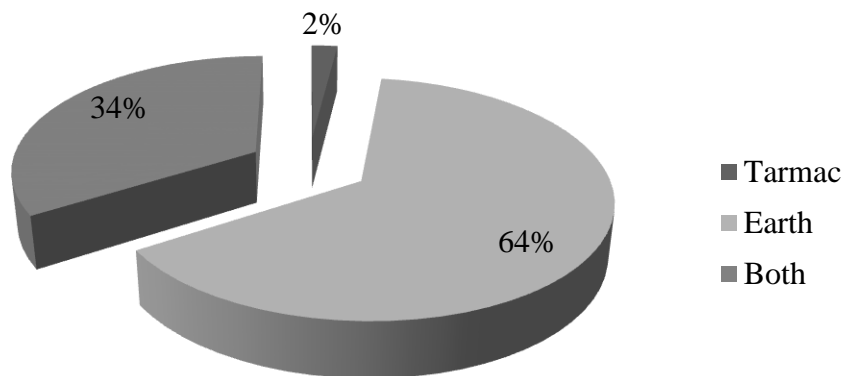
Figure 3: The percentage of the road infrastructure used in pineapple marketing.
Source: Survey data (2013).

4.2.3 Market characteristics in relation to market participation

Table 12 presents the results of continuous marketing variables. In terms of marketing experience, the result shows that the least experienced market participant had 3 years while the most experienced had 13 years. The marketing experience mean was found to be 7.19 years. In essence, marketing experience captures the aspects relating to social networks and linking with marketing players, which accrue over time. The existence of such links reduces transaction cost in searching for the trading partners, contracting, negotiating and enforcing contracts which in turn increases market participation.

In terms of distance to the market, the results reveal that the shortest distance to the market place was 0 kilometers while the furthest distance was 50 kilometers. The 0 kilometers means the farmer's market place was at the farm. The average mean of the distance to the market place was found to be 6.45 kilometers. The distance to the market has been found to have a negative impact on market participation. Ogunleye and Oladeji (2007) found that a greater distance to the market increases transportation costs and marketing costs and this hampers the extent of market participation.

In terms of pineapple price, the results reveal that the lowest price per pineapple piece was found to be 10 shillings while the highest was found to be 40 shillings. The average mean of pineapple price was found to be 23.55 shillings. Price variable plays a fundamental role in pineapple marketing because it determines the amount of income to be earned from

pineapple sales. Better output price is the key incentive for the sellers to supply more to the market. Therefore, higher price is perceived to increase the extent of market participation.

Table 12: Market characteristics in relation to market participation

Variable	N	Min	Max	Mean	Std
Marketing experience (yrs)	100	3	13	7.19	0.258
Distance to market (Kms)	100	0	50	6.45	0.784
Pineapple price (Kshs)	100	10	40	23.55	0.560

Source: Survey data (2013)

The results in the Figure 4 indicate that 55% of market participants had price information while 45% did not have. Price information plays the crucial role of informing the farmers on pricing condition. Therefore, the farmers with price information have more propensity of participating in the pineapple market than those without.
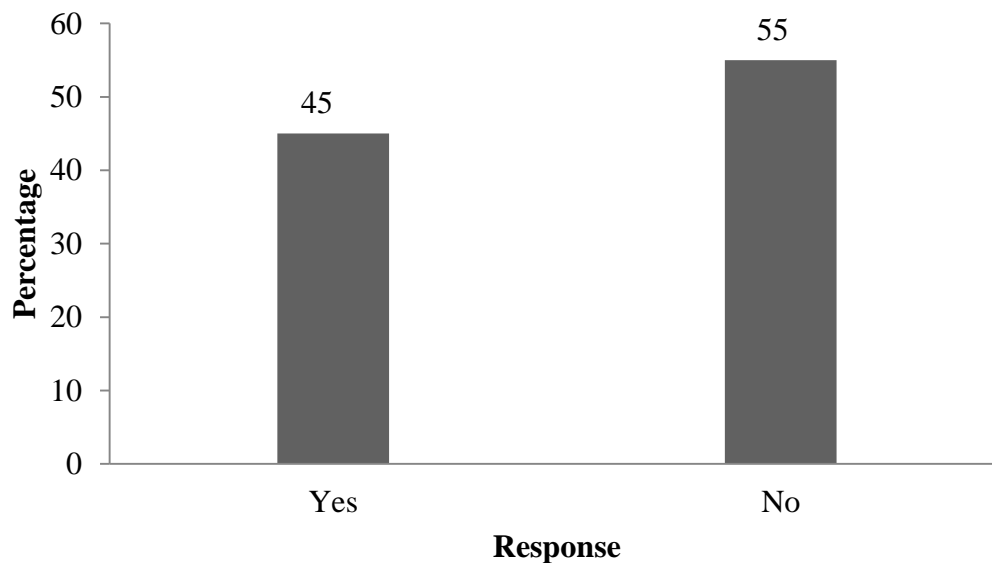
Figure 4: The percentage of the price information among the market participants
Source: survey data (2013)

4.2.4 Characteristics in relation to choice of marketing outlets

The results in Table 13 on vehicle ownership indicate that 21%, 44% and 96% of market participants used farm gate, local market and urban market, respectively as the choice of marketing outlets. This means that the majority of those who sold at urban market owned vehicles. In essence, vehicle ownership plays a fundamental role of providing the market

participants with the variety option of marketing outlets, whereas those who do not own are constrained to market their produce at the farm gate or compelled to hire a vehicle. In terms of price information, the results reveal that 36%, 65% and 75% of the market participants who sold at the farm gate, local market and urban market, respectively had an access to price information. This implies that the majority of market participants who sold at urban market had an access to price information. Price information aids in acquainting the market participants with the pricing conditions. In terms of group marketing, the results reveal that 7%, 35% and 71% of the market participants who belong to marketing groups sold their produce at the farm gate, local market and urban market, respectively. This implied that the majority of pineapple farmers who marketed their produce at urban market belonged to the group marketing. Marketing in a group enables the farmers to pull their resource together and take advantage of economies of scales in marketing. In terms of contract marketing, the results indicate that 64%, 53% and 17% of the market participants who were under contract marketing sold their produce at the farm gate, local market and urban market, respectively. This implied that the majority of those who sold at farm gate were under contract marketing. Marketing under contract guarantees the farmers with the ready market, hence; the farmers prefer it to minimize the cost of transportation and that of searching the buyers.

Table 13: Categorical marketing characteristics in relation to marketing outlets

Variable		Percentages		
		Farm-gate	Local market	Urban market
Vehicle ownership	Yes	21	44	96
	No	79	56	4
	Total	100	100	100
Price information	Yes	36	65	75
	No	64	35	25
	Total	100	100	100
Group marketing	Yes	7	35	71
	No	93	65	29
	Total	100	100	100
Contract marketing	Yes	64	53	17
	No	36	47	83
	Total	100	100	100

Source: Survey data (2013)

The results in Table 13 indicate that 48%, 82% and 88% of the male headed households, used farm gate, local market and urban market, respectively as a choice of marketing outlets. On the other hand, 52%, 18% and 12% of the female headed households used farm-gate, local market and urban market, respectively as the choice of marketing outlets. This showed that the male headed households who used, local and urban markets as the choice of marketing outlets were more than their counterparts. This implies that the male headed households are likely to be resource endowed hence they are capable of marketing their outputs at local and urban market.
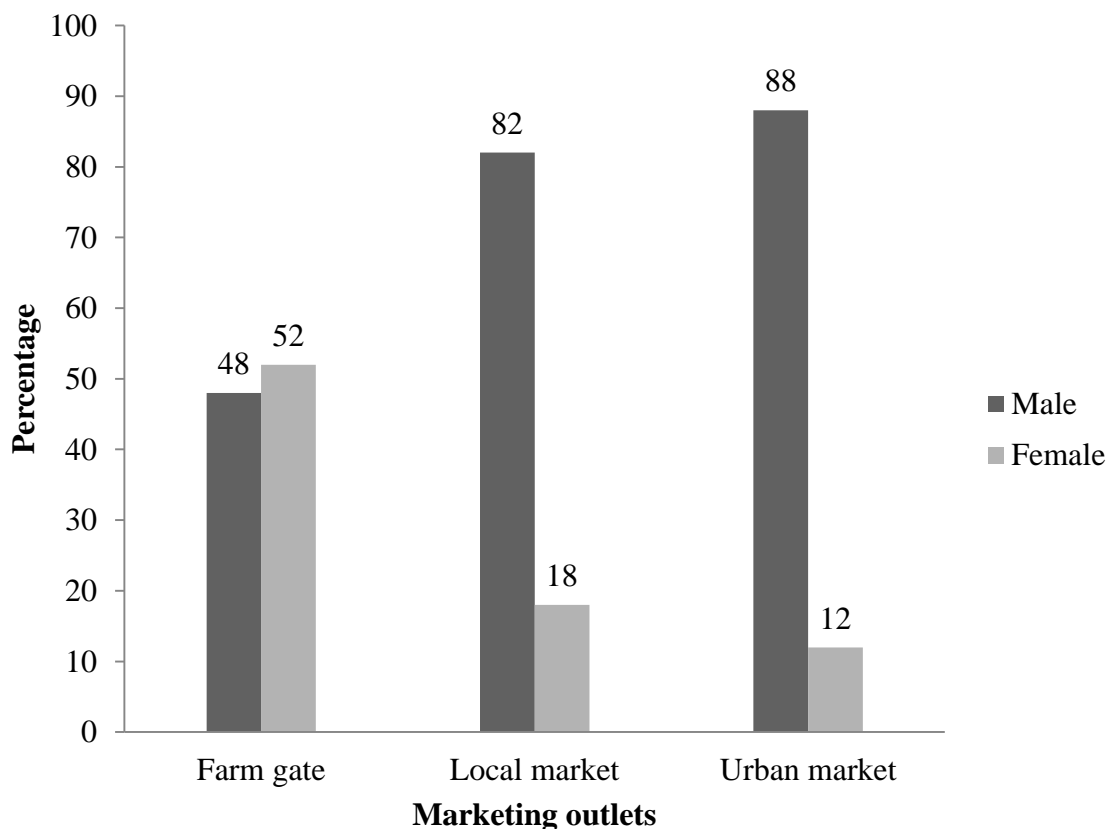
Figure 5: Distribution of Gender in relation to relation to marketing outlets

Source: Survey data (2013)

Figure 6 shows the mean age of household head in relation to marketing outlets. The results indicate that the mean age of the market participants who used the farm-gate, local market and urban market as a marketing outlet had 49 years, 45 years and 38 years, respectively. This implied that those who sold their produce at farm-gate were slightly younger than those who sold at local and urban market. This can be expounded by the fact that younger people tend to market their produce to a far distance places like urban markets because they are energetic and risk takers.
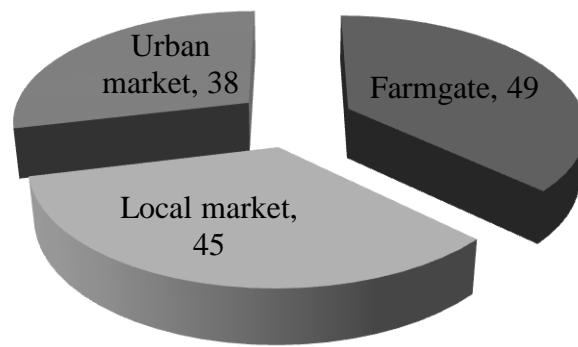
Figure 6: Means age distribution of marketing outlets

Source: Survey data (2013)

The result in Figure 7 shows the level of education of market participants in relation to marketing outlets. It is evident that the market participants who sold at urban market had higher levels of education than those who sold at farm-gate and local market. With enhanced education, market participant has the ability to perceive, interpret and assimilate marketing information that can lead to informed choice of markets with high level of returns like urban market.
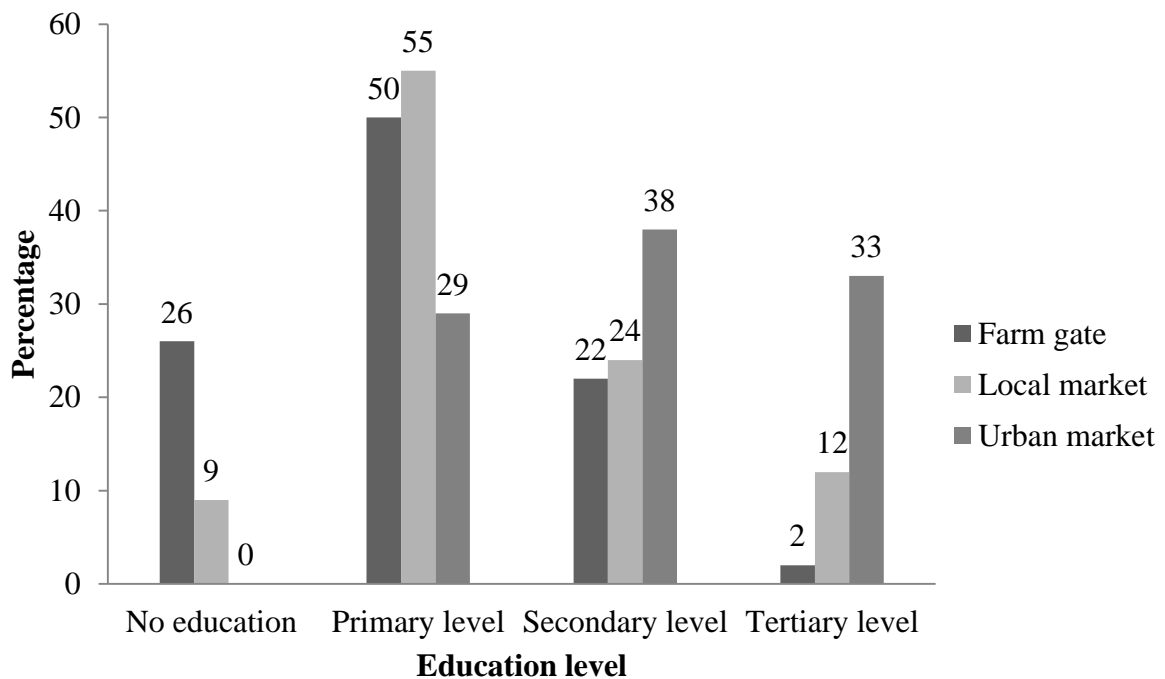
Figure 7: Education level distribution in relation to marketing outlets

Source: Survey data (2013)

4.3 Econometric results.

4.3.1 Factors influencing market participation and extent of participation

Heckman two-step procedure was used to determine the factors influencing participation and extent of participation in pineapple marketing. The variables included in the model were age, gender, household income, education, occupation, household size, pineapple price, contract, price information, vehicle ownership, marketing experience, group marketing, pineapple yield, and distance to market. The data were analyzed and post estimation of the selection equation results was done to obtain the marginal effects. The marginal effects were used for interpretation, since the coefficients of selection equation have no direct interpretation. The reason is that they are just values that maximize the likelihood function. Marginal effects have a direct interpretation (Heckman, 1979).

4.3.1.1 Factors influencing market participation.

To determine the factors influencing market participation of pineapple in Bureti district, a Probit model was estimated in the first step of the Heckman selection equation. The results presented in Table 14. Four variables (age, gender, education, and pineapple yield) were significantly found to influence the farmers' decision to participate in the pineapple market. The Inverse Mills Ratio (IML/Lambda) term was significant and positive at (0.003), which suggest that the error term in the selection and primary equation is positively correlated. This implies that unobserved factors that make participation in pineapple marketing are more likely to be associated with higher scores on the dependent variable. The marginal effects were used to interpret the results.

Age of the household head significantly and negatively influenced market participation. An increase in the age of household head by one year decreases the probability of participating in the pineapple market by 0.02%, all other factors held constant. This implies that the younger people are more enthusiastic to participate in the pineapple market than the older people are. Barret *et al*. (2007) stated that younger people participated more in the market because they are more receptive to new ideas and are less risk averse than the older people. The finding concurs with that of Chalwe (2011), who found younger people to participate more than older people in marketing of beans in Zambia.

Table 14: The Heckman two-step selection equation result

Variable	δy/δx	Coef.	Std. Err	P>|z|
Age	-0.0002**	-0.0498	0.0241	0.040
Gender	0.0388**	1.1690	0.5550	0.035
Household size	-0.0044	0.2781	0.1838	0.130
Education in years	0.0002***	0.1613	0.0528	0.005
Pineapple yield in Kgs	0.0002***	0.0528	0.0100	0.000
Vehicle ownership	0.0459	0.1610	0.6412	0.802
Occupation	0.0002	0.0494	0.3997	0.902
Household income	-0.0140	0.0823	0.2882	0.775
Mills lambda	-0.0690***	-0.0690	-0.0690	0.003
Rho	-1.0000			
Sigma	0.0690			

***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Survey data (2013)

Gender of the household head significantly and positively influenced market participation. Being male-headed household increases the probability of participating in the pineapple market by 3.88%, all other factors held constant. This suggests that the male-headed households are more market oriented than female, hence they participate more in the market for cash crops like pineapple. This finding is in line with the argument by Doss (2001) who argued that men are responsible for providing cash income to the household and to accomplish this they grow cash and export crop.

Education level of the household head significantly and positively influenced market participation. One year increases in household head's education, increase the probability of participating in the pineapple market by 0.02%, all other factors held constant. This can be explained by the fact that as an individual access more education he/she is empowered with the marketing skill and knowledge that will spur individual to participate in the market. This is in line with Astewel, (2010) who illustrate that if paddy producer gets educated, the amount of paddy supplied to the market increases, this suggests that higher level of education provides a greater opportunity for the farmers to participate in the pineapple market.

Pineapple yield significantly and positively influenced market participation. An increase in a weight of pineapple yield by one kilogram increases the probability of participating in the pineapple market by 0.02%, all other factors held constant. This implies that as the pineapple yield increases, market participation also increases. This is in line with the findings of Abay (2007) and Adugna (2009) who found that an increase amount of tomato and papaya yield augment the market supply of these commodities significantly. Tadesse (2011) also found that avocado and mango quantities had a significant and positive effect on marketable supply in Gomma Woreda, Ethiopia.

4.3.1.2 Factors influencing the extent of market participation

To determine the factors influencing the extent of market participation in pineapple marketing, OLS regression was estimated in the second step of the Heckman outcome equation. The results are presented in Table 15. Six variables (gender, marketing in group, price information, marketing experience, vehicle ownership and contract) were significantly found to influence the extent of market participation.

Table 15: The Heckman two-step outcome equation results

Variable	Coef.	Std. Err.	P>|z|
Household income	-0.0140	0.0089	0.116
Age in years	-0.0000	0.0007	0.980
Gender	0.0387**	0.0177	0.029
Price information	0.0488***	0.0175	0.005
Contract marketing	0.0464**	0.0197	0.019
Group marketing	0.0385*	0.0201	0.055
Distance to market in Kms	-0.0000	0.0015	0.980
Marketing experience	0.0098**	0.0041	0.018
Pineapple yield in Kgs	0.0002	0.0002	0.271
Vehicle ownership	0.0459**	0.0226	0.042
Education in years	-0.0002	0.0022	0.916
Occupation	-0.0001	0.0120	0.993
Price in Kshs	0.0006	0.0018	0.742
Household size	-0.0044	-0.0064	0.499

*: significant at 10% level; **: significant at 5% level; ***: significant at 1% level.

Source: Survey data (2013).

Gender of the household head significantly and positively influenced the extent of market participation. Being a male headed household increased the proportion of pineapple sales by 0.0387. The male-headed households are believed to have strong bargaining power which in turn increases the proportion of pineapple sales. The result is consistent with that of Cunningham *et al*. (2008) who argued that men are likely to sell more due to their acumen in bargaining, negotiating and enforcing contracts. This argument was advanced by Dorward *et al*. (2004) who concluded that the discriminatory tendencies against women tend to weaken their negotiation prowess and therefore making them less influential in agro-commodity trade.

Price information significantly and positively influenced the extent of market participation. The result shows that an increase in access to price information by one unit increases the proportion of pineapple sales by 0.0488. Price information is vital instrument during marketing because it informs the farmers about marketing conditions. Farmers who have price information prior to marketing tend to sell more of their produce than those without. The finding is consistent with economic theory by Key *et al*. (2000) and Alene *et al*. (2008) who found the existence of a positive relationship between the price and the proportion of sales and confirm price to be an incentive to sell.

The coefficient of contract marketing was found to be positive and significant. Being in contract marketing increases the proportion of pineapple sale by 0.0464. This denotes that the farmers who were marketing under contract sold more of pineapple produce due to availability of ready market. The finding is in line with that of Jari and Fraser (2009) who found an increase in formal market participation with the availability of contractual agreement amongst smallholder and emerging farmers in the Kat river valley, South Africa.

Group marketing positively and significantly influenced the extent of market participation. The result shows that an increase in group marketing by one person increases the proportion of pineapple sale by 0.0385. Marketing in the group has enabled the farmers to pull their resources together and take advantage of economies of scale. Kirsten and Vink (2005) argued that belonging to a group empowers farmers to bargain and negotiate for better trading terms. This enhanced trading term increases the extent of market participation among the pineapple farmers.

Marketing experience positively and significantly influenced the extent of market participation. An increase in a farmer's marketing experience by one year increase the proportion of pineapple sale by 0.0098. The marketing experience has direct relationship with the farmer's level in bargaining prowess and marketing network. This means that the farmers

with more years in marketing have higher ability to sell more pineapple produce in the market. The finding concurs with that of Abay (2007) who found an increase in farmer's experience resulted in the increases of tomato being supplied to the market in Fogere, South Gonder.

Vehicle ownership positively and significantly influenced the extent of market participation. The result shows that an increase in vehicle ownership by one vehicle increases the proportion of pineapple sale by 0.0459.Vehicle ownership plays crucial role in lowering the transport cost as well as boosting the volume of transport and this increases the proportion of pineapple sales to the market. The finding concurs with the study by Jagwe (2011) on the impact of transaction cost on the participation of smallholder farmers and intermediaries in the banana market of Burundi, Rwanda and Democratic Republic of Congo who found the ownership of bicycle to increase the banana sales.

4.3.2 Factors affecting the choice of pineapple marketing outlets.

The multinomial Logit model was used to determine the factors influencing the choice of pineapple marketing outlets in Bureti district. The variables included in the estimation were: age, gender, education, vehicle ownership, pineapple yields, marketing group, marketing experience, price information, and contract marketing. Table 16 presents the results of the Multinomial Logit model. The Chi-square value of -63.657 showed that likelihood ratio statistics are highly significant (P < 0.000) suggesting that the model had strong explanatory power. The pseudo-R square was 0.4071 indicating the explanatory variable explained about 40.71% of the variable in the choice of market outlets. Before the marginal effects were run, the coefficient estimates were run and presented in appendix 1 to provide only the direction of the effect of the independent variable on the dependent variables but not the actual magnitude of the change of probabilities. Thus, the marginal effects from the MNL model, which measure the expected change in the probability of a particular choice being made with respect to a unit change in an independent variable, are reported and discussed. The significant value (also known as p-values) show whether a change in the independent variable significantly influences the Logit at a given level (Gujarati, 2007).

Table 16: Marginal effect from Multinomial Logit on the choice of marketing outlets

Explanatory variable	Farm-gate		Local market		Urban market	
	δy/δx	P-value	δy/δx	P-value	δy/δx	P-value
Age	-0.0654	0.116	-0.1656	0.184	-0.0823	0.178
Gender	-0.2649*	0.089	0.2781*	0.062	-0.0133	0.886
Education	-0.0088	0.679	-0.0146	0.514	0.0234	0.163
Group marketing	-0.3873***	0.002	0.1752	0.280	0.2121*	0.088
Market experience	-0.0719	0.124	0.0510	0.198	0.0144	0.354
Pineapple yield	-0.2973***	0.008	0.3551***	0.002	0.0578	0.290
Price information	-0.1851	0.243	0.2973 **	0.045	0.1122	0.245
Contract marketing	0.3154*	0.087	-0.2872	0.108	-0.0282	0.725
Vehicle ownership	0.0001	0.990	0.3517**	0.042	0.3616**	0.021

Number of observations = 100   Wald chi^2 (18): 87.42

Prob > Chi^2 = 0.000   Pseudo R^2 = 0.4071

Log likelihood = -63.657324

***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Survey data (2013)

Gender of the household head had a significant influence on the choice of farm-gate and local market. Male-headed household had a higher probability of selling at local markets by 27.81%; however, they had a lower probability of selling at farm-gate by 26.49%. A plausible explanation for this is that male-headed households tend to risk takers thus they are capable of searching markets in the distance and competitive places like local market. Conversely, female household's head tends to be confined at home by household chores hence hindering them from attending the market places. The finding concurs with that of Morrison *et al.* (2007), who found that female farmers are faced with gender specific constraints like a time burden that limit them from accessing the best market for their output.

Group marketing had a significant influence on the choice of farm-gate and urban market. The farmer who belongs to group marketing had a lower chance of selling at farm gate by 38.73 %; but also had a higher chance of selling at urban market by 21.21%. The justification behind this is that the farmers who collectively market their yields to the distant places like urban markets tend to incur a lower transaction cost. Njuki *et al.* (2009) stated that besides reducing transaction costs, collective marketing empowers farmers to negotiate for better trade terms and prices. This finding is in line with the argument of Jari and Fraser

(2009), who stated that the farmers who participate in groups have the ability to reach a distant market because they are able to share information and broaden social capital within the groups.

Pineapple yield had a significant influence on the choice of farm-gate and local market. An increase in the weight of pineapple yields by one kilogram increases the probability of selling at local markets by 35.51%, while a decrease in one kilogram weight of pineapple yields increases the probability of selling pineapple at farm-gate by 29.73%. This means that the farmers who have more yields have more opportunities of selling their produce at the market places than those with the little produce. The finding is in line with that of Chalwe (2011), who found more of the beans produced are sold to the private traders in the market places than to other households at the farm gate.

Price information had a positive influence on the choice of the local market. An increase in price information by one unit increases the probability of selling the pineapple yield in the local market by 29.73%. Price information informs the farmer on prevailing pricing condition. This shows that the farmers who market their produce at local market incur neither higher transaction cost like urban marketer nor poor prices like farm-gate marketers.

Contract marketing had a positive significant influence on the choice of farm-gate. The farmers who were under contract in marketing had a higher probability of selling at farm-gate by 31.54%. Contract marketing guarantees the farmers with a ready market. In essence, a ready market reduces the farmers' costs that are associated with searching the potential buyers and transport. For this reason, the farmers opt to sell at farm-gate in order to incur zero transaction cost. The finding is consistent with that of Escobal and Cavero (2007), who found that marketing of potato at the farm-gate in Peru involves no tax obligation (taxes are not levied) or trade commitments, since the farm is an open market and there is no restriction or barrier.

Vehicle ownership had a significant influence on the choice of the local market and urban market. An increase in the vehicle ownership by one vehicle increases the probability of selling at local markets and urban markets by 35.17% and 36.16%, respectively. Vehicle ownership helps in reducing the long distance constraints and aids in offering the greater depth in marketing choices. The result concurs with argument of Chalwe (2011) who stated that the availability of on-farm transport increases the probability of transporting goods to private traders in the market.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the discussion of results of the socio-economic characteristics of small-scale pineapple farmers, institutional and market characteristics in Bureti district. It also summarizes the empirical results of the Heckman two-stage model and multinomial model. With regards to marketing challenges revealed by the empirical results, policy recommendations are posited to help in enhancing market participation as well as choice of marketing outlets among small scale pineapple farmers.

5.2 Conclusions

Socio-economic characteristics like age, gender, education level, vehicle ownership and pineapple yield were described. The results show that the mean age of market participants was about 45 years while that for non-market participants was about 51 years. Gender shows that 69% of market participants were male while 31% were female. On the other hand, 18% of non-market participants were male while 82% were female. Education level shows that 14% of market participants had no formal education, 47% attained primary level, 26% attained secondary level and 13% attained tertiary level. On the other hand, 50% of non-market participants had no formal education, 42% attained primary level, 8% attained secondary level and none attained tertiary level. Pineapple yield shows that the means of pineapple yields for market participants per week was found to be 201.60 kilograms while that for non-market participant was found to be 107.80 kilograms. Vehicle ownership shows that 47% of market participants own vehicles while 53% did not own. On the other hand, 22% of non-market participants own vehicles while 78% did not own. Institutional characteristics like road infrastructure, access to extension service, group marketing and contract marketing were described. The results show that only 5% of market participants had access extension service to marketing while 95% did not. Road infrastructure used by pineapple farmers were found to be in poor conditions, 64% were made of earth's surface. Group marketing shows that 32% of the market participants were in group while 68% were not. In terms of contract marketing, the results show that 53% of the market participants were under contract markeing while 47% were not. Market characteristics like marketing experience, price information, distance to market, and pineapple price were also described. The result shows that the least experienced market participant had 3 years while the most experienced had 13 years. For price information, 55% of market participants had access to

price information while 45% did not access. The pineapple price per piece was found to be 10 shillings while the highest was found to be 40 shillings. Distance to the market was found to have the shortest distance of 0 kilometers and the furthest distance of 50 kilometers.

Four factors were found to be significant in influencing the pineapple market participation. Age, gender, education level and pineapple yield positively influences the decision to participate in pineapple market. Age was negatively significant meaning that more of younger people participated in pineapple marketing. The rationale behind this is that younger people tend to be energetic and risk takers. Gender of household head was positive and significant. Male-headed households tend to be more of a market oriented than female household heads mainly because men are perceived to be more resource endowed than women. Education level was positive and significant. This can be explained by the fact that as an individual gets more educated, marketing abilities and information also increases. Pineapple yield was also positive and significant, implying that more yield leads to marketable surplus spurring the individuals to participate in the market.

Six factors were found to be significant in influencing the extent of market participation. Gender, group marketing, price information, marketing experience, vehicle ownership and contract marketing had a positive influence on the proportion of pineapple sales. Male-headed household was found to increase the proportion of pineapple sales due to their acumen in bargaining, negotiating and enforcing contracts. Marketing in groups was found to positively influence the proportion of pineapple sales because they enable farmers to pull their resources together and take advantage of economies of scale. Price information positively influences the proportion of pineapple sales because it informs the farmers about pricing conditions. For that reason, the farmers will be motivated to sell more of their produces when they found the prices to be higher. Marketing experience positively influences the proportion of pineapple sales because it has a direct relationship with the farmer's level in bargaining power and marketing network. This means that the farmers with higher marketing experiences have higher capacity to sell more of their pineapple produce. Vehicle ownership positively influences the proportion of pineapple sales because it enhances the volume of produce to be transported as well as lowering the transport cost. Contract marketing positively influences the proportion of pineapple sales since it guarantees the pineapple farmers with the ready market.

Six factors were found to be significant in determining factors influencing the choice of pineapple marketing outlet. Gender, group marketing, price information, pineapple yield,

contract marketing and vehicle ownership significantly influence the choice of pineapple marketing outlet. Gender had a significant influence on the choice of marketing outlets. Male-headed household positively influences the local market as a choice of marketing outlets and negatively influences the farm gate as a choice of marketing outlet. Male-headed households tend to risk takers; hence, they are adept at searching market in the competitive place like local market. Conversely, female-headed households tend to be confined at home by household chores hence hindering them from attending the market places. Group marketing positively influences the urban market as a choice of marketing outlet and negatively influences the farm gate as a choice of marketing outlet. The reason behind this is that farmers' marketing in a group tends to prefer urban market because of economies of scale which lower their transaction costs. Price information positively influences the local market as the choice of marketing outlet. Price information informs the farmer on prevailing pricing condition. This shows that the farmers who market their produce at local market incur neither higher transaction cost like urban marketer nor poor prices like farm-gate marketers. Pineapple yield positively influences the local market as a choice of marketing outlet and negatively influences the farm gate as a choice of marketing outlet. The farmers who had little produces prefer farm-gate than local market to minimize higher transaction costs. Contract marketing positively influences the farm-gate as the choice of marketing outlet. Contract marketing guarantees the farmers with a ready market, hence the farmer opt to sell at farm-gate in order to incur zero transaction cost. Vehicle ownership positively influences the local and urban market as a choice of marketing outlets because vehicle ownership helps in reducing the long distance constraints and aids in offering the greater depth in marketing choices.

5.3 Recommendations

Based on the results of the study, education level, gender, vehicle ownership, price information, group marketing and market contracting were significantly found to influence the pineapple market. The study recommends that for holistic market participation among pineapple farmers, proper marketing infrastructure like pineapple hub must be put in place. The government and other policy makers should also increase the marketing information and abilities of pineapple farmers through avenues like mass media, extension service and other means of capacity building.

Affirmative action should also be considered for gender awareness; this is done by empowering more women to engage in pineapple marketing. Group marketing should also be

put as priority in marketing to improve the bargaining position of the pineapple farmers as well as a means of lowering transaction costs. Government should also invest in rural infrastructure, especially on the road network to ease conveyance of the pineapple produce from the area of production to marketing point. Marketing extension services should also be strengthened to enable the farmers to make good marketing decisions by enabling the farmers to produce in accordance to marketing requirement, especially on varieties; by training the farmers in harvesting and post-harvest handling and also by conducting market related information for the farmers on price trends, future demands and change in consumer preferences.

Price factors also play a vital role in market participation as well as the choice of marketing outlet. This implies that farmers with price information are more likely to participate in pineapple marketing and in the right position to make prudent decisions on an appropriate market outlet. Therefore, the farmer should be made to access price information at all time. Dissemination of price information can be done through mass media, government administration, and extension officer among others avenues. Contract marketing should also be extended to farmers who market their produce at local and urban market. The price of pineapple at farm-gate was found to be inadequate because the farmers are forced to be price takers which result in lower prices. Therefore, the pineapple farmers are encouraged to take their pineapple produce to competitive places like local or urban markets where the prices are higher.

5.4. Further research

The main intention of the study was to determine the factors influencing market participation and extent of market participation among the pineapple farmers. It also determined the factors that influence the choice of marketing outlets. However, the study proposes further research on:

1. Impact assessment of transaction cost of market participation among pineapple farmers in Bureti district. There is need to determine the constraints and barriers that affect the pineapple farmers as they are reflected in transaction cost.

2. The factors that influence the choice of marketing channel among the pineapple farmers. This study merely studied on the choice of marketing outlets, but not on marketing channels (the path that the farmers use from production to consumption point).

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Appendix 1: Coefficient Results of Multinomial Logit Regression

Marketing outlet	Coef	Std. Err	Z	P >|z|
Farm gate	(Base outcome)			
Local market				
Marketing experience	0.2673	0.1837	1.45	0.146
Group marketing	1.6620	0.8827	1.88	0.060
Price information	1.0957	0.7109	1.54	0.123
Age	-0.9609	0.5525	-1.74	0.083
Pineapple produces	1.4517	0.4964	2.94	0.003
Gender	1.2344	0.6936	1.78	0.075
Vehicle ownership	-0.7827	0.8831	-0.89	0.375
Contract marketing	-1.4263	0.9178	-1.55	0.120
Education	-0.0051	0.0919	-0.06	0.956
Urban market				
Marketing experience	0.3251	0.2152	1.51	0.131
Group marketing	2.9880	1.0012	2.98	0.003
Price information	0.6509	1.0961	-0.59	0.553
Age	-1.5313	0.6900	-2.22	0.026
Pineapple produces	0.1486	0.7223	0.21	0.837
Gender	0.4789	1.1345	0.42	0.673
Vehicle ownership	2.9046	1.5159	1.92	0.053
Contract marketing	1.1792	1.1791	-1.00	0.317
Education	0.2746	0.1940	1.42	0.157

Number of observations = 100   Wald chi^2 (18): 87.42

Prob > Chi^2 = 0.000   Pseudo R^2 = 0.4071

Log likelihood = -63.657324

Appendix 2: Questionnaire

This study is conducted to find out the factors that determine market participation among small-scale pineapple farmers in Bureti district, Kenya. The information provided will assist in the formulation of policies and programs that will improve pineapple marketing in the district. The information will be treated with strict confidentiality.

Questionnaire Identification

Questionnaire number……………………………….

Division …………………………………………….

Location…………………………………………….

Name of enumerator………………………………..

Name of farmer…………………………………….

DEMOGRAPHIC DETAILS

A.1. Gender/sex: ☐ Male ☐ Female (*Tick where appropriate*)

A.2. Relation to head (*Tick where appropriate*)

Head	Wife	Sibling	Others (specify)

A.3. Occupation of the head (*Tick where appropriate*)

Farmer	Businessman	Employed	Others (specify)

A.4. Age of the householdhead ……………………………. years

A.5. Marital status of the head

Single	Married	Widowed	Divorced

A.6. Household size (*number of people living and eating together*)………………….

A.7 (a). What is the highest educational level the head of household has completed?

No formal education	Primary level	Secondary level	Tertiary level	Others (specify)

(b). how many years of schooling…………………………….. (Years)

A.8. Indicate the number of employees who assist with farm work

Type of employee	Full-time employees	Part-time employees	Family member	TOTAL
Number				

A.9. What is your employment status and under which income class do you fall in

Employment status		Income class(Ksh)					
	Tick	< 1000	1000-10,000	10,000-20,000	20,000-30,000	40,0000-50,000	>50,000
Full-time worker							
Part-time worker							
Formally employed							
Pensioner							
Other (specify)							

PHYSICAL CAPITAL/ASSETS

	Number	How much did it cost	Current value	Source of investment
House(specify)				
Car/motor cycle/bicycle				
Overall farm size(in acres)				
Livestock				
Farm machinery				
Tv				
Mobile phone				
Electricity				
Others (Specify)				

PINEAPPLE MARKETING

C. 1. How much pineapples are produced in the farm every day in …….. kgs

C.2. Which markets do you usually use for selling pineapple produced?

Market	Reason
Formal market	
Informal market	
I don't sell (household consumption)	

C.3. How many pineapples do you sell every day in ………… kgs

C.4. where do you sell most you pineapples produced

Place	Tick where appropriate	Reason
Farm gate		
local market		
Urban market		
Other countries (export)		

C.5. How many have you been pineapple market .... yrs

C.7 Do you always find the market for pineapple produced   Yes { } or No { }

C.7. If no what happen to unsold pineapple produced(tick where appropriate)

lost to spoilage	Eat (family & friend	Sell at low price	Store and sold later	Process it

C.8. How difficult is it to find the buyer (tick where appropriate)

Easy	Fair	Difficult

C.9. Is pineapple graded before marketing? Yes { } or No { }.

C.10. Do your perceived grade corresponds with the one that is being used (Explain)

………………………………………………………………………………………………
……………………………………………………………………………………………..

C.11. Do you have problems meeting the grades? Yes { } or No { }

C.12. What happens with a poor grades pineapple?

………………………………………………………………………………………………
……………………………………………………………………………………………..

C.13. In terms of the market outlet you use regularly, what are the main benefits

Receive high price	Understand contract	Provided input	Nearer	Others (specify)

C.14. Do you have contractual agreements or a guaranteed/ ready market (formal or informal) with any agribusiness outlet e.g. schools, supermarkets e.t.c? Yes { } or No { }

C.15. Do you have regular customer, who always buy from you?   Yes { } or No { }

C.16. If yes, how long have you been trading with these customers? ....

C.17. How well do you know you customer?...

C.18. How is your produce moved to the marketing point (tick appropriate)

	Type of transport				
	Bike	Motorbike	Truck	Nissan	Other (specify)
Own transport					
Hired vehicle (individual)					
Hired vehicle (group)					
Public transport					
Buyer transport					
Move by donkey cart					

C.19. How far is marketing point .... Km

C.20. How much do you pay for single trip to the market? Ksh …………..

C.21. What general problem do you experience in moving your produce?

Lack of transport	Small size of transport	High transport cost	Others (specify)

C.22. Complete the below for payments and how long it take to receive the payments

List the marketing outlet	How are you paid			Time taken for payment
	cash	Cheque	Other (specify)	

C.23.When selling do you combine, with other farmers?

Yes	Reason	No	You don't sell at the same time
	It is lower cost		You don't sell at same market
	Increase bargaining power		You conflict
	Share market knowledge		They will degrade you produce
	Specify (others)		Specify (others)

C.24. Before selling your produce what value adding activities do you performs? (Tick)

Activity	Tick	Importance
Washing		
Packaging		
Cutting		
Processing		
Specify (others)		

INFRASTRUCTURE

D.1. What type of road do you use to the market

Tarmac	Rough	Both

D.2. In your own opinion, how do you rate your road?

Fine	Good	Bad

D3. Are you satisfied with the number of road that links you to the market? Yes { } or No { }

D.4. Does market stalk exist in your area Yes { } or No { }

D.5. If it exist, what is the condition of marketing stalks you have access to?

Unavailable	Bad	Good	Fine

D.6. In your own opinion do you think marketing stalk are important? Explain

……………………………………………………………………………………………………

………………………………………………………………………………………....

MARKETING INFORMATION

E.1. Do you have access to market information?   Yes { } or No { }.

E.2. Do you receive market information prior to sale   Yes { } or No { }

E.3. What are your sources of information

Sources	Type of information (provided)						
	Rank	Prices	Date for sale	Buyer	Market demand	Market opportunies	Others (specify)
Public administration							
Buyer							
Extension officers							
Friends							
Co- farmers							
Media							
Others (specify)							

E.4. How often do you receive the information?

Daily	Weekly	Monthly	Annually	Others (specify)

E.5. How do you want information to be delivered

Through media	Through cellphone	Through extension officer	Through farmers group	Specify (others)

E.6. Which language is use to deliver information?...

E.7. Do you consult other farmer, before making decision Yes { } or No { }

E.8. What do you normally consult others farmers about?

…………………………………………………………………………………………………

……………………………………………………………………………………………

EXTENSION SERVICE

F.1 Do you have contact with extension officers during marketing period? Yes { } or No {}.

F.2. what service are provided by extension officers

Advice on marketing	Advice on processing	Specify (other)

F.3. Are the extension officers are always available when you need help?

Never available	Sometime available	Always available

F.4. List the problem you encounter when you contracting extension officers

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

PRICING

G.1. At what price do you sell per pineapple in Ksh ……………..

G.2. Do you perform price surveys, before selling Yes { } or No { }

G.3. How is price set during sales?

I set the price	We negotiate	It is market driven	It is dictated by the buyer	Specify (others)

G.4. How do you decide the sale price of your produce? Tick where appropriate

	Very important	Important	Not important
a) It depends on the price of other local farmers			
b) It depends on the price of international farmers			
c) It depends on the market we sell to			
d) It depends on the production costs			
e) It depends on the concentration of the market			
f) It depends on the transaction costs			

G.5. How do the price that the buyer is willing to pay differ from your expectation

Lower than expected	Equal	Higher than expected

G.7. When selling who negotiate on your behalf?

……………………………………………………………………………………………………

…………………………………………………………………………………………………

G.8. When negotiating, which language is used?

Own language (Name it)	English	Kiswahili

G.9. If not own language, are you able to negotiate as well as you would do if you were to use you own language……………………………………………………………………………….

G.10. List what you consider to be the major problems you face in marketing your goods

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G.11. Suggest ways in which such problems can be addressed

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