FACTORS INFLUENCING CHOICE OF MARKET OUTLETS FOR UNPROCESSED TEA BY SMALL AND MICRO TEA AGRI-ENTERPRISES IN CHESUMEI SUB -COUNTY, KENYA

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A Thesis Submitted to the Graduate School in Partial Fulfillment of the Requirements for the Master of Science Degree in Agribusiness Management of Egerton University

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been presented in this university or any other for the award of a degree

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Recommendation

This thesis has been submitted for examination with our approval as University supervisors.

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DEDICATION

This thesis is dedicated to God.

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ABSTRACT

Formal market outlets are more profitable than informal ones. However, small tea agri-enterprises in Chesumei Sub County prefer selling their unprocessed tea to informal market outlets. Empirical evidence on what motivates these agri-enterprises to sell most of their tea to these outlets is scanty. The general objective of this study was to contribute to increased tea production and income through the choice of efficient and effective market outlets by small and micro tea agri-enterprises. Specific objectives of the study were to; characterize the market outlets available for small and micro tea agri-enterprises, socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea, and comparing the profitability of formal market outlets with informal market outlets among small and micro tea agri-enterprises. A multistage sampling procedure was employed, and 384 respondents interviewed using a semi-structured questionnaire. Data were analyzed using descriptive statistics, the Multinomial logit model, and Gross margin analysis. Results show that tea agri-enterprises choose the market outlets based on services offered and institutional arrangements. On credit, payment had the highest frequency for farmers selling to Kenya Tea Development Agency (KTDA) and private companies (99% and 98%, respectively), contrary to agripreneurs, which had a high frequency on cash payment (100%). Household size, experience, group membership, and access to information significantly influenced the choice of market outlets for unprocessed tea. Formal market outlets are more beneficial because of a higher gross margin rate of 13% than informal market outlets having a gross margin rate of 1%. The study concludes that; on-credit payments attracted farmers who choose the formal market outlets, access to supply of input and credit access while cash payments and none strict plucking guidelines and standards mainly attracted those who decided the informal market outlets. Access to market and production information influenced formal and informal market outlets for unprocessed tea positively and negatively, respectively, and formal market outlets have higher gross margins than informal market outlets for unprocessed tea. This study recommends that KTDA and private companies have contractual arrangements where part of the sale proceeds are paid in cash mode to attract those selling to agripreneurs. It further suggested that the County Government of Nandi improve on extension services to reach all the farmers. The findings help guide smallholder tea farmers in information on the most profitable and efficient market outlets and informing policymakers on how to improve the efficiency of market outlets.

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LIST OF ABBREVIATIONS AND ACRONYMS

AGM	Average Gross Margin
AFDB	Africa Development Bank
CPDA	Christian Partners Development Agency
EPZ	Export Processing Zone
GDP	Gross Domestic Product
GMA	Gross margin Analysis
IEBC	Independent Electoral Boundaries Commission
ILC	International Labour Conference
KETEPA	Kenya Tea Packers Ltd
KNBS	Kenya National Bureau of Statistics
KTDA	Kenya Tea Development Agency
MNLR	Multinomial Logistic Regression Model
NAS	National Agribusiness Strategy
TBK	Tea Board of Kenya
SMMEs	Small, Micro and Medium Enterprises
SIDA	Swedish International Development Corporation Agency
STATA	Statistical Analysis Software
SPSS	Statistical Package for Social Sciences
TRFK	Tea Research Foundation of Kenya

CHAPTER ONE
INTRODUCTION

1.1 Introduction

This chapter gives the background of the study, statement of the problem and the objectives in sections 2, 3, and 4 respectively. The research questions and justification of the study are presented in sections 5 and 6 respectively. Section 7 gives the scope and limitation of the study and operational definition of terms are presented in the last section.

1.2 Background Information

Small, Medium, and Micro Enterprises (SMMEs) form an integral part of the country's culture and economy, particularly among entrepreneurial and trade union organizations in developmental projects (Tokman, 2007; Wedderburn *et al.*, 2009). The developments of SMMEs are essential factors in employment, innovation, economic growth, and equity, so consequently are given policy thrusts in most developing countries (Jabir, 2016). However, formalization considers conditions of labor availability and production infrastructure and outlets that link products of everyday work with the formal economy (William *et al*., 2013).

Kenya has a dual economy comprising of the formal and informal economy. It is also an agricultural-based economy with leading crops being tea, horticulture, cereals (wheat and maize), sugarcane, and livestock production contributing to rural employment, food production, foreign exchange earnings, and rural incomes (Kiprono *et al.*, 2011). The agricultural sector directly accounts for about 26% of Kenya's GDP and 27% indirectly through linkages with manufacturing, distribution, and other service-related sectors (KNBS, 2016). It is argued that an increase in tax revenues received from a sector producing unreported income in total GDP would eliminate the country's massive budget deficit (Wedderburn *et al.,* 2009).

Studies have characterized the SMMEs sector by the ease of entry, low-resource base, and family ownership, labor-intensive, adapted technology, and informal processes for acquiring skills (Obare, 2015; Tokman, 2007). According to Wedderburn *et al.* (2009), most economic activities in the sector are small-scale farming, domestic serving hawking, casual vending, and drug dealing. However, if informal actors are classified according to their income levels rather than ideological status, informal workers could burden informal sectors (Yussuf, 2011).

Entrepreneurial and market orientation and organizational competency, and the ability to use social networks are essential capacities for farmers to build competitive advantages to help them succeed in free markets and eventually achieve sustainable development (McElwee, 2006). Competitive advantages mediate entrepreneurial orientation and marketing performance reflected from the innovation and market differentiation (Pardi, 2014).

A competitive agribusiness sector requires practical innovation and entrepreneurship development to compete and strengthen growth (Jabir, 2016). An entrepreneur recognizes an unmet need of the society as an opportunity (Pardi, 2014) and takes risks to develop solutions through development on skills and capacities such as marketing, management, organizational and financial, besides being open to adopting new and innovative technologies, strategies, and products (Omid *et al*., 2016). Agripreneurs possess the qualities of an entrepreneur and apply them in agriculture (Wickramaratne *et al.,* 2017) and informal SMMEs sectors to enhance agricultural production, productivity, and income (KNBS, 2016). Successful farmers can distinguish between conventional and portfolio farmers, the latter having more growth orientation, risk-taking, innovativeness, and personal control characteristics (Shadbolt *et al.,* 2016).

The tea industry plays a crucial role in the agriculture sector and the economy, with tea output contributing about 11% of the agriculture sector's contribution to Gross Domestic Product. Like many other crops in Kenya, tea is produced both on a small and large-scale basis. Smallholder farmers in Kenya contribute to the industry producing 61% of the total national production and 66% of tea acreage (Monroy *et al.,* 2013).

Market liberalization has given farmers a choice of where to sell their unprocessed tea. The multinational firms have managed to access the smallholder tea farmers, which was not possible before market liberalization. The freedom of market choice has led to the rise of whether formality or informality in marketing. Most farmers prefer informal market outlets because they pay promptly for the unprocessed tea delivered as per the farmer's demands. In contrast, KTDA and private companies pay monthly (Kirui *et al*., 2014). Informal market outlets are evident as one of the main arising market alternatives in the tea industry. Trends in the industry provide a platform for the emergence of unregulated businesses. In this case, liberalization of the tea sector is the crucial factor that influences the behavior and production techniques of smallholder tea farmers in Kenya. Increased awareness of entrepreneurial and market orientation has had a more significant impact on the household's welfare through a

change in production levels and income from tea agri-enterprises. Informal market outlets involve agripreneurs buying and selling of unprocessed tea among themselves (Muku & Mwaura, 2007).

In Nandi, the tea industry comprises tea estates and smallholder sectors that comprise individual farmers with areas under tea averaging between 0.5 to 20 acres per household (Kirui *et al.,* 2014). Micro enterprises classified as a survivalist or non-survivalist enterprises. Survivalist enterprises do not employ anyone, such as hawkers, vendors, and shop owners. Non-survivalist enterprises employ no more than four regular workers. Both these types of enterprises tend to form part of the informal economy.

1.3 Statement of the problem

The formal market outlet is essential and more income-generating market outlet for many tea agri-enterprises. However, informal market outlets for unprocessed tea dominate the tea industry. Furthermore, public policy advisors have expressed a wide range of views from time to time concerning how enterprise formalization contributes to a country's economy. Informal market outlets can be a constraint to development, and others see it as a potential source of economic growth and poverty alleviation. Over the last decades, a theory and policy shift has taken place, from integrating informal economic activities and businesses to a formal economy. Hence, integrating informal marketing of unprocessed tea in the tea industry may affect the performance of the tea value chain and household decisions on the allocation of resources to other agri-enterprises. However, there is little information on whether the benefits from choosing the formal market outlets exceed those from the informal market. The study intends to fill the knowledge gap based on factors that determine the choice of informal and formal market outlets by tea agri-enterprises and evidence from gross margin analysis.

1.4 Objectives

1.4.1 General objective

To contribute to increased tea production and income through choice of efficient and effective market outlets by small and micro tea agri-enterprises in Chesumei Sub-County.

1.4.2 Specific objectives

i. To characterize different market outlets available for tea agri-enterprise in Chesumei Sub-County

ii. To determine socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea in Chesumei Sub-County
iii. To compare the profitability of formal and informal market outlets for unprocessed tea in Chesumei Sub-County

1.5 Research questions

The following are research questions

i. What are the characteristics of different market outlets available for unprocessed tea agri-enterprise in Chesumei Sub-County?
ii. What are the socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea in Chesumei Sub-County?
iii. What are the profit margins of formal and informal markets outlets for unprocessed tea in Chesumei Sub-County?

1.6 Justification

Kenya is the third-largest producer of high-quality black tea globally and makes a significant contribution to Kenya's economy, accounting for 2% of earnings of the country's agricultural gross domestic product (GDP). About four million people, one-tenth of the country's population, rely on tea for employment (AFA, 2019). The smallholder produces 60% of total tea produced in Kenya; hence main actors in the local auction influencing both the amount and prices offered at the auction (Mwaura & Muku, 2007).

After the liberalization of tea production in Kenya in 1997, there has been a significant improvement. In 2019, smallholder farmers had occupied a more significant part of 163,120 ha while the estates occupied 106,310, making the smallholder occupy 60% of the total tea area coverage in Kenya. The tea in terms of kilograms had increased from 311,980 kilograms in 1963 to 258,111,645 kilograms in 2019 by smallholder farmers (AFA, 2019). Therefore, there is a need to continuously analyze and improve marketing systems for unprocessed tea to achieve higher efficiencies and improve agribusiness competitiveness in the tea industry.

The findings of the study help guide small and micro tea agri-enterprises in information on the most profitable and efficient market outlets to strike a balance in terms of high and reliable returns. This information is expected to increase tea production and eventually improve the farmers' livelihoods because tea has remained dominant in contributing to household income in growing areas. Increasing tea production is key in attaining the National Agribusiness Strategy (NAS 2012) and vision 2030. High agricultural productivity and improved market

access for small and micro tea agri-enterprises is a precondition for growth and development in the agribusiness sector. The findings from this study inform policymakers on how to improve the efficiency of market outlets for unprocessed tea, which will improve the livelihoods of small and micro tea agri-enterprises in Chesumei Sub-County.

1.7 Scope and limitation

The study was confined to Chesumei Sub-County in Nandi County, focusing only on small and micro tea agri-enterprises. Additionally, it only looked at drivers, socio-economic and institutional factors influencing the choice of unprocessed tea market outlets and finally to compare the profitability of formal and informal market outlets for unprocessed tea. The study was limited to one production year based on recall memory data due to lack of farm records.

1.8 Operational definition of terms

Agri-enterprise: Activities concerning supply of inputs, production, processing, transporting, and marketing of agricultural and related produce within the agriculture value chain.

Agri-preneur: Farmers who are passionate about their farm business and are willing to take calculated risks to make their farms profitable and their businesses grow (Kahan, 2012).

Entrepreneurial orientation: It is the process, structure, and behaviour of firms (Wickramaratne *et al.,* 2017).

Smallholder farming: This refers to a grower cultivating tea in a small piece or pieces of land less than 20 acres.

Small and Micro Enterprises: Small businesses operating within the agriculture value chain

Peri-urban areas: These are areas along the urban-rural continuum.

Push/pull approach: A market-oriented, pathways-based approach to poverty reduction.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter gives literature review on previous related studies. The literature has been presented in the following order; Formal and informal economy, small and micro tea agri-enterprises in Kenya, market channels and strategies, push and pull market approaches, justification of econometric models, and finally the theoretical and conceptual frameworks of the study.

2.2 Formal and informal economy

A formal economy is defined as an economic zone legally sanctioned, regulated through state intervention, and marked by regular work. In contrast, the informal economy is defined as irregular work, outside legal sanction, without state regulation (Yusuff, 2011). According to Obare (2015), the government policy approach to the informal economy in Kenya is not popular among economy investors. This approach has significantly compromise casual employment creation for the majority of formally unemployed citizens. However, Africa Development Bank (AFDB, 2013) report indicates that despite the informal economy contributing about 55 percent of Sub-Saharan Africa's GDP. In addition, 80 percent of the labor force, most government, and affiliated agencies pay little attention to the role of the informal economy in fostering growth and creating jobs.

The informal economy thrives in a context of high unemployment, underemployment, poverty, gender inequality, and precarious work (ILO, 2014). This is in line with SIDA's major concern areas of activities. Informal activities play a significant role in income generation because of the relative ease of entry and low requirements for education, skills, technology, and capital. However, most people enter the informal economy not by choice but out of a need to survive and access basic income-generating activities. According to SIDA (2004) report, there should be an increased knowledge of the informal economy within the organization to address the problems (Becker, 2004; ILO, 2014).

Obare (2015) concludes that organizing the informal economy and recognizing its role as a profitable activity may contribute to economic development by increasing their incomes and strengthening their legal status. The study recommended that public policy-makers in Kenya recognize the critical role informal economy companies play in the economy. There is a need

for the government to coordinate its policies and strategies to support the formalization of the sector. The effective regulatory framework, good governance, better government services, improved business environment, and improving access to financing, technology, and infrastructure are essential in this process.

2.3 Small and micro tea agri-enterprises in Kenya

Tea agri-enterprise has recently faced numerous challenges. The major one is declining market price leading to low household income and thus becoming negative incentives. Like other agricultural products, tea prices fluctuate, posing more problems to those deriving their livelihood from it. This led to a variation of family income, prompting farmers to adjust their way of life. If a family does not have another source of income, the tea price changes would be more devastating. Therefore, these challenges need to be addressed before these farmers shift completely (Nyaga & Doppler, 2009).

According to Nyaga and Doppler (2009)**,** the results from dynamic models showed that **c**hildren would drop out of school, diseases would go untreated, the family would incur debts, and food ration would reduce among other problems. According to the analysis, price fluctuation is a significant problem affecting tea farmers' way of living. The fluctuation of tea prices as suggested in the study addressed by holding buffer stock, keeping stabilization funds, value addition, quality improvement, and diversification of markets. According to Gesimba *et al*. (2005), the tea industry faces significant challenges affecting smallholder farming negatively in terms of low income. The declining export price of tea is due to the consistent supply of tea into the world market. Furthermore, policies for regulating the supply of tea implemented did not work as expected. Categories of challenges facing smallholder tea farmers are production-related, management-related, local market challenges, regulatory-related and international market challenges (Kagira *et al*., 2012).

The cost of production is increasing notably in the estate sector because demand for labor is high for daily operation. Therefore, the dynamical pattern of wage awards obligatory within the industry. Additionally, lack of work contributes to the increasing cost (Gesimba *et al*., 2005). Farmers with over ten acres of land might lack employees to help in plucking tea compared to those with tiny farms as they maximize labor from relations while not payment. The plucking price per kilogram has risen thanks to the lack of those employees. The causes attributed to a shortage of labor square measure HIV/AIDs pandemic, rural to urban

migration, and negative perception by teens towards the agricultural sector. The government must improve the final conditions in rural areas by stressing the importance of agriculture in economic development to attenuate these issues (Karimi, 2008).

Poor infrastructure, unreliable electricity, high prices of fuel, and packaging materials are also seen as the significant contributors to the skyrocketing price of production. Poor infrastructure like roads affects the flexibility of tea farmers to fulfill the specified process schedules, contributory to a great deal of tea wastage (Kagira *et al.*, 2012). Authors advocates that farmers ought to improve the standard of those roads to confirm the property of the tea sector; for instance, farmers will have a communal workday wherever they'll devote their time and different resources in unblocking the emptying and repairing dangerous sections of the roads.

Farmers ought to be even educated on the importance of electing effective administrators to the tea factories boards for these deliveries to KTDA factories. This is often because of politics between the farmers, the elective administrators, and therefore the works managers pose an enormous challenge within the management of tea factories (Kagira *et al.*, 2012; Keraro *et al*., 2012). There was a great deal of interference in managing the operations in the majority of the factories. This interference is generally directed at the KTDA works managers and, therefore, the board of administrators. The results indicate that production prices square measure high as compared to different countries manufacturing tea (CPDA, 2008).

Old tea gardens that tend to yield but expected output are other challenges that lower the farmers' capacities to guarantee consistent productivity and property within the sector. Farmers' square measure is unable to adopt new varieties approved by high yield because the price of replacement is preventive. What is more, the maturing amount takes concerning 2-3 years, which means that a farmer will not be earning additional financial gain than if they had maintained the previous tea bushes (Gesimba *et al*., 2005; Kagira *et al*., 2012).

Smallholder farmers lack general farm management practices. Mwaura and Muku (2007) indicated that small-scale tea farmers had considerable expertise in tea farming, starting from one year to fifty years, touching the extent of productivity. The use of plant food by farmers was mixed, with some farming applying plant food while others did not. The farmers that applied plant food, their application were 229% above the recommended rate of 150 kgs per annum. Poor supervising of tea pluckers and different farm laborers contribute considerably to high operational prices. The exporters, for example, the United Nations agency, would import

tea from Kenya and use it for blending with lower quality tea (TRFK, 2005). Investment opportunities for worth adding activities through process and packaging for agricultural commodities to extend farm incomes and off-farm employment have not been exploited (Karimi, 2008). To confirm the property of the arena KTDA managed factories ought to diversify from the production of solely tea and manufacture a spread of branded tea merchandise. This may facilitate to enhance farmers' financial gain and scale back financial condition levels in tea growing areas of the Republic of Kenya. Tea exports need international certifications to access international markets and to fetch high costs. For example, Rain Forest Alliance, a global non-governmental organization (NGO), awards accreditation to tea factories that have created tea in an environmental property manner. Rain Forest Alliance requires that farmers shield the natural forests among their jurisdictions and plant autochthonal trees to extend forest cowl. It conjointly needs farmers and factories to provide tea ethically by avoiding kid labor and protecting employees' health at the farm and works levels (KTDA, 2013).

KTDA established a micro-finance company (Greenland Fedha Ltd) to produce money services to smallholder farmers to alter their block on rising farm inputs (Karimi, 2008). Provision of credit to growers United Nations agency square measure suppliers of the essential staple can cause the production of top quality tea resulting in increased client satisfaction. KTDA has computerized its operations at tea shopping for centers, and this has already started yielding dividends in terms of larger answerableness and returns. Networking all the tea chain players pay more significant advantages in data access, market access, and operational potency (Kagira *et al*., 2012). According to Gesimba *et al*. (2005), Kenyan teas can increase the market share by 100% contributed by the agreement signed by Kenya Tea Packers and Tabai Tea, KTDA and Campaign Tea Canada and the government to secure the export market has given all the tea factories Export process Zone (EPZ). This may make sure that factories get constant electrical power and low tariffs and reduce the assembly prices.

Tea has remained dominant in contributing to household income in growing areas. Most farmers have less awareness of the importance of diversifying to other enterprises. Development agencies have neglected smallholder tea farmers by assuming that tea is a leading export crop and thus high levels of poverty (Mwaura *et al.,* 2010). This is in contrast with one of five elements of poverty reduction strategies indicated in the Kenya Economic Report (2013). Majority of Kenya's poor depend on smallholder agriculture for their

livelihood and therefore calls for strategy enhancement that boost the productivity of smallholder farms. Increasing their productivity through fertilizer, improved seeds, and access to markets will lead to significant poverty reduction in the short to medium term. The report indicates that in 2005, the poverty level stood at 43% and this has declined to 37%. The vast majority of the poor lived in rural areas based on Kenya's national poverty line. Poor households are also more likely to depend on income and consumption from crops and livestock as a source of livelihood (Karimi, 2008).

The idea behind the establishment of net welfare was the assumption that tea-farming households whose returns from tea enterprise were less than its financial requirement to meet basic needs are inadequate. The basis for household financial requirements is the number of adult equivalent and the cost of buying necessities. They measure the welfare level as net income from tea enterprise less the household costs (Mwaura & Muku, 2007). However, investments in both farm and non-farm diversification could increase production and income. Therefore, encouraging public and private education will help rural economy diversification (Joshi, 2004).

Tea farming is one of the primary income earners among smallholder farmers in rural describes how tea farming leads to generating income for those who have multiple enterprises. Furthermore, the literature indicates that one out of five farmers had off-farm activities that supplement tea income. In conclusion, most farmers depend on tea enterprise as the leading income-generating enterprise. It has also helped farmers improve motivation and satisfaction (Keraro *et al.,* 2012; Mwaura *et al.,* 2010). According to Kirui *et al.* (2014), the government has also benefited from the liberalized tea sector as a source of revenue by way of corporation tax. Furthermore, it has given farmers full responsibilities for their farms and factories, which was way back government work. This shows that government has less to worry about the efficiency and management of the value chain.

Tea has a low risk because it has well established processing, assembling, marketing, and credit systems, and farmers paid on time for monthly deliveries. Farmers receive high returns while others were experiencing some losses attributed to high establishment costs. Tea plants take four years before fully established. The annual returns show that tea enterprise enjoys better returns and may have a comparative advantage in Kenyan highlands (Mwaura & Muku, 2007). Emerging informal market outlets for unprocessed tea is a significant challenge to the effective management of tea factories. Informal markets for unprocessed tea refer to a

situation where smallholder farmers prefer to sell their green leaves for immediate payment then wait for the monthly payment. Farmers in some parts of Kenya continued to sell their tea to these agripreneurs due to a lack of adequate knowledge, thus compromising the management of the factory companies (Keraro, 2012).

Informal markets and their practices are widespread in the West of Rift Valley tea-growing region The problem with informal markets is that the farmer only gets the farm gate payment, which is low, and misses out on the annual payment commonly called "bonus" that is higher in price per kilogram. Poor tea husbandry, low returns to the farmer, and non-repayment of farm input loans advanced to the farmers by the factory companies to which these farmers belonged are some of the contributions to informal marketing. Increased supply of unprocessed tea through informal markets attributes to low delivery of unprocessed tea to KTDA factories. The change in supply has hampered the efficiency of factories by increasing the production per unit as firms use the same capacity to process less in Rift Valley, forcing them to pay farmers low monthly payments and bonuses at the end of their financial year. These cases happen in areas where there are private companies but where farmers are operating in an environment of no private factories like in Mount Kenya, allow them to focus on quality and benefit from reduced production costs (Keraro *et al.*, 2012; Kiprono, 2011).

2.4 Market channels and strategies

The choice of market outlet is the farmers' decision-making behavior and market orientation on where to sell their farm produce. Numerous factors that include socioeconomic factors, institutional factors, production factors, and market factors determine the choice of marketing outlet. These factors could have a negative or positive influence, which could eventually affect the welfare of the smallholder farmers. Institutional factors, prices, and education level significantly influence the choice of marketing channels by smallholder tea farmers, and this supports a strong indication that farmers are gradually shifting away from KTDA for private companies (Chepkulei, 2013). However, this is not the case because variables affecting continuous decisions may affect the discrete participation decision. Some factors like fixed costs of market participation due to transport costs or vendor license fees that affect the discrete participation decision will not (Boughton *et al.*, 2007).

Majority of old farmers prefer choosing KTDA as their marketing channel (Kirui, 2016). Variables such as age, gender, education, farm years, and bonus (second payment)

significantly affect a farmer's decision to participate in a marketing channel (Chepkulei, 2013; Kirui, 2016). Age was negative and insignificant in influencing market participation but significantly affecting the extent of the involvement, meaning that more of the younger people participated in selected marketing outlets being energetic and risk-takers. However, factors affecting market participation and quantity decisions affect the dependent variable in the same direction (Mignouna *et al*., 2015).

Studies have shown that apart from socioeconomic factors, institutional factors play a significant role in determining market participation. Personal motives concerning the benefits from agricultural production, such as higher sale prices, select the intensity of the involvement in the marketing of farm products. Farmers with lower transaction costs participated in markets and sold more because they were likely to recover their production and marketing costs (Mignouna *et al*., 2015). In addition, vehicle ownership and marketing experience have a positive effect on the extent of participation. Farmers with more experience have established networks and therefore have a higher ability to sell more of their agricultural produce in the market. Asset ownership can be an avenue of reducing transport cost and boosting the volume and proportion of sales in the market (Sigei, 2015).

According to Boughton *et al.* (2007), private asset holdings are the key determinants of market participation. Unclear relationship between household asset portfolios and involvement in different product markets initiated a systematic assessment of this relationship using an asset-based approach. Household participation in crop markets will be associated with asset endowments. That participation in higher return markets may require different asset portfolios in terms of amount and types of the asset than participating in less remunerative. There is need to understand the role of transaction costs and market failure in smallholder decision making to participate in the markets in the presence of selection bias. When analyzing the determinants of market participation researchers have to deal with the econometrics of hazards of selection bias as identified by Heckman (1979). The problem arises because households face different types of decisions concerning market participation decisions. Whether to participate or not participate in a given particular market as a seller and how much to buy or sell is conditional on market participation.

2.5 Push and pull market approaches

A push-pull system is a market-oriented, pathways-based approach to poverty reduction that seeks to link, design, and practice the efforts to support transitions out of poverty for the extremely poor and market development initiatives (Garloch, 2015). The system describes the movement of a product or related piece of information between two subjects. Thus, on the market, the consumers usually pull the goods and parts of knowledge adequate to their demand to satisfy their needs, while those who are offering and supplying push the required products and services toward consumers (Minculete, 2016).

Market-pull strategy, which expands the diversity and quality of accessible economic opportunities focuses on identifying stakeholders downstream in the value chain, driving for change, and ensuring a well-connected network to the end market creating demand for smallholders' products. This strategy is associated with an established coordinated market characterized by shared information, mutual interests, long-term relationship, and trust. The product-push approach relates to everyday needs, and its characteristics are self-interests, minimal information sharing, independence, flexibility, and opportunism (Danida, 2016).

Motivations related to strategic choices can be classified into push and pull factors (Karim & Janann, 2016; Prayag & Ryan, 2011). Strategic decisions have responded to industry conditions that offer or curtail business opportunities and instigate various strategies (Karim & Janann, 2016). The 'push' factors originate from Maslow's hierarchy of needs. They are motivational factors that arise due to a state of disequilibrium or tension in the motivational system. Pull factors, on the other hand, have been described as those factors influencing when, where, and how people travel and are related to the features, attractions, or attributes of the destination itself and are significant in the decision process (Dawson & Henley, 2012; Prayag & Ryan, 2011).

Kirkwood (2009) identified pull factors are essential motivators for entrepreneurship. The author also identified push factors such as dissatisfaction with a job, helped from an employer, the changing world of work, and motivations regarding children as push factors. The desire for independence and money is critical to both men and women. Other push factors such as family and home circumstances or the nature of the chosen occupation allied to the possible pull of independence for those women who report multiple motives. For men, the

picture is perhaps more precise since internal pull factors such as independence tend to be combined with external pull factors such as market opportunities (Dawson & Henley, 2012).

Financial constraints may act as a push factor, created perhaps by the demands of managing and paying for childcare when combined with the pull factor of independence with the push factor of previous working conditions. Similarly, a combination such as working conditions and family commitments may push motivation to avoid severe organizational working conditions and the impact of those on managing caring activity, which propels women towards self-employment (Dawson & Henley, 2012). Informed by market demand, increases capacities (such as assets, skills, networks, behaviors) of the extreme poor to gainfully participate in markets and promotes the development of market systems in a manner that expands the quality and diversity of opportunities and impoverished households have for such participation (Garloch, 2015).

2.6 Justification of econometric model

The concept of a farmer's market outlet choice was adapted from random utility model (RUM). RUM is particularly appropriate for modeling discrete choice decisions such as between market outlets because it is an indirect utility function where an individual with specific characteristics associates an average utility level with each alternative marketing channel in a choice set (Greene, 2002). Econometric models such as multivariate probit/logit and multinomial probit/logit are useful models for analysis of categorical choice dependent variables. A number of studies done on factors influencing market outlets choice decisions revealed significant results. A study by Berem *et al*. (2016), Hailu and Fana (2017), Jari and Fraser (2009), Kuma *et al*. (2013, and Sigei *et al*. (2014), used multinomial logit model in an attempt to determine factors affecting producers' market outlet choice. Sori *et al*. (2017), Tarekegn *et al*. (2017) and Wosene *et al*. (2018) employed multivariate probit model to analyze factors affecting producers' market outlet choice. Whereas Gido *et al.* (2016) and Mueni (2017) analyzed their studies to model the producers' behaviour decision making on market outlets using multinomial probit models.

Multinomial probit model is most widely used modelling method for data analysis that focus on the analysis of the behaviour of decision makers who face a finite set of alternative choices especially when alternatives have correlated error terms and has been successfully applied in most studies (Gido *et al*.,2016; Mueni, 2017). It therefore relaxes the independence restrictions built into the multinomial logit (MNL) model. However, the main obstacle to

implementation of the MNP model has been the difficulty in computing the multivariate normal probabilities for any dimensionality higher than two computes (Greene, 2002). Multinomial logit fits the data better than MNP from the lower BIC statistic values for MNL model for groups in the study. MNL have a better fit to the data than both variations of MNP despite the presence of slight correlation as evidenced by IIA assumption violation (Gikonyo, 2013)

A MNP parameter estimate fits such specifications as free correlations among the choices, uncorrelated disturbances but free standard deviations and uncorrelated disturbances and equal standard deviations. The standard deviations and correlation shown in the MNP model are parameters of the distribution of eij, the overall randomness in the model. (Greene, 2002). MNP allows the modeling of correlated choices through the relaxing the IIA restriction and introduces additional parameters to the covariance matrix of the errors which increases flexibility of the error structure which allows any pattern of substitution. However, MNP model's increased flexibility involves the evaluation of high dimensional multivariate normal integrals for solving probabilities which increases time before reaching convergence and becomes challenging especially if probability is close to zero or one (Gikonyo, 2013).

Multivariate probit approach simultaneously models the influence of the set of explanatory variables on choice of market channels and allowing potential correlations between unobserved disturbances, as well as the relationships between the choices of different market channels and error terms jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity (Belderbos *et al*., 2004). Therefore, based on the empirical studies reviewed multinomial logit model was adopted for this study because it is appropriate when individuals can choose only one outcome from among the set of mutually exclusive, collectively exhaustive alternatives. Household information on the most preferred choices of households. The number 1 ranked outlet only retained for every household and drops all lower ranked outlets (Greene, 2002).

2.7 Theoretical framework

2.7.1 Profit maximization

Farmers have the objective of maximizing profit because the process of decision-making of peasant farmers involves both production and consumption aspects; other economists have argued that the profit-maximizing theory tends to ignore the consumption side (Mendola, 2005). As small-scale farmers often operate in a household economy, consumption and

production decisions are separable. Doing so enables farmers to focus on the market outlet with more impact on farm output profits. The assumption is that small-scale farmer choose the level of output for each distribution outlet in a manner that maximizes profits (Blandon *et al.,* 2010).

2.7.2 Utility theory

Utility theory modeled the decision to either chooses formal markets or not in this study. This decision depends on whether the formal markets give the household higher utility than informal markets. Households face different types of decisions concerning market participation and involve a discrete decision over whether or not to choose a given market as either a buyer or a seller, and a continuous decision as to how much to buy or sell conditional on market choice (Boughton *et al.,* 2007). The net returns from market participation guide these choices. Each household faces a parametric market price for the crop and transaction costs that may depend on both public goods and services and household-specific characteristics reflected in the vector Z and its assets, A, and liquidity, Y (Boughton *et al.,* 2007).

Limited resources available attribute to the fundamental economic problem to satisfy human beings' unlimited wants and needs (Varian, 2010). Resource scarcity drives individuals to make choices to attain satisfactory ends consistent with their preference hierarchy. Differential access to resources affects the individual's ability to attain the alternative results, making some easy to achieve and others more difficult or even impossible to reach (Fishburn, 1968). However, the assumption is that decision-makers conduct rational calculations and subsequently select the course of action associated with the highest outcome values.

Utility theory offers an understanding of individuals' choices through utility maximization behavior. Individuals' preferences are associated with a real-value indexed utility. Consequently, individuals' choice assumed to favor the course of action that provides the highest utility or maximum satisfaction. Yet, individuals' decisions typically often fail to trust such a perfect proposition. Other factors affect individuals' decisions. One issue is what economists' term as chance prices, which arise with creating a particular selection. These implicit costs are associated with the act of preceding the next best alternative available to decision-makers. Individuals must consider these implicit costs to pursue maximum benefits and satisfaction (Varian, 2010).

High opportunity costs can affect the attractiveness of the most preferred action and urge decision-makers to act accordingly by choosing a lower level of satisfaction attainment. Thus, individuals' choices favor the course of action that would provide the highest expected net benefits. Similarly, institutional norms, rules, and access to better quality information at the time a choice also influence individuals' decision outcomes. Individuals may also reduce the risk and uncertainty surrounding their choice (Blandon *et al.,* 2010).

2.8 Conceptual framework

Socio-economic characteristics of the farmer such as age, education, gender, occupation, and household income assumed to influence smallholder tea farmers' decision of marketing outlet choice. Marketing factors such as distance to buying center, price of unprocessed tea per kilogram, market experience, road infrastructure, and transport cost also assumed to influence the choice of market outlet. Institutional factors such as access to credit, contract marketing, access to extension services, and tea policies hypothesized to influence the choice of the market outlet. These factors influence the farmers to choose a given outlet like KTDA companies, agripreneurs, or private companies. Therefore, the perceived chosen outlet reduces the household expenditure, increases income, and assets, thus improving the livelihood of smallholder tea farmers, as shown in Figure 1.

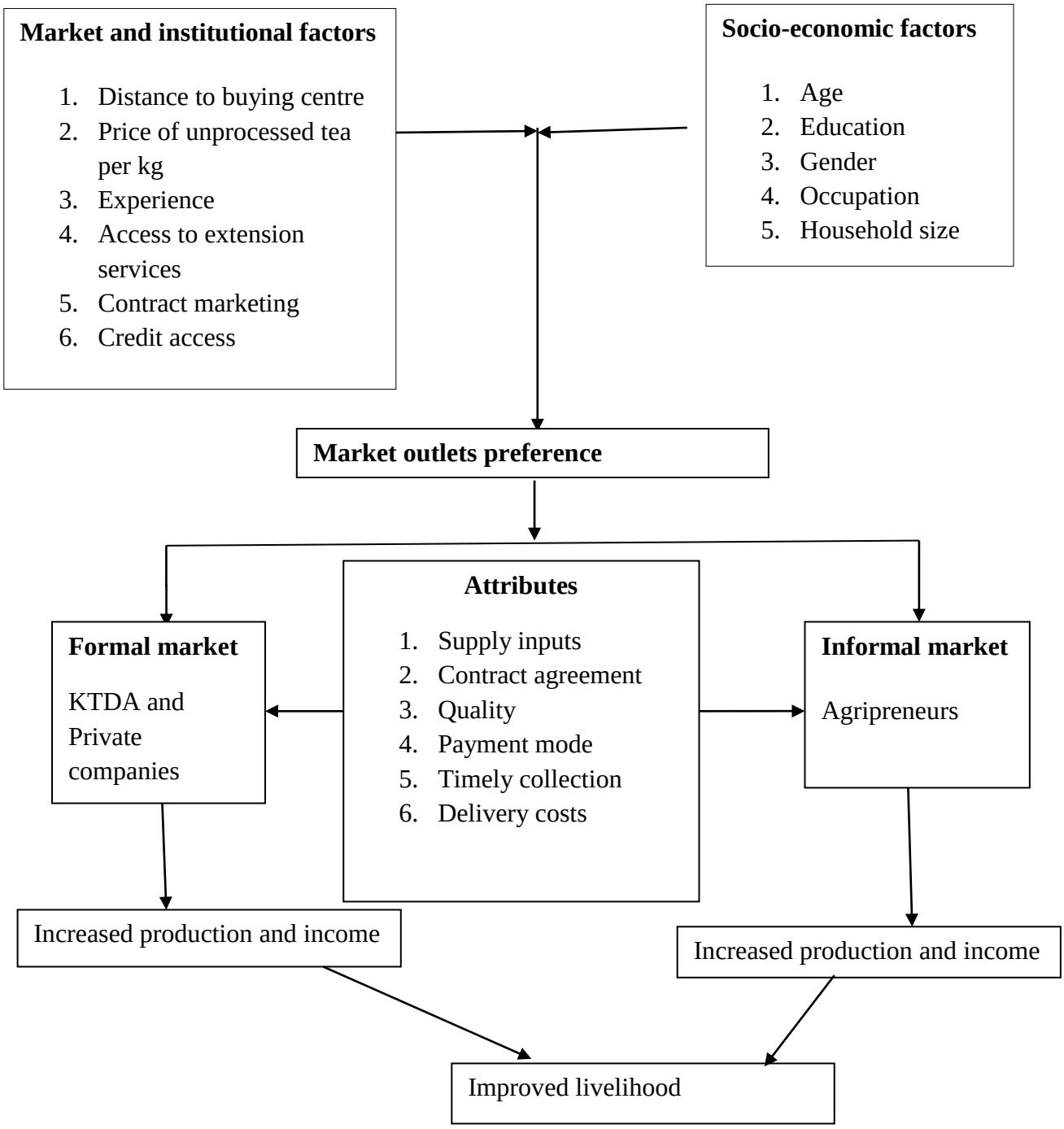

Figure 1. Conceptual Framework

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter deals with materials and methods. It begins by looking at location of the study area. It then provides the sampling procedure and method of data collection. Finally, a comprehensive analytical framework for each objective was written. This sub-section provides modeling and the econometric models used.

3.2 Study area

This study was carried out in Chesumei Sub-County in Nandi County, Kenya on small and micro tea agri-enterprises**.** This research selected purposively the study area because it is the tea catchment area for both KTDA (Chebut tea factory) and private companies (Kapchorua, Elgon, Koisagat, Nandi Tea, Mbogo Valley, Sang'alo, and Emrok tea factories). Presence of formal and informal market outlets for unprocessed tea will enable comparison between the two outlets. Tea agri-enterprises are opting for informal market outlets though there is an established formal market outlet and therefore there is need to examine why they are shifting or what drive them.

Chesumei Sub-County occupies a part of 472.10 Km^2 with a population of 130,752 individuals and lined by Mosop Sub-County to the north and Emgwen Sub-County to the south. In addition, divided into 5 wards namely: Chemundu/Kapng'etuny, Kaptel/Kamoiywo, Kiptuiya, Kosirai, and Ngechek/Lelmokwo. Geographically, Nandi County is bound by the Equator to the south and extends northwards to latitude 0˚34′N. The Western boundary extends to Longitude34˚45′E, while the Eastern boundary reaches longitude 35˚25'E (CIDP, 2013).

Generally, Chesumei Sub County receives an average rainfall of about 1200mm to 2000mm per annum. The long rains begin in early March and continue up to end of June whereas short rains begin in September and end in November. Only rarely is there a month without some rainfall. The dry spell is usually experience from end of December to mid-March. Crop and livestock production is the main source of livelihood. Most parts of the County experience mean temperatures between 20˚C during the rainy season. During the dry months of December and January the temperatures are as high as 23˚C and during the cold spell of July and August the night temperatures are as low as 14˚C (CIDP, 2013).

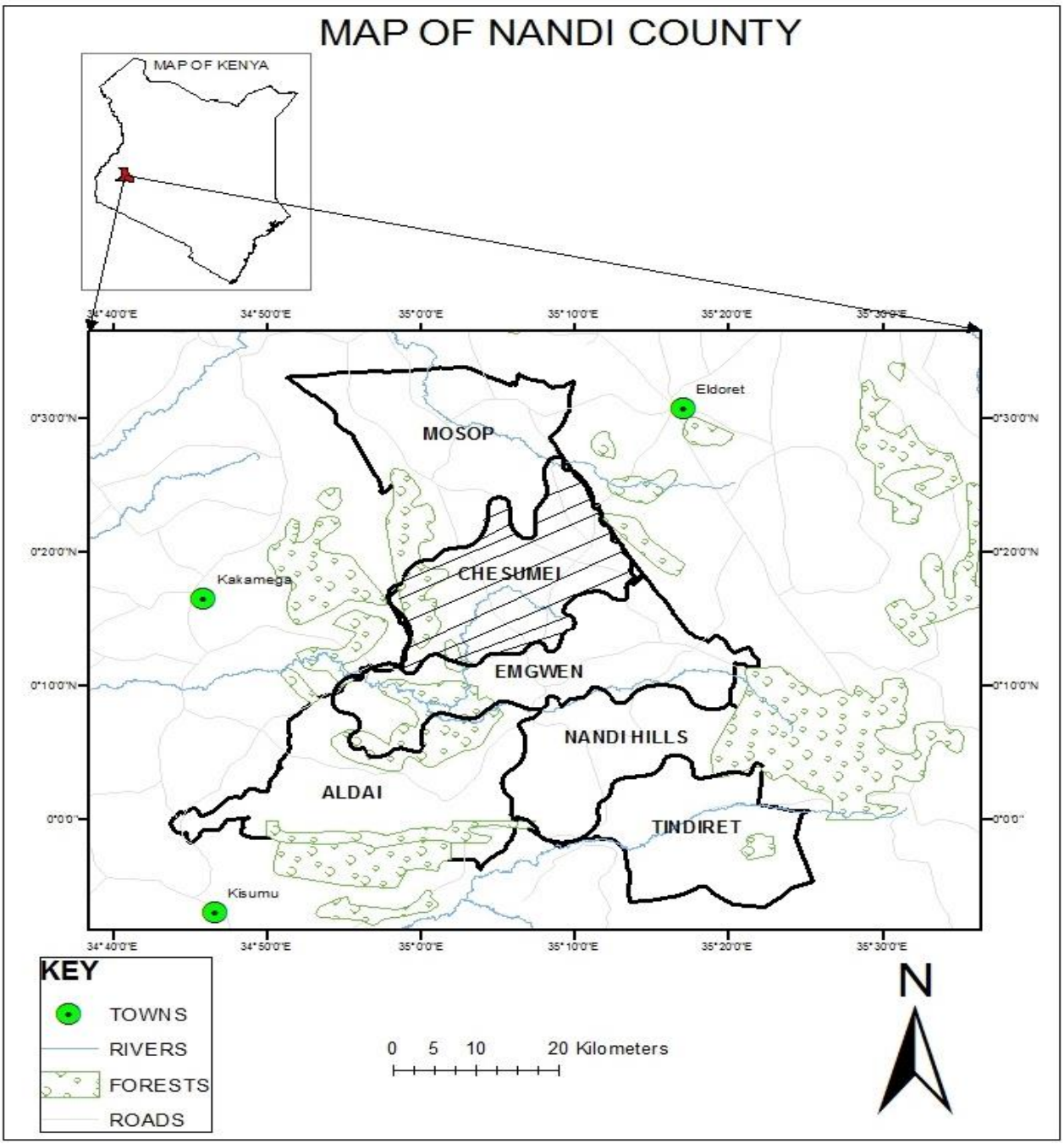

Figure 2. Map of study area

Source: World Resource Centre (2016)

3.3 Sample size determination

The required sample was determined by proportionate to size sampling methodology (Kothari, 2004).

$$n = \frac{z^2 pq}{e^2}$$

(1)

Where n = sample size and z confidence level (α = 0.05) with a z-value of 1.96. P = proportion of the population of interest, set to 0.5 because statistically, a proportion of 0.5 results in a sufficient and reliable sample size when the population is unknown. Q computed as 1-p, *e* is the level of precision that is set at 5% significance level to eliminate 95% bias in sampling.

Replacing the values above to the formula gives the following

$$n = \frac{0.5 \times 0.5 \times (1.96)^2}{(0.05)^2} \quad (2)$$

$$n = 384$$

This results to a sample population of 384 respondents distributed proportionate to population size at the ward level.

3.4 Sampling procedure

The population for this study was small and micro tea agri-enterprises in Chesumei Sub-County. The procedure for selecting a sample for the study was multi-stage sampling. Chemundu and Kaptel purposively sampled in the first stage. Chemundu was purposively chosen to represent peri-urban area while Kaptel ward chosen to represent the rural area. In the second stage, market outlets stratification was undertaken based on information obtained from tea extension services agents. The third stage entailed a simple random sampling procedure used to select respondents. The number of respondents in each ward was determined based on the proportion to the total number of tea Agri-enterprises delivering unprocessed tea leaves through different market outlets, resulting to respondents 226 and 158 respondents in rural and peri-urban areas respectively.

Table 1. Sample size distribution

Ward	Tea farmers	Ward distribution	Formal	Sample	Informal	Sample
Chemundu	2281	158	1596	110	684	48
Kaptel	3240	226	2268	161	912	65
Total	5521	384	3864	271	1596	113

Source: Chebut Tea Factory (2018)

3.5 Data collection

Primary data was collected using pre-tested semi-structured questionnaire administered to the farmers by enumerators. The questionnaire had both open and closed-ended questions. The data collected include information on market characteristics, institutional arrangement and household characteristics. STATA and SPSS software used for data management and analysis.

3.6 Analytical framework

Objective 1: To characterize different market outlets available for unprocessed tea in Chesumei Sub-County. The study used descriptive and inferential statistics such as means, frequency tables, percentages, standard deviation, t-test, and chi-square. In addition, one-way analysis of variance (ANOVA) tested whether there was any significant difference between the prices offered by the different market outlets available in the study area. The analysis involves carrying out a variance ratio test (F-test) to determine whether all group means are the same.

Objective 2: To determine socio-economic and institutional factors influencing choice of market outlets for unprocessed tea in Chesumei Sub-County. This study used multinomial logistic regression (MNLR) model to determine the socio-economic factors influencing choice of market outlets for unprocessed tea by agri-enterprises in Chesumei Sub-County because it gives more accurate point estimates of coefficients than MNP. It also reports the correct sign and significance level more frequently than MNP, even when the IIA assumption is severely violated (Kropko, 2008). Additionally, multivariate logit model tries to examine more than one independent variables to predict the outcome probability with two categorical outcomes and thus rejected in this study. This study therefore, had more than two categorical outcomes and dichotomous in nature (mutually exclusive and exhaustive) thus followed multinomial logit modelling (Pal *et al.*, 2016).

Multinomial logit model allows for analysis of different individual characteristics when confronted with more choices (Greene, 2002; Maddala, 1983). It estimates the probability of individual $i$choosing anactivity j or particular market outlets (KTDA factories, private companies, and agripreneurs) given some set of explanatory variables. The MNLR predict a dependent variable based on continuous and/or categorical independent variables, where the dependent variable takes more than two forms (Greene, 2002; William, 2018). Furthermore, it can determine the percent of variance in the dependent variable explained by the independent variables and rank the relative importance of independent variables.

Logistic regression does not assume a linear relationship between the dependent variable and independent variables, but requires that there is linear relationship between independent variables and logit of the dependent variable (Greene, 2002). The model allows for the interpretation of the logit weights for the variables in the same way as in linear regression. Moreover, when the dependent variable that cannot be ranked exhibits more than two categories (a polytomous variable), MNLR is used (Jari, 2009).

Multinomial logistic model allows analysis of data when participants have more than two choices. In this study, small and micro enterprises are facing set of three choices, which are agripreneurs, KTDA factories, and private companies. In marketing of unprocessed tea, farmers have to decide on the market outlet to select to maximize their utility, subject to socio-economic and household constraints. Therefore, the axiom of utility maximization develops MNLR. It assumes that if an individual makes choice $j$from a complete list of consumption bundle then, $u_{ij}$is the maximum among the j_{th}option. The probability that choice j made drives the statistical model. Based on the theory of consumer behavior, an individual will choose a particular option (market outlet) that offers the greatest utility. An individual i faced with the decision to choose from among market outlets for unprocessed tea alternatives is perceived to make this decision following the utility function formulated by Greene (2002);

$$U_{IJ} = \beta Z_i + e_{ij} \quad (3)$$

Where; $U_{ij}$is the maximum utility that an individual i_{th}derived from choosing j_{th}option and $Z_i$is a vector of individual characteristics is the parameter to be estimated and ij is the error term.

The underlying assumption is that individual chooses option j if and only if the utility derived from it is greater than that of all other options. From the utility maximizing function specified in equation 3, it is evident that small and micro enterprises make decisions to produce and market, subject to socioeconomic and other household factors. It follows that if the costs that are associated with using a particular outlet are greater than the benefits, households will be discouraged from choosing it, shifting to another option that maximizes their utility. For instance, if there are socio-economic and/or technical challenges specific to formal markets that increase marketing cost above the revenue, households will be discouraged from using formal market. They then, analyze the costs associated with informal markets (other market subsets besides KTDA and private companies).

If the socio-economic and/or technical factors that are unique to a sub-set of informal markets increase marketing costs above returns, then households will decide to sell their produce in a sub-set that is more rewarding. In the utility function, the amount of good say *k* that sold does not have to exceed the amount that produced. However, Asfaw *et al.* (2012) pointed out that it is difficult to measure utility directly and therefore assume that households make choices based on the option that maximizes their utility. Thus, decisions to choose either formal or choosing among market sub-sets within informal markets signify the direction, which maximizes utility. With the given postulation, the multinomial logistic regression relates the decisions of choosing formal markets, and selecting any channel within informal markets and the factors that influence these choices. The general model specification for multinomial logistic regression used is in equation 4 (Williams, 2018).

$$prob(Y_1 = 1) = \frac{e^{\beta_j x_i}}{\sum_{k=0}^{j} e^{\beta_k x_i}}, j = 0,1$$

(4)

Since there are three categories in the dependent variable, two equations estimated to provide probabilities for *J + 1* choice of a decision maker with characteristics Xi. The β are the coefficients estimated through the maximum likelihood method. The simplified empirical specification as presented in equation 5.

$$\pi_{ij} = \beta_\theta + x_1 k_k + e_{ik}$$

(5)

Where π is the probability that tea farmer i chooses to market unprocessed tea leaves produce through market outlet j, *0* is the constant term, $X_i$are the tea farmer's socioeconomic characteristics, and $k_k$are the parameters to be estimated and $\varepsilon$is the error term. In this

circumstance, the parameters estimated represented the model coefficients. Setting $\beta_0 = 0$ will solve the problem of indeterminacy through normalization of the model in equation 5. This is because the problem probabilities sum up to one. Therefore, determining the $J + 1$ probability in the model of analysis will only need Jparameter vectors. Thus the probabilities are:

$$prob(Y_1 = 1) = \frac{e^{\beta_j x_i}}{\sum_{k=0}^{j} e^{\beta_k x_i}} f\ or\ j = 0,1 \dots \dots j, \beta_0 = 0 \quad (6)$$

In the model, market outlet choice with three possibilities as KTDA factories, private companies, and agripreneurs was set as the dependent variable. The variable of KTDA factories holds the value of 1, private companies take the value of 2, agripreneurs takes the value of 3. The odds of each/all market versus agripreneur market outlets were determined using the MNLR model suggested in this study. Paying attention to the that fact, the MNLR model follows the theory of probability, therefore the probability that the tea agri-enterprises prefers one market compared to the other was restricted to a range between zero and one$(0 \leq Pi \leq 1)$. It should be noted that logit (π_i) ranges from negative infinity to positive infinity (Greene, 2002;Williams, 2018).

Objective 3: To compare the profitability of formal and informal market outlets for unprocessed tea in Chesumei Sub-County. GMA model was used. Gross margin refers to the difference between total revenue and total variable cost costs (Msangi, 2000).) The enterprise profitability and the means of selecting farm plans is measured using gross margin analysis (GMA). The size of gross margin depends on the services provided, market structure, market price, perishability of the product as well as the distance between producers and consumers and market information especially over the short-run.

The advantages of the GMA as an economic tool include its easiness to understand and utilize the logical interrelations of economic and technological parameters and its ability to forecast rational variants for the operational structure of an enterprise or individual farmer (Selejio, 2002). In addition, GMA is an easy way to understand profitability of an enterprise as it shows how effective management can bring profits from sales and how an enterprise can minimize competition (McClure, 2004). The GMA model is very useful in cases where some data, for example analyzing the profit of an enterprise. However, the calculation of depreciation has often been difficult to undertake due to the ambiguity related to nature of

estimating the lifespan of fixed assets, appreciation, and salvage value in many firms, thus necessitating the use of GMA models rather than the normal profit margin models.

Gross margin refers to the entire financial gain derived from associate enterprise less the variable prices incurred within the enterprise.

$$GM = TR - AVC \quad (7)$$

Where; GM=Gross margin, TR=Total revenue, AVC=Average variable costs

However, gross margin analyses do not include fixed or overhead costs such as depreciation, machinery purchases, or permanent labour costs and comparison can be misleading (Firth, 2002). Therefore, estimation of profits for market outlets for unprocessed tea was determined using gross margin (GM) analysis.

GM calculated using the following formula below.

$$GM = \sum P_y Y - \sum P_x X \quad (8)$$

Where;

Py= Unit price of unprocessed tea, Px= Unit price of inputs used in tea agri-enterprise Y and X = Quantities of output and inputs in kilograms per acre, respectively.

The basis of estimated mean GM by a tea agri-enterprise was on the average tea production per acre produce in a particular day in kilograms and later on, the monthly average gross margin (AGM) was computed accordingly. Mathematical presentation of the AGM equation is below.

$$AGM = AR - AVC \quad (9)$$

Where;

AR = Average revenue of unprocessed tea, AVC =Average variable cost of inputs used in tea agri-enterprise per acre.

3.7 Priori Assumptions of the Study

The assumptions of the prior similar studies findings were used to form a basis for independent variables in this research study. However, the current research findings presented in chapter four could be either in agreement with, or contrary to these assumptions. Age, gender, education, household size, price of agricultural products, yield, access to information and extension services have been reported to have positive significant influence on the choice of market outlets (Chalwe, 2011; Emana *et al*., 2015; Jari & Fraser, 2014; Kuma *et al.*, 2013; ; Nyaga, *et al*., 2016). Time taken walking to nearest market had a significant negative influence on the choice of marketing outlets in prior studies (Chalwe, 2011; Emana, *et al*., 2015; Nyaga, *et al*., 2016). However, Gender, extension services, inputs credit access experience and amount of yield produced and sold had both positive and negative influence on selection of different market outlets (Kirui *et al.*, 2015; Nyaga *et al*., 2016; Sigei *et al*., 2013). Age and number of years of schooling of a farmer was important in determining the farming experiences therefore influencing the choice of market outlets for agricultural produces (Waweru, 2012; Wosene *et al*., 2018). Knowledgeable and experienced farmers were able to select most rewarding markets as it earns them more returns (Hailu & Fana, 2017; Mutura *et al*., 2015). Similar previous studies on gross margins analysis found out that informal market were more profitable than formal markets and incurred less costs in marketing their agricultural products (Ishaq & Abdullah, 2016; Kadigi, 2013;). However, formal markets are more organized and offer other services apart from high prices and guaranteed market for the produces. Farmers selling through formal markets have had higher yield because of continued trainings offered (Kagira *et al*., 2012; Waweru, 2012).

Table 2. Description of variables used in the study

Variables	Definition	Measurement	Sign
Dependent variable			
Market outlets for unprocessed tea	Farmers choices of delivery outlet	Categorical(0= KTDA;1=Private;2=Agripr)	
Explanatory Variables			
AGE	Age of tea farmer	Continuous	+
GENDER	Gender of tea farmer	Dummy1 = Male 0 = Female	-
YIELD	Total farm output	Continuous; kgs	+
EDUCATION	Number of years spend in formal education of a farmer	Continuous; years	+/-
HHSIZE	Total number of members of the household	Continuous	-
EXPERIENCE	Number of years a farmer have been in tea farming	Continuous ;Number of years	+
EXTENSVS	Number of farm visits per month	Continuous	+/-
DISTMARKET	Time taken walking to the nearest buying centre	Continuous; Number of minutes	+
CRDTACC	Whether the respondent have access to credit	Dummy;1 = Yes 0 = No	+
LNDSIZE	Size of land under tea production	Continuous ; acres	+
PRICE	Monetary value of unprocessed tea	Continuous; Ksh	+
GRPMEMBERSHIP	Whether the respondent is a member of tea farmer group	Dummy;1 = Yes 0 = No	+
QUALITY	Whether the buyer gives strict plucking standards	Dummy1= NO, 0 = YES	+
PAYMENT	Mode of payment	Categorical(1=daily basis;2=weekly;3=monthly)	+

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents both the descriptive and econometric results of the study. The first section presents descriptive statistics that address the first objective; to characterize the different market outlets available for tea agri-enterprise in Chesumei Sub-County. The second section addresses the second objective; to determine socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea. The final section presents an analysis for the third objective; to compare the profitability of formal and informal market outlets for unprocessed tea in Chesumei Sub-County.

4.2 Descriptive statistics

4.2.1 Socio-economic characteristics of farmers choosing formal and informal market outlets

The gender of the household head had a significant (=3.08, p-value 0.08) relationship with market outlets choice (Table 3). A large proportion of the farmers were males constituting 70%, while females were 30%. However, among the male farmers, 73% choose formal market outlets while 64% chose informal market outlets, and among the females, 27% chose formal market outlets while 36% opted for informal market outlets.

Tea agri-enterprises managed by males tend to choose distant and more income-generating markets. In comparison, a female will go for nearer markets, possibly because they are involved in household chores and other agricultural activities for subsistence in the households. The level of women's involvement in the marketing of unprocessed tea is low in all market outlets. The implication of gender in this study indicates that most of the households' decision-makers are male controlling resources and are concerned with producing crops (majorly cash crops). Similarly, the findings from other studies confirm that most decision-makers in tea agrienterprises are men though women provide most of the labor in production activities (Maina *et al.*, 2015; Owuor *et al.*, 2005). Cultural beliefs and traditions influence the low participation of women in decision-making and access to resources such as land and other productive resources and, therefore, cannot venture into cash crop production systems (Ajadi *et al*., 2015).

Table 3. Association of household characteristics with alternative market outlets

Variable		Formal market outlets		Informal market outlets		Overall %	x^2	Significance
		Freq	%	Freq	%			
Gender	Male	197	72.69	72	63.72	70.05	3.06	0.08*
	Female	74	27.31	41	36.28	29.95		
Marital status	Single	12	4.43	1	0.18	3.39	5.85	0.119
	Married	180	66.42	68	60.18	64.58		
	Divorced	19	7.01	10	8.85	7.55		
	Others	60	22.14	34	30.09	24.48		

The association between the participation in market outlets versus the size of household and the level of education of household head is significant. Household size had a negative relationship (= -2.33, p-value 0.01) with the choice of market outlets at a 1% significance level. The formal market outlet had a smaller mean household size than the informal market outlet (Table 4). Household size and composition has an adverse impact on the choice of formal market outlet. Family sizes have a positive correlation with demands for financial resources for household expenditure, and based on the type of the market outlets; households will choose an outlet that best meets their demands at hand. The need for urgent cash to sustain the family needs attribute to larger household size for smoothening of their consumption. This is because it is assumed that as the size of household increases, the amount of money that is spent on goods and services increases, and thus, in this study, larger household sizes require cash to facilitate the family needs. This, therefore, contributes to the choice of the outlet based on a cash or on-credit mode of payment provided on the contractual arrangement of the particular market outlet. However, the literature indicates that households with a larger number of members living together could aid in providing family labor that could otherwise reduce the cost of sourcing and managing labor that would reduce the cost of production. According to Kirui *et al.* (2016), a significant contribution of the household size in the study was labor availability. Households with more members use readily available family labor. However, the implication of household size in this study impacts the choice of the market outlet based on how it addresses the liquidity needs for household expenditure.

On the other hand, the education level of the household heads has a positive association (= 2.53, p-value 0.01) with the choice of the market outlet at a 1% significance level. The mean number of years spent in formal schooling of household heads was 12.73 years and 11.92 years for formal market outlets and informal market outlets. This is an indication that farmers that spent more years in formal schooling chose formal market outlets. Therefore, an inference on knowledge acquired through formal education can help farmers sharpen their entrepreneurial skills to do a market analysis and choose the best rewarding outlet. Furthermore, the level and years spent in schooling imply access and use of the information available. The findings are consistent with that of Jari (2009), Kirui *et al.* (2016) and Mueni, (2017), where they found that education levels influenced production and market information interpretation, thus aiding farmers do a market analysis and eventually choosing a market outlet with the best marketing strategies.

Table 4. Test of association between household characteristics and alternative market outlet

Variable	**0verall**	**Formal market**			**Informal market**			***t*-value**	**Significance**
	N=384	**N=271**			**N=113**				
	Mean	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**		
Age	46.28	46.10	24	70	46.69	23	70	-0.45	0.33
	(11.57)	(11.66)			(11.38)				
Household size	5.52	5.24	1	12	6.17	1	14	-2.33***	0.01
	(1.87)	(1.77)			(1.93)				
Education	12.49	12.73	8	19	11.92	4	16	2.53***	0.01
	(2.87)	(2.66)			(3.24)				

Note: Figures in parenthesis represent standard deviation and ***= significant at 1% level.

4.2.2 Characteristics of the agrienterprises

The significance of the mean difference of agrienterprises' characteristics across the market outlets was determined using t-tests in the study. Out of five variables included in analysis, the land size under tea, distance, price, and yield had a significant difference across the choice of market outlets (Table 5).

The mean difference of land size allocated to tea agrienterprises between those participating in the formal and the informal markets were statistically significant at 1% level (Table 5). The mean land size under tea production (in acres) is higher for households choosing formal market outlets compared to those preferring the informal market outlets. Services and incentives received from the formal market outlet could attribute to the difference in this study. Formal markets are highly rewarding by offering better prices, non-financial benefits (trainings and farm visits, medical plans, and health savings) compared to informal markets, and this could be the reason more farmers have invested and ventured into tea agri-enterprises. However, allocation of land to other income generating enterprises such as dairy farming and other crop production influences allocation of land to tea agrienterprises and therefore limiting other farmers from increasing production. According to Kirui (2016), benefits and market incentives motivates allocation of land to tea enterprises.

The mean difference of distance to the nearest buying center between formal and informal market outlets is statistically significant (t= 6.96, p-value 0.00). The mean distance to buying centre for formal market outlet is higher than informal market outlet (Table 5). Buying centers for formal markets outlets are usually located at a designated point that may be further away for some farmers. Therefore, farmers have to cover some distances to these collection points. However, for informal market outlets, the buyer is flexible in collection irrespective of points of delivery and therefore the farmer avoids longer distances and cost incurred. In addition, prices offered by formal market is higher compared to informal market and could be the reason why farmers prefer spending more time while accessing formal markets. Similarly, the results in a study by Emana *et al.* (2015) revealed that potato producers prefer selling their products at farm gate to cut on costs incurred during marketing.

Table 5. Mean Difference of agrienterprises' characteristics across the market outlets

Variables	Measurement	Overall N=384		Formal N=271		Informal N=113		*t*-value
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	
Land under tea(acres)	Land allocated for tea enterprise	2.89	2.63	3.20	2.90	2.15	1.61	3.61***
Distance	Distance to the nearest buying center(in minutes)	11.15	8.18	12.92	8.52	6.90	5.27	6.96***
Experience	Numbers of years in tea farming	11.21	7.31	11.49	7.37	10.54	7.14	1.56
Price	Price of unprocessed tea per kg	20.44	4.36	21.75	4.35	17.31	2.30	10.26***
Yield	Production of unprocessed tea in kg	2035.87	1835.22	2364.37	2201.34	1248.05	1052.57	5.15***

***Indicates significance level at 1%

The mean difference of price for unprocessed tea between formal and informal market outlets is statistically significant (t= 10.26, p-value 0.00). The mean price for formal market outlets is higher than informal market outlets (Table 5). Market organization and structure attributes to price difference in this study. Formal market outlets have established logistic framework and interests for the smallholder farmers enabling them to offer better prices. Price variable plays a fundamental role in tea marketing because it determines the level of income earned from tea sales. Better output price is the key incentive for smallholder tea farmers to deliver more to the market. However, informal market outlets offer lower prices and the need for immediate cash could accelerate its selection notwithstanding the otherwise available prices in other markets. The findings on the choice of marketing outlets show the same significant results on how price of the beans affect the decision of a household in market participation as

evident in the study. Therefore, higher price increase the chances of choosing the best market (Chalwe, 2011).

The mean difference of yield for unprocessed tea between the formal and informal market outlets was statistically significant at 1%. The means yield for farmers participating in the formal market is higher than that of informal market (Table 5). This is an indication that the formal market households had more yields than informal market because of the possibility of higher land allocation to tea agrienterprises and better field management. Formal market households allocated larger portion of land to tea agrienterprises unlike those households in informal market outlets. In addition, access to information on agronomical practices is key to enhancing production in a farm enterprise. However, better prices offered could increase the chances of a farmer selling more output to formal market. According to Chalwe. (2011),farmers were likely to sell large quantities of beans to private traders as opposed to households because they buy in bulk and large producers have the resources for transportation to cover long distances.

4.3 Characterization of different market outlets available for unprocessed tea in Chesumei Sub-County

The study considered a number of specific attributes with respect to farmer-buyer interaction and analyzed them to determine the differences across the available market outlets. The majority of farmers deliver their unprocessed tea through private companies (49%) while agripreneurs and KTDA accounted for (29%) and (21%) of the market share respectively (Figure 3).

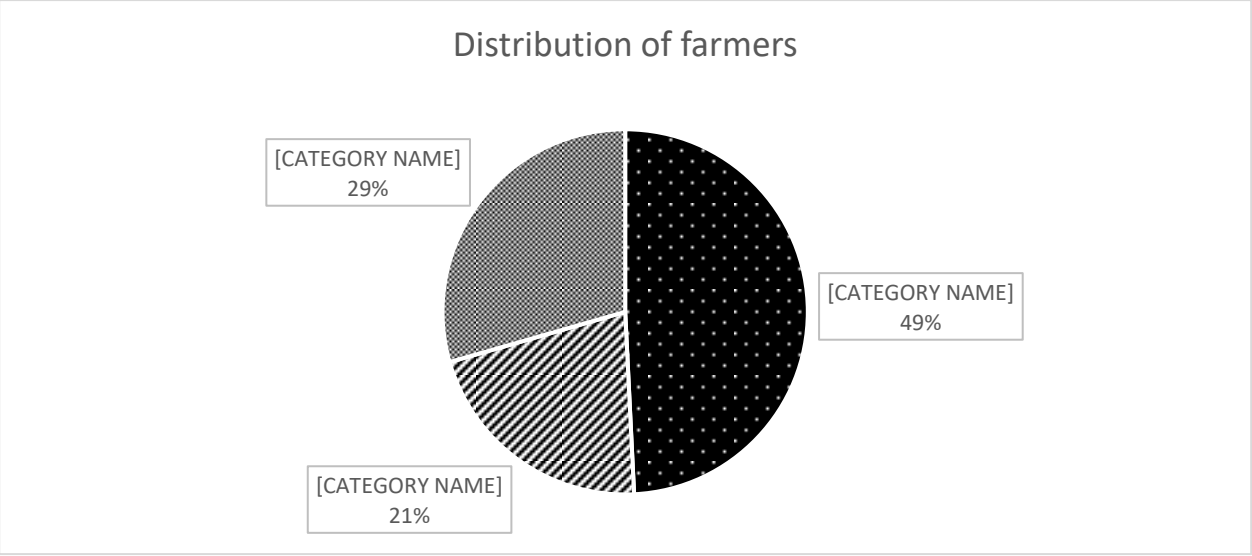

Figure 3. Distribution of farmers across the market outlets

4.3.1 Price variation across market outlets

The significance of mean price difference for unprocessed tea across the market outlets was determined using analysis of variances (ANOVA). The price of unprocessed tea had a significant effect on the choice of available market outlets at 1% significance level [F (2,381) =315.464, p=0.000] (Table 6). However, the ANOVA test only provides the overall difference across the market outlets but does not show the difference across specific market outlets. Literature indicates that post hoc tests confirm the differences across the individual market outlets when there is an overall statistically significant mean difference in groups.

Table 6. Analysis of variance of mean price variation across the market outlets

Source	SS	df	MS	F	Prob > F
Between groups	4439.231	2	2219.615	315.464	0.000
Within groups	2680.727	381	7.036		
Total	7119.958	383			

The Tukey post hoc test confirms that specific mean differences across the market outlets were statistically significant as depicted in the pairwise comparisons (Table 7). Price of unprocessed tea had statistically significant mean difference between farmers that deliver to private companies and KTDA (p = 0.000), as well as between the private companies and agripreneur (p = 0.000). However, there were no differences between the farmers that deliver to KTDA and agripreneur (Table 7).

Table 7. Mean price comparison across the market outlets

Price of unprocessed tea					
(I) Market outlet mostly preferred by farmers to deliver unprocessed tea		(I) Market outlet mostly preferred by farmers to deliver unprocessed tea	Mean Difference (I-J)	Std. Error	Sig.
Tukey HSD	Private	KTDA	6.939*	.351	.000
		Agripreneur	6.697*	.315	.000
	KTDA	Private	-6.939*	.351	.000
		Agripreneur	-.241	.385	.806
	Agripreneur	Private	-6.697*	.315	.000
		KTDA	.241	.385	.806

* indicates significant level at 10%.

4.3.2 Association of selected qualitative attributes across the market outlets

The association of selected qualitative attributes across the market outlets was determined using Chi^2 test in the study. Contractual mode of payment, credit access, extension services, plucking guidelines, access to information, and input credit had a significant association with the choice of market outlet. Mode of collection across the market outlets and group membership had no influence in the choice of market outlet contrary to the study hypothesis (Table 8). However, it was noted that majority of farmers selling to agripreneurs choose the outlet because of its flexibility in collection. Though other market outlets as KTDA and private companies indicated slight lower percentages in how the mode of collection is structured, it revealed the tendency of farmers to go for a flexible market outlet.

Contractual mode of payment to smallholder tea farmers had a statistically significant (x^2=347.72, p-value 0.00) association across market outlets at 1% level. Farmers delivering to private companies and KTDA prefer monthly payment schedule as opposed to those delivering to agripreneurs with daily and weekly pay (Table 8). KTDA and private companies were mostly preferred because they pay a higher price. Different market outlets used by the farmer to sell unprocessed tea attributes to difference in payment schedule based on whether payments made in either cash or credit depending on the need of cash. However, the trust build through social capital within the community attributed to the contractual arrangement between the agripreneurs. According to the study by Ngigi, (2002), the most prevalent modes of payments were cash and credit attributed to difference in transaction cost and risk of exchanges. However, households selling the produce might have the information about the buyer depending on unobserved characteristics based on the long-term relationship.

Credit access had a positive (x^2=19.68, p-value 0.00) association with the choice of market outlets at 1% significance level (Table 8). KTDA and private companies have higher number of farmers accessing credit as compared to agripreneurs. This is an indication that formal market outlets have special arrangements where tea processors and other financial institution have collaborated to provide financial services to their farmers. Farmers for instance will take loan from a non-agricultural processor institution under a contractual arrangement where the sale of produce can repay part of the loan. Agripreneurs also offer loans based on the relationships terms with farmers. Usually, such loans have no collateral and attract minimal interest rates. Access to credit correlate positively to competitiveness of agribusiness in terms

of efficiency and productivity. Therefore, an inference on the quality of financial services can help farmers to adopt better technologies, purchasing of agricultural inputs and make other decisions that can improve the efficiency and yield of their agribusinesses. According to Abera (2016), the results similarly confirmed that farmers increase yield due to use of credit and ability to provide for farm households power to spend in input market that boost yield leading to more marketable surplus.

Access to extension services and trainings had statistically significant (x^2=16.90, p-value 0.00) association with market outlets at 1 %. Farmers accessing credit and delivering their unprocessed tea to KTDA is higher than those delivering to private companies and agripreneurs. Farmers accessing credit for KTDA is 65% while private companies and agripreneurs accounted for 63% and 41% respectively (Table 8). However, it is apparent that access to extension and trainings is still low in general and lower among farmers selling to agripreneurs. Access to extension services contributes to increased chances of a farmer in accessing information, better understanding of the marketing strategies and improves the production techniques by adopting technologies. Similar studies pointed out that trained farmers are able to do market research on the quality required in the market. Moreover, with trainings received through extension program, fish farmers were able to cater information about the traders in the region (Nyaga *et al.,* 2015). According to Tarakegn *et al*. (2017), the frequency of extension contact increases the ability of farmers to acquire important information as well as beekeepers to improve production methods hence leading to high output.

Plucking guidelines had a positive (x^2=51.25, p-value 0.00) association with the choice of market outlets at 1% significance level. Farmers who were able to follow the standard plucking guidelines, which is two leaves and a bud, is higher in both KTDA and private companies than agripreneurs (Table 8). Formal market outlets have a well-developed logistic and institutional framework and thus farmers deliver their unprocessed tea on quality based-demand and usually face higher rejection rate. However, they are able to access well-developed and stable market outlets for their unprocessed tea, input credit, credit access, trainings, high price for the produce and bonuses. On the other hand, informal markets show no strict emphasis on observing the plucking guidelines provided in the tea sector. Similar influence on grading and standards is evident in a smallholder agricultural marketing choices study that outlined the preference by households to select a more paying formal markets

putting more emphasis on grades and standards and therefore a major factor in shaping the behaviour of the household decision on the market outlet choice (Jari & Fraser, 2013). A further study by Owour *et al*. (1996), indicate that efficiency and profitability of tea agri-enterprise is influence by the plucking rounds.

Table 8.Association of selected qualitative attributes across the market outlets

Variable	**Description**	**Private %**	**KTDA %**	**Agripreneur %**	x^2-**value**	**Significance**
Mode of collection	Flexible	52.38	56.10	61.06	2.17	0.34
	Not flexible	47.62	43.90	38.94		
Contractual mode of payment	Daily	0.53	-	49.56	374.72	0.00***
	Weekly	-	1.22	50.44		
	Monthly	99.47	98.78	-		
Credit access	Yes	80.95	82.93	60.18	19.68	0.00***
	No	19.05	17.07	39.82		
Extension services	Yes	62.96	64.63	40.71	16.90	0.00***
	No	37.04	35.37	59.29		
Plucking guidelines	Strict	82.01	78.05	44.25	51.25	0.00***
	Non-strict	17.99	21.95	55.75		
Access to information	Yes	82.01	91.46	45.13	66.76	0.00***
	No	17.99	8.54	54.87		
Group membership	Yes	76.19	74.39	84.96	4.19	0.12
	No	23.81	25.81	15.04		
Input credit	Yes	83.54	75.61	28.32	96.58	0.00***

	No	17.46	24.39	71.68

*******indicates significance level at 1%

Access to information had a significant (x^2=66.76, p-value 0.00) association with choice of market outlet at 1% level. Private companies and KTDA had higher number of farmers accessing information as compared to agripreneur, which interestingly had 54.87% of farmers having no access to information (Table 8).This is an indication that information helps the farmers with ability to make informed decisions concerning production and marketing strategies. Extension services received by farmers depend on specific choice of sourcing information. KTDA and private companies usually organize for field visits, demonstrations and farmers' field school system and this could be the reason why there is high number of farmers selling to those market outlets having higher percentage. This agrees with the findings of the study on choice of haricot-bean market outlet, that price information significantly affects the probability of choosing the market outlets. The study further explains that with price information, a farmer can create an opportunity to opt for best rewarding outlets (Abera, 2016). Tarakegn *et al*. (2017) presented similar findings on ability of a farmer to use current market information to analyze the price honey in different market outlets in their locality.

Input credit had significant (x^2=96.58, p-value 0.00) relationship with the choice of market outlets at 1%. Private companies and KTDA had higher number of farmers accessing inputs than agripreneurs where accessibility to input credit was low (Table 8). In this study, it is evident that input credit plays a vital role in marketing of agricultural produce. Private companies and KTDA supply inputs to farmers on credit payable at agreed time based on the produce sold. Therefore, such arrangement motivates and increases the chances of a farmer delivering to these market outlets with this kind of attribute. On the other hand, agripreneurs do not supply inputs possibly because of immediate pay for proceeds and therefore making such arrangement to farmers hard. Similar results from other studies confirm that farmers in an organized market get supply of inputs tied to sale of produce. Buyers usually use input as part of the business relationship to enable them secure product of good quality consistently supplied. In the case of supermarket value chains, use of this kind of relationship increases the influence over the production processes and eventually quality and required standards are met (USAID, 2012).

Selected attributes across the market outlets show that on credit payment had the highest frequency for farmers selling to KTDA and private companies contrary to agripreneurs which had high frequency on cash payment (Figure 4). This concludes that formal market outlets pay their farmers at the end of an agreed period while informal market outlets prefer cash payment. Input credit and strict plucking guidelines is high in both KTDA and private companies as well as access to credit services. For agripreneurs, farmers prefer this market outlet because their plucking guidelines were not strict.

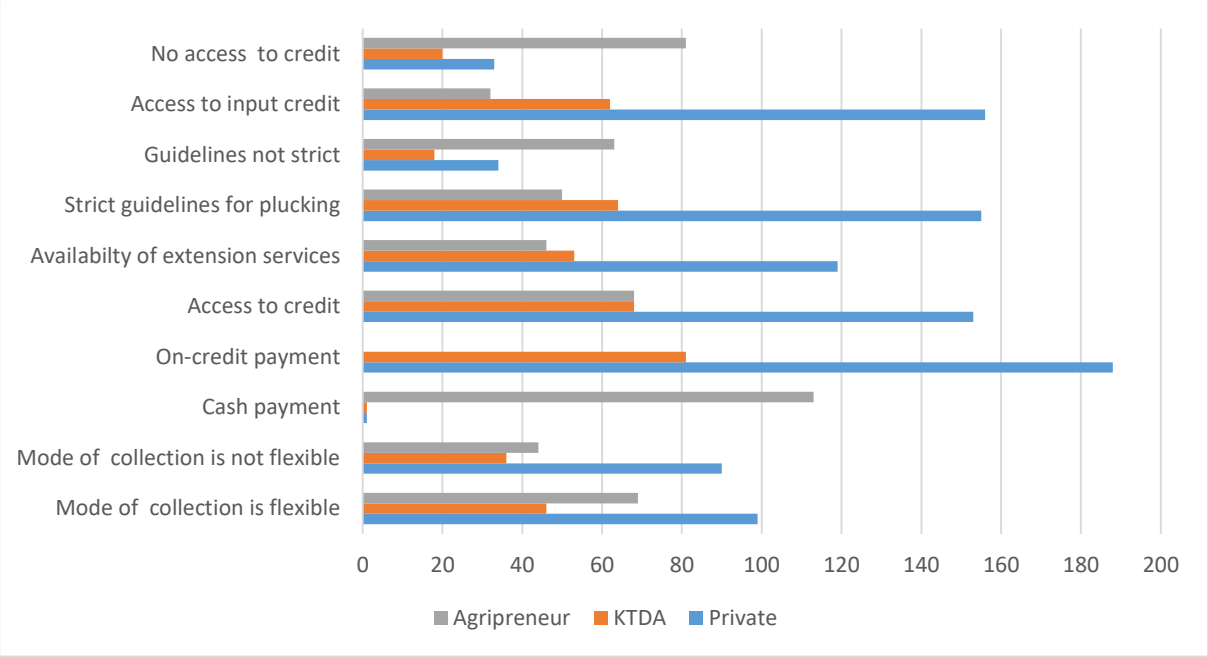

Figure 4. Market attributes across the market outlets

4.3.3 Sources of information

Farmers mostly prefer combination of several channels of accessing information followed by fellow farmers and farmers' field schools, which probably attributed to association in either group meetings or trainings (Table 9). Farmers tend to share information during such events and thus choice of information source. According to Muthini (2015), buyer, fellow farmer, and visiting the market are the most active used source in this study; fellow farmers contribute to likelihood of accessing information apart from combination of all sources of information. Access to information both production and market is important in that it reduces risk and uncertainties in market. It influences the adoption of agricultural practices such as conservation measures, fertilizer use, pest, and disease control and use of certified seeds (Mwangi, 2003).

Table 9. Source of information

Source of information	Frequency	Percentage
Combination of channels	260	67.71
Fellow farmers	65	16.93
Farmers field schools	38	9.9
Radio	17	4.43
Television	2	0.52
Internet	2	0.52

4.3.4 Constraints to tea agri-enterprises

The most constraining factors are high input cost (29%) and quality requirement (23%) (Table 10).The cost of fertilizers cost is high and therefore increases the cost of production. However, farmers are able to increase their incomes through increased production with less cost attached when provided with subsidized fertilizers. According to Karanja (2014), despite rainfall being a major challenge facing Irish potato farmers, high cost of inputs was also a challenge in potato production. This is a huge burden to farmers as input cost takes more share of their revenues.

Table 10. Constraints to tea agri-enterprise

Constraints	Frequency	Percentage
High input cost	110	28.65
Quality requirement	90	23.44
Inadequate labour supply	85	22.14
Declining soil fertility	74	19.27
Poor prices	9	2.34
Harsh weather condition	9	2.34
High transport cost	5	1.30
Unfavourable soil type	2	0.52

Farmers pointed out that differential in quality requirement is major challenge in tea sector were 23%. Farmers see plucking guidelines and standards put in place by tea processors as obstacles to increase production. Strict regulations on quality pose a challenge of unprocessed tea rejected often by the weighing clerk during the buying process. Farmers delivering through formal market outlets observe the standards of two leaves and a bud unlike those in informal market outlets. Interestingly, agripreneurs deliver their unprocessed tea bought from farmers to formal markets either directly or through a normal contractual agreement as other farmers.

Farmers pointed inadequate labour supply (22%) as one of the emerging challenge in tea sector. Mechanization characterizes large-scale production of tea unlike smallholder tea farmers who entirely depend on labour are at risk. Shortage of labour has forced smallholder farmers to increase wage rate, this will in turn increase the cost of production and thus decline in the total revenue received from the enterprise.

4.4 Factors influencing the choice of market outlets for unprocessed tea in Chesumei Sub-County

The significance influence of socioeconomic and institutional factors across the market outlets was determined using multinomial logistic regression in the study. The reference category for the model was private companies market outlets, as it best represents the most common market outlet choose by smallholder tea farmers. The beta coefficients and exponentiated beta coefficients estimates provide direction and probability of change respectively. Exponentiated values of coefficients measure the actual effect of a unit change in each of the independent variables on the market outlet choice for unprocessed tea. Diagnostics tests for multi-collinearity, IIA assumption tests, and goodness of fit done before running multinomial logistic regression to obtain the best transformation for the various continuous variables. Out of fourteen independent variables included in multinomial logistic model, two variables significantly influence KTDA; twelve variables influenced significantly agripreneur as market outlet choices at 1, 5 and 10% significance level as compared to the base category (private companies).

4.4.1 Variance inflation factors for multi-collinearity test

Pairwise correlation and variance inflation factor (VIF) for continuous and categorical variables, respectively run to test for multicollinearity in the study. VIF measures the presence of multicollinearity among the independent variables in a regression model on the precision of

estimation. A value of VIF between 5 and 10 indicates a high correlation amongst the explanatory variables in a regression model (Gujarati, 2003). The details of the VIF tests for continuous variables presented in appendix II Stata Output confirmed that there was no serious relationship among all independent variables. The pairwise correlation results presented in appendix III revealed that there were independent variables that were highly collinear and therefore dropped from the model during analysis. The largest correlation coefficient in absolute value is on land under tea and the total production of tea in kgs (0.975). This may be due to a relationship between production and the yields from the same portion.

Table 11. Variance inflation factors results for multi-collinearity test

Variable	VIF	1/VIF
ACCEXTENSION	2.12	0.471938
Age	2	0.499059
EXPERIENCE	1.8	0.555446
GRPMEMBERSHIP	1.72	0.582947
DISTMARKET	1.71	0.585424
HHSIZE	1.53	0.653413
MRKTINFO	1.38	0.725748
YIELD	1.34	0.748362
INPUTSS	1.33	0.75442
EDUCATION	1.28	0.784247
CRDTACC	1.24	0.807025
PLUCKGUIDE	1.23	0.811967
PRICESATIF	1.19	0.840215
Gender	1.18	0.847726
Mean VIF	**1.5**	

4.4.2 Assessing goodness of fit

The MNL model gives a McFadden's R_2 (PseudoR^2) of 0.409 indicates the independent variable explained about 41% of the variation in choice of market outlets for unprocessed tea. In addition, acceptable values were obtained from pseudo R^2 (Cox and Snell=0.572; Nagelkerke=0.654). The chi-square (X^2) value of 326.27 showing that likelihood ratio statistics are highly significant (P< 0.001) suggesting a good predictive ability of the model. This implies that the explanatory variables included in the model explain well the variation in the dependent variable. The necessity of a good model has a value that lies between zero and one, the closer it is to one indicates a better model fit (Gunjarati, 2003). According to Ayuya *et al.* (2012), the acceptance of Pseudo R^2 of 0.4218 confirmed the same. The details of assessment of good fit is presented in the Appendix V Stata Output

4.4.3 Testing the assumption of the independence of irrelevant alternatives (IIA)

Unrelated estimation through Hausman test was done in determining whether IIA assumption was violated. The test combines estimation results, parameter estimates and associated covariance matrix into one parameter vector and simultaneous covariance matrix of the sandwich/robust type (Hausman and McFdden, 1984). The multinomial logistic regression full model was fitted for all the three market outlets and two restricted multinomial models in which one alternative market outlet was excluded. The results show no violation of assumption of IIA. This is according to McFdden Hausman specification of a test for IIA as it states that coefficients of the equations on parameter vectors and simultaneous covariance should be the same for both the market outlets included in restrictive models (Greene, 2002). The results on Appendix IV revealed this equality.

4.4.4 Test for heteroskedasticity

Heteroscedasticity occurs when the variances in regression disturbances are not constant across observations evident in clustering of large and small disturbances and disturbance variance depends on the size of the preceding disturbance. A Bruesch-Pagan test for heteroskedasticity was done and the results indicated $Chi^2$of 0.24 and Prob>Chi^2 of 0.6273 indicating that there was no problem of heteroskedasticity (Greene, 2002). Appendix VI Stata Output presents the details of assessment of good fit of the model used in the study.

Table 12. Results for factors influencing the choice of market outlets for unprocessed tea

	Market outlet choice					
	KTDA			Agripreneur		
	B	Std. Error	Exp (B)	B	Std. Error	Exp (B)
Intercept	-0.896	1.367		11.125***	2.200	
Age	-0.010	0.017	0.991	-0.047*	0.028	0.954
HHSIZE	-0.013	0.096	0.988	0.377**	0.167	1.457
EDUCATION	-0.051	0.060	0.950	-0.163*	0.090	.849
YIELD	0.000	0.000	1.000	-0.001***	0.000	0.999
DISTMARKET	0.010	0.027	1.010	-0.317***	0.052	0.729
EXPERIENCE	0.064**	0.025	1.066	-0.003	0.043	0.997
[Gender=0]	0.431	0.366	1.539	-1.884***	0.568	0.152
[Gender=1]	0[b]			0[b]		
[PLUCKGUIDE=0]	-0.073	0.370	0.929	-1.642***	0.491	0.194
[PLUCKGUIDE=1]	0[b]			0[b]		
[PRICESATIF=0]	-0.063	0.304	0.939	-0.152	0.505	0.859
[PRICESATIF=1]	0[b]			0[b]		
[INPUTSS=0]	-0.435	0.362	0.647	-2.303***	0.481	0.100
[INPUTSS=1]	0[b]			0[b]		
[CRDTACC=0]	-0.045	0.408	0.956	-1.662***	0.554	0.190
[CRDTACC=1]	0[b]			0[b]		
[GRPMEMBSHIP=0]	-0.285	0.518	0.752	4.137***	0.815	62.610
[GRPMEMBSHIP=1]	0[b]			0[b]		
[MRKTINFO=0]	1.026*	0.535	2.791	-2.162***	0.529	0.115
[MRKTINFO=1]	0[b]			0[b]		
[EXNSIONSVC=0]	0.016	0.572	1.016	-3.215***	0.709	0.040
[EXNSIONSVC=1]	0[b]			0[b]		

Number of observation= 384; -2 Log Likelihood= 471.35; Cox and Snell R2=0.572; Nagelkerke R2=0.654; Mcfadden R2=0.409
a The reference category is: Private
b This parameter is set to zero because it is reduntant

******* indicates significant at 1% level ******, significant at 5% level, *significant at 10% level.

The influence between the choice in market outlets verses the age of the household head and the size of the household is significant. Age had a negative influence with the choice of agripreneur as the market outlets at 10% significance level (Table 12). This indicates that a unit increase in age is associated with 0.954 decrease in the probability of a farmer choosing agripreneur as the market outlet relative to private companies. This could be because older tea farmers have built networks and trust through frequent and consistent sale of unprocessed tea to KTDA and private companies as market outlets and therefore chose to continue selling to them rather than selling to emerging new markets such as agripreneurs. Similar results was evident in study on intensity of participation by smallholder tea farmers where older household heads sell more of their tea to KTDA as compared to non-KTDA (Kirui *et al*., 2016).

Household size on the other hand has a positive influence with the choice of agripreneur as a market outlet at 1% significance level. This indicates that a unit increase in household size is associated with 1.457 increase in the probability of a farmer choosing agripreneur as the market outlet relative to private companies (Table 12). Family needs and wants attribute to this positive association as larger families require cash to facilitate their immediate needs. The contrary association was evident in a study on choice of marketing channels as there was a negative influence on farmers delivering milk to the milk bar (informal market outlet). The main contribution for such association is because as household size increases, there is a tendency to consume more milk that decreases the volume of milk surplus sold (Berem *et al*., 2015). However, in tea marketing, smallholder tea farmers entirely depend on the proceeds of unprocessed tea and therefore sell all the produce.

Education had a negative influence with the choice of agripreneur as the market outlets at 1% significance level. The probability of choosing agripreneurs relative to private companies decreases by 0.849 for every unit increase in the level of education acquired by the household head (Table 12). Knowledge acquired through education enhances managerial competence and implementation of innovative technologies and marketing practices. Moreover, skills derived from education, enable farmers to engage in non-farm activities that serves as alternative source of income for agricultural production. Therefore, it implies that those households with high level of formal education were more aware of market outlets and able to get market information for the unprocessed tea enabling them to choose the best market outlet. However, farmers could choose the best rewarding market outlets by sharing

knowledge among farmers on farm management irrespective of their educational level. According to the study by Hailu and Fana (2017), educational attainment had a negative effect on the choice of retailer channel for vegetables marketing. However, there was a positive relationship on the wholesaler market channel indicating how education aid in market analysis.

The yield of unprocessed tea had a significant and negative influence with the choice of agripreneur as the market outlet at 1% significance level and consistent with prior expectations. This indicates that a unit increase in yield is associated with 0.999 decrease in the probability of a tea farmer choosing agripreneur as the market outlet relative to private companies (Table 12). The implication is that if the quantity of unprocessed tea produced is large, farmers will prefer to sell to a market outlet that buys large volume with fair price. Farmers will sell to available market outlets when the quantity is low without searching higher price and market information. Yield of unprocessed tea depends on agronomical and field management practices. It will therefore, influence the choice of market outlets because other market outlets put more emphasis on quality of unprocessed tea. Short plucking rounds is characterized by slight high yield and good quality through multiple rounds within a month while long plucking rounds mean high yield with low quality of unprocessed tea. Pineapple yield according to study by Sigei (2015) had a negative relationship on the farm gate indicating a declining probability of selling pineapple by 29.73%. This revealed how farmers with more yields had more opportunities of selling their produce at the local market contrary with low yield. In addition, the results are consistent to a study by Emana *et al*. (2015), quantity produced in the farm acts as an incentive in choosing the best alternative market outlets for potatoes.

Distance had a significant and negative influence with the choice of agripreneurs as market outlets at 1% significance level. The probability of choosing agripreneurs relative to private companies' decreases by 0.729 for every unit increase in the distance traveled to an outlet (Table 12). The reasons for a negative effect of distance and likelihood of farmers selling to agripreneur are the further away they are, the higher the cost of transactions making them less attractive. Selling unprocessed tea to agripreneur requires less cost but as a result, smallholder tea farmers interestingly prefer to sell to further market outlets, which require additional transport and market costs. However, the reason could be the benefits and returns acquired through sale of produce with a higher price attract farmers and therefore their higher

probability of choosing between private companies and KTDA. Contrary, according to the study by Kuma *et al*. (2013), households living furthest to the urban centre choose to sell their market surplus to individual consumer milk outlets because hotel outlets were far from the farm. This revealed that farmers would sell their produce to nearest outlet to reduce the costs of transacting.

Farming experience had a positive and significant influence with choice of KTDA as the market outlet relative to private companies at 5% significance level. The likelihood of a farmer choosing KTDA as an outlet for selling unprocessed tea increases by 1.066 when there is a unit increase in number of years spent in tea agrienterprises (Table 12). Knowledge gained through trainings and extension services by the farmer about the market outlet, their support to the farmer and revenue generated from tea sold attribute to this positive relationship. In addition, experienced farmers had better knowledge of costs and benefits associated with individual market outlet and more likely to sell more to higher rewarding markets. Similarly, findings from study on choice of dairy marketing channels experience in dairy farming show a positive association between selection of hawkers and cooperatives and this has been associated with increased confidence on reception to new production ideas and technologies (Berem *et al*., 2015)

Gender had a negative and significant influence with choice of agripreneur as the market outlet relative to private companies at 1% significance level. The likelihood of household choosing agripreneur decrease by 0.15 (Table 12). The gender of the household head influence the choice of market outlet used because female producers are expected to use agripreneur market outlets because of differences in access to information, source of networks, ownership of assets and wealth. Mostly, men control the decision on farm income and therefore there are high chances of them selling to market outlets that give higher market margins. This finding is similar to that of a study on pineapple marketing outlets; male-headed household had a lower probability of selling at farm gate indicating a negative relationship between marketing outlets and gender (Sigei, 2015).

Plucking guidelines had a significant and negative influence with the choice of agripreneur as market outlet choice at 1% significance level (Table 12). A negative sign on its coefficient indicates that an improvement in plucking guidelines and standards results in a decrease in the likelihood of a household selecting the agripreneur as the market outlet choice by 0.194 relative to private companies. Formal market outlet have a well-developed logistic and

institutional framework allowing farmers deliver their unprocessed tea on quality based-demand and usually face higher rejection rate but they are able to access a well-developed and stable market outlets for their unprocessed tea. Agripreneurs on the other hand, quality is not key and farmers choose these outlets because they have less requirements to satisfy farmers' needs and have a more flexible mode of payment and selling strategy. Tea plucking standards have an influence on the quality processed tea and therefore the need to instill standards and guidelines to farmers. According to a study by Samanga and Sachitra (2017), the results indicated that there is need to adopt the factory cultivation model that emphasis on the importance of tea input quality to improve the quality of tea output.

Input supply was significant and negative with the choice of agripreneur as market outlet relative to private companies and 1% significance level. The probability of a farmer choosing agripreneurs decrease by 0.1 when there is an increase in number of farmers accessing credit by one (Table 12). Farmers are likely to increase the chances of selecting a market outlet that offer input credit attached to the sale of agricultural produce. In most cases, farmers prefer input credit because the cost attached is high and farmers might not be able to afford the amount at a go (USAID, 2012).

Credit access had a significant and negative influence with the choice of agripreneur as market outlet relative to private companies and 1% significance level. A unit increase in credit access is associated with 0.190 decrease in the probability of a farmer choosing agripreneur (Table 12). Farmers were more likely to deliver through available market outlets when they have access to credit facilities. This indicates that farmers selling to either private companies or KTDA had higher chances to benefit from easy access to credit. For KTDA, they have a financial plan for farmers to get loan services as well as private companies. This is not the case with agripreneur because their agreement is mutual with the kind of loan arrangements. Access to credit helps farmers to get loans that could assist them in expanding their scale of operation. In addition, it increases farmers' access to resources needed for production. The results are in line with findings of the study by Hailu and Fana (2017), access to credit increases production of vegetables and since wholesalers buy in bulk, they tend to allow farmers choose wholesalers thus a decrease in probability in choosing retailer channel.

Membership to a group had a positive and significant influence with the choice of agripreneur as market outlets at 1% significance level. The likelihood of a farmer selling unprocessed tea to agripreneurs relative to private companies increases by 62.610 (Table 12). The positive

influence could be that farmers may have access to various services and information relevant to production and marketing of farm produce. Membership to a cooperative and other groups involved in marketing of the agricultural produces has positive association. This positive association is in line with the findings on milk market outlets (Kuma *et al., 2013*).

Access to production and market information had a significant positive and negative influence with the choice of KTDA and agripreneurs relative to private companies, respectively. Access to information increases the probability of a tea farmer selling unprocessed tea to KTDA relative to private companies by 2.791 whereas it is contrary to agripreneur with probability decreasing by 0.115 (Table 12). Farmers with access to information have the ability to make decisions on what to produce and where they are going to sell. In addition, According to a study by Dlamini-Mazibuko *et al*. (2019), a similar positive association between markets outlets selection strategies by smallholder farmers and access to information is evident.

Access to tea extension services such as production information, training, field days, and farm visits received by households negatively and significantly influenced selling of unprocessed tea to agripreneurs as market outlets relative to private companies. The probability of choosing agripreneurs decreases by 0.040 (Table 12). Access to extension services increases the ability of farmers to acquire important information, which boosts the ability of a farmer to increase production and choosing the best market outlets for the products. This is in line with the findings of the study by Sori *et al.* (2017) who found that access to extension had significant negative relationship with the choice of consumer outlets by groundnuts producers. According to a study by Mwangi (2003), extension methods and contact with the farmer is critical and most farmers citing farm visits most preferred method. Tea productivity and training received by farmers from agricultural extension officers is highly associated as the study indicate 85% farmers after being trained were able to carry their tea production activities (Waweru,2012).

4.5. Comparing the profitability of formal and informal market outlets for unprocessed tea in Chesumei Sub-County

The profitability of unprocessed tea across the market outlets were determined using gross margin analysis. Formal market outlets had the highest average revenue of Kshs 51,716.85 while informal market had average of Ksh 45,137.65. The average variable costs were Ksh 24,531.18 and Ksh 24,113.25 for formal market and informal market, respectively. The high deviation in returns is because of variations in socio-economics characteristics as well as the

family size and operational prices. Other factors affecting tea returns and the variation in return include efficiency in resources allocation and adoption of production technologies.

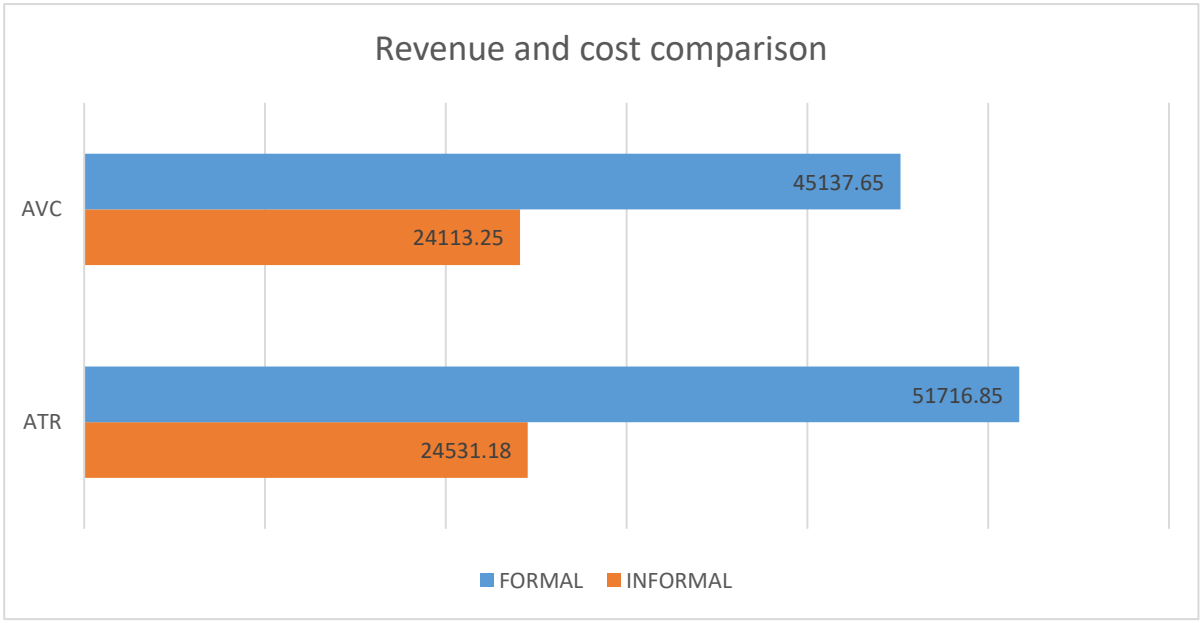

Figure 5. Cost structure of the tea agri-enterprise

The variable costs incurred in marketing of unprocessed tea in the study include labour, transportation, fertilizers, chemicals for weed control and other costs such as pruning, table maintenance and terracing to control rain water flow. Labour and fertilizer costs were major variable costs incurred in tea production for both the market outlets. The costs of fertilizer in formal markets were high with average of Ksh 7,176 per acre while labour costs had average of Ksh 5,174. Informal market outlets on the hand, fertilizer, and labour were Ksh 5,634 and Ksh 4,647, respectively (Figure 6). This indicates that farmers in formal market outlets used more fertilizer bags per acre than farmers choosing informal market outlets. Strict plucking guidelines and standards and increased productivity due to use of fertilizers also attribute to more use of hired labor. According to a study to Mwaura and Muku (2007), plucking and fertilizers costs were high among the major operational costs though other households utilized family labour lowering the returns to a household. In addition, labour costs was highly rated by majority of farmers at 96% and therefore need adequate monthly payment to organize for plucking of unprocessed tea to minimize transaction costs (Maina *et al*., 2015).

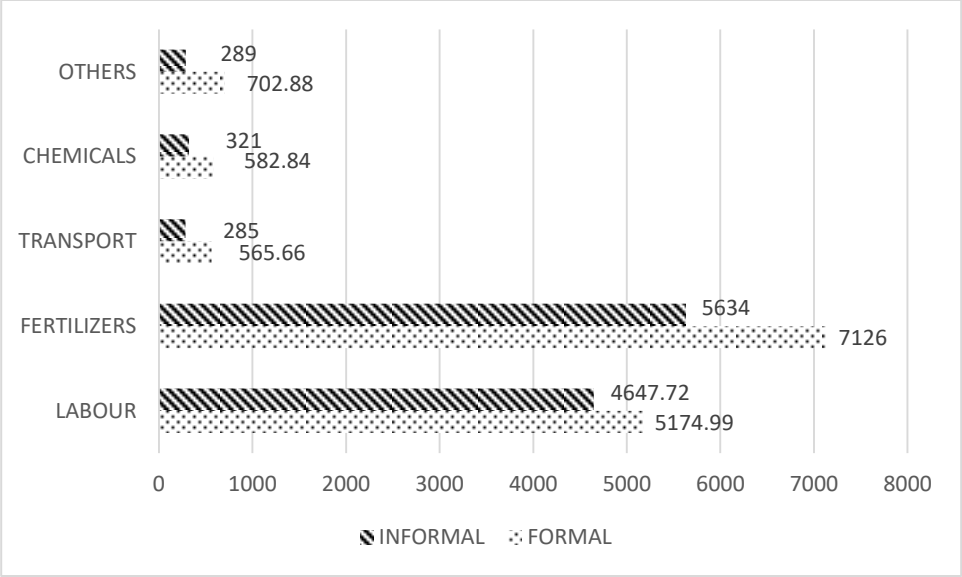

Figure 6. Structure of variable costs

4.5.1 Gross margin analysis

There were costs incurred in tea production and marketing by the farmers although it was not easy to quantify because farmers do not keep proper records. This study therefore relied on the farmer's memory over the last one production period to determine their gross margins in the market outlet choice.

The tea agri-enterprise recorded a positive gross margin rate for both formal markets outlets and informal market outlets (Table 13). Therefore, tea agrienterprises performed differently in terms of profits because its extent in profitability varied between formal and informal market outlets for unprocessed tea. High positive gross margin indicate that farmers selling unprocessed tea to formal market outlets were doing better in tea agri-enterprises. This is similar to a study on analysis of coffee marketing cost and margins by Gachena and Kebebew (2014) found that the level of profit efficiency accrued was higher for licensed marketing channels in relation to the unlicensed marketing channels and this could be because licensed collectors and wholesalers buy large amount of coffee berries.

Tea farmers who sold their unprocessed tea to formal market received a relatively higher prices and gross margin than informal market outlets. Tea farmers obtained a mean price of Ksh 22 per kilogram and a gross margin of Ksh 8.89 per kilogram when sold to formal market outlet (Table 13). The observed difference in returns among these tea farmers could be as result to the variation in prices offered by the marketing outlets. This implies that the higher the prices, the higher the gross margin. Farmers selling to this outlet are therefore encouraged

by the prices. They are able to sell to formal market outlet because of higher gross margins and benefits. However, the average price of milk and gross margin for informal market outlets was Ksh 18 per kilogram and Ksh 0.40 respectively. Farmers incur less cost in transport and labour thus the difference in the gross margins. Households may have utilized the available family labour during the production process and therefore lower labour costs as compared to formal market outlet household.

Table 13. Gross margin analysis

Revenues(Kshs)	**Formal**	**Informal**
Tea yield sales	2,358.31	1,441.49
Total Revenue	51,716.85	24,531.18
Variable Expenses(Kshs)		
Labour	16,508.20	10,090.44
Fertilizers	22,732.00	12,232.00
Transport	1,804.00	619.00
Chemicals	1,859.00	697.00
Others	2,242.00	628.00
Total variable expenses	45,145.20	24,266.44
Gross margin/month	6,571.65	264.74
Summaries		
Gross margin rate (%)	12.71	1.08
Gross margin/variable expenses (Kshs)	0.15	0.01
Gross margin/labour cost(Ksh)	0.40	0.03
Gross margin/fertilizer cost(Ksh)	0.29	0.02
Gross margin/transport cost(Ksh)	3.64	0.43
Gross margin/chemicals cost(Ksh)	3.54	0.38
Gross margin/others cost(Ksh)	2.93	0.42
Average unprocessed tea produced per acre per month(Kgs)	739.28	663.96
Variable cost of production per Kg of unprocessed tea(Kshs)	19.14	16.83
Average tea selling price (Kshs)	22.00	18.00
Gross margin per kilogram of unprocessed tea (Kgs)	8.89	0.40
Fertilizer cost/kilogram of unprocessed tea(Ksh)	30.75	18.42

Formal market outlets show total average revenue of Ksh 51,716.85 while informal market outlets had an average revenue of Kshs 24,531.18. This indication shows the extent of profitability for market outlets. Formal market outlets offer higher price relative to informal and could be the reason for difference in revenues. In addition, the yield of unprocessed tea might be crucial in determining the overall revenues because more yield increases the returns from individual market outlets. Gachena and Kebebew (2014) analyzed and compare the profitability of marketing channels and found similar findings to this study that coffee farmers sell their cherries to illegal traders to satisfy the urgent cash needs, especially those living in distant areas where there's a shortage of or no coffee washing service. Moreover, illegal traders buy broken coffee beans for a lesser price and blend them with better quality coffee to get huge gross margin and sell it to coffee collectors for a profit at the expense of farmers. Illegal traders pay an analogous price for both broken and quality coffee.

On average, tea farmers were able to sell 739.28 kilograms and 663.96 kilograms of unprocessed tea per acre to formal market outlets and informal market outlet, respectively. This could be attributed to higher monthly price and accessed to credit facilities because farmers are able to source for inputs and pay for recurrent variable costs with ease. Continuous trainings and shared knowledge through farmer's field school attributes to higher yield for farmers selling to formal outlets (Kagira *et al*., 2012; Waweru, 2012).

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main aim of this chapter is to present conclusions drawn from the results of the analysis and then make recommendations for further research. The study was undertaken with an objective to characterize different market outlets available for tea agri-enterprise in Chesumei; determine socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea in Chesumei Sub-County and comparing the profitability of formal and informal market outlets for unprocessed tea in Chesumei Sub-County.

5.2 Conclusions

Tea agri-enterprises use different market outlets to sell their unprocessed tea although amount of unprocessed tea and reasons for delivering through each market outlet differs. According to this study three main market outlets (KTDA, private companies and agripreneurs) that tea agrienterprises utilize in Chesumei Sub-County, Nandi County were identified from the survey result. Tea agri-enterprises can choose to sell all or proportion of their unprocessed tea through any one of these market outlets.

i. Farmers who choose the formal market outlets were attracted by on-credit payments, access to supply of inputs and credit access while those who chose the informal market outlets were mainly attracted by cash payments and none strict plucking guidelines and standards. This therefore demonstrate the need for integrating necessary measures and strategies to enhance flexible mode of payment and improving the framework of supplying inputs on credit to all tea agri-enterprises.
ii. Access to extension service by tea farmers influenced significantly and negatively the agripreneur market outlet. Therefore, strengthening efficient and extension education through training and farmer field schools would assist the farmers to choose the most profitable market outlets. Additionally, access to information influenced the choice of KTDA and agripreneur market outlets for unprocessed tea positively and negatively, respectively and thus there is need for government intervention on ensuring quality and useful information disseminated to farmers.
iii. The formal market outlets have higher gross margins than informal market outlets for unprocessed tea. This indicates the need to encourage farmers to supply to formal

market outlets in order to maximize profits and thus improving the household wellbeing.

5.3 Recommendations

The following are policy recommendation observed from the study.

i. KTDA and private companies should have contractual arrangements where part of the sale proceeds paid on cash mode to attract those selling to agripreneurs.
ii. The County Government of Nandi should improve on extension services so that they are able to reach all the farmers through farm visits, demonstrations, farmers' field schools and field days.
iii. KTDA, private companies and other key stakeholders through the County Government should further reduce the prices of fertilizers to increase the gross margins for farmers.

5.4 Further Research

The main intention of the study was to contribute to increased tea production and income through choice of efficient and effective market outlets by small and micro tea agri-enterprises in Chesumei Sub-County. However, there are several areas for further research

i. This study focused on the socio-economic and institutional factors influencing the choice of market outlets for unprocessed tea. A further study could include entrepreneurial orientation and infrastructural development in tea agri-enterprises in Nandi County.
ii. Assessment of marketing efficiencies effects on different market outlets available to farmers in chesumei Sub-County.
iii. Further research can use marketing margins and multivariate analysis.
iv. Factors influencing farm diversification strategies among smallholder tea farmers in Nandi County.

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APPENDICES

Appendix A: Questionnaire

This study intends to analyze factors influencing choice of market outlets for unprocessed tea by small and micro tea agri-enterprises in Chesumei Sub-County, Kenya**.** Your response to the questions was used to assess and compare formal and in formal market outlets. The information you provide was treated with the confidentiality it deserves and was used only for the purpose of this study.

Instructions for the Enumerators

1. Introduce yourself and tell the respondents the purpose of the study before the interview
2. Tick the box on the closed questions as indicated
3. Write interview clearly

Name of the enumerator……Name of the farmer (Optional)……

Name of the village …….Date……

1. SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENT

Household head information

1.1. Gender M [ ] F [ ]

1.2. Age _____ (Years)

1.3. Marital status Single [ ] Married [ ] Widowed [ ] Divorced [ ]

1.4 What is your household size? _____

1.5 Household composition

1.5.1 How many children in your household are below 5 years? _____

1.5.2 How many are in primary school? _____

1.5.3 How many are in secondary? _____

1.5.4 How are in tertiary? _____

1.5.5 How members in your household are chronically ill? _____

1.5.6 Average number of workers who are family members? _____

1.5.7 Number of workers who are not family members? _____

1.6 How many years did you spend in formal schooling? _____

1.7. Do you participate in off farm income generating activities Yes [ ] No [ ]

1.8. What was the estimated amount of income per month (in Ksh)? _____

1.9. What is the size of land _____ acres and under tea _____ acres?

2. MARKET INFORMATION

2.1 Where do you sell your unprocessed tea leaves?

At farm gate……tea collection centers…… others……

2.2 Which markets do you usually use for selling your unprocessed tea?

Formal…….Informal……. Both……

2.3.1 If formal, give reasons for the choice

a) Tea delivery cost per kg Yes [ ] No[ ]

   If Yes, how much per kg…….

b) Guidelines for tea plucking. Strict [ ] Not strict [ ]

   If strict, does is increase quantity of green leaves? Yes [ ] No [ ]

   If not, does it increase quantity of green leaves? Yes [ ] No [ ]

c) Availability of extension service. Yes [ ] No [ ]

d) Price satisfaction. Yes [ ] No [ ]

e) Supply of inputs. Yes [ ] No[ ]

   If Yes,describe form of payment. Cash [ ] Inkind [ ]

f) Second payment (bonuses) Yes [ ] No[ ]

g) Others ……

2.3.2 If informal, give reasons for choice

a) Tea delivery cost per kg Yes [ ] No[ ]

   If Yes, how much per kg…….

b) Guidelines for tea plucking. Strict [ ] Not strict [ ]

   If strict, does is increase quantity of green leaves? Yes [ ] No [ ]

   If not, does it increase quantity of green leaves? Yes [ ] No [ ]

c) Availability of extension service. Yes [ ] No [ ]

d) Price satisfaction. Yes [ ] No [ ]

e) Collection modes. Flexible [ ] Not Flexible [ ]

f) Supply of inputs. Yes [ ] No[ ]

If Yes,describe form of payment. Cash [ ] Inkind [ ]

g) Urgent need of money. Yes [ ] No[ ]

h) Rejection of green leaves. Frequent [ ] Not Frequent [ ]

i) Relationship bound by trust Yes [ ] No[ ]

2.3.3 If both, give reasons for the choice?

a) Tea delivery cost per kg Yes [ ] No [ ]

If Yes, how much per kg…….

b) Guidelines for tea plucking. Strict [ ] Not strict [ ]

If strict, does is increase quantity of green leaves? Yes [ ] No [ ]

If not, does it increase quantity of green leaves? Yes [ ] No [ ]

c) Availability of extension service. Yes [ ] No [ ]

d) Price satisfaction. Yes [ ] No [ ]

e) Collection modes. Flexible [ ] Not Flexible [ ]

f) Supply of inputs. Yes [ ] No [ ]

2.3.4 If both, which one is mostly preferred? Formal…..Informal…..

2.3.5 And during which season do farmers choose the most preferred? Peak season [ ] Off peak season [ ]

2.4. Do you have contractual form of payment with your buyer? Yes [ ] No [ ]

2.4.1 If yes what is the mode of payment? Daily [ ] Weekly [ ] Monthly [ ] Yearly [ ]

2.5. Which means of transport do you usually use in unprocessed tea delivery?

Head carrying ☐ Wheelbarrow ☐

Bicycles/Motorcycles ☐ Hired vehicles ☐

2.6. What is the time taken to get to this collection centre……. Mins

2.7. For how long have you been in tea farming? ..... Years

2.8. What has been the trend of tea yield in the last years?

1=Decreasing ☐ 2=Increasing ☐ 3=Stagnated ☐

2.8.1 If increasing, what are the reasons?

a. ……,……..
b. …….
c. ……..
d. …….

2.8.2 If decreasing, what are the reasons?

a. ……..
b. …….
c. ……
d. …….

3. REVENUES AND COSTS

3.1. Which market outlet do you mostly prefer to deliver your unprocessed tea through and at what price are they offering for kilo of green tea? (per month)

No.	Market outlet	Quantity by outlet(kg)	Price per unit(Ksh)	Total revenue
1	KTDA			
2	Private			
3	Agripreneur			

3.2. What are the production and marketing cost in your tea enterprise?

Item	Quantity cost/unit kes	Total
Variable and overhead cost		
Labour		
Fertilizers		
Transport		
Fuel		
Chemicals (spraying)		
Taxes		
Others (specify)Weeding, pruning,		

table management,		

3.4. List what you consider to be major problems constraining you in channeling your unprocessed tea via formal market outlets?

_____

_____

_____

3.5. Suggest ways in which such problems can be addressed?

_____

_____

INSTITUTIONAL SERVICES

4.1 Do you access any extension services? Yes ☐ No ☐

4.1.1 If Yes, who are the providers of these services mentioned? Tea processors ( ) Government (NGOs ( )

4.1.2 How many times in a month? _____

4.2 Do you access credit? Yes/No

4.3 Which form of loan? Formal…..Informal

4.3.1 If formal, how do you access?

Banks. Yes [ ] No [ ]

Tea processors. Yes [ ] No [ ]

4.3.2 Why do you prefer formal loans?

1.
2

4.3.3If informal, how do you access?

Tea hawkers [ ] Merry-go rounds [ ] Family members [ ] Friends [ ]

4.3.4 Why informal loans?

a) No security required……
b) No procedures for acquisitions…..
c) Minimal or no interest rates….

4.4 Do you belong to any tea farmer group?

Yes [ ] No [ ]

4.5 Do you have knowledge on the existence of tea production information?

1=Yes [ ] 2=No [ ]

4.6 What is your priority source of information on tea and agriculture related activities which you get?

1= Extension agents [ ] 2= Radio [ ] 3= Television [ ] 4=Internet [ ]

5= Fellow farmers [ ] 6= Farmers field schools 7=Others (specify)……..

4.7 What kind of information?

Price information…

Market…

Agronomical information…

Inputs applications…

Your participation in this study greatly appreciated.

Thank you for your time!

Once again, I assure you that your identity will remain

STRICTLY CONFIDENTIAL.

Appendix B: Multicollinearity Tests Stata Output

```
. regress MARKETOUTLET Gender Age HHSIZE EDUCATION YIELD PLUCKGUIDE PRICESATIF INPUTSS DISTMARKET EXPERIENCE CRDTACC GRPMEMBERSHIP MRKTINFO
> ACCEXTENSIONSERVICES
```

Source	SS	df	MS	Number of obs	=	384
				F(14, 369)	=	25.68
Model	141.613141	14	10.1152244	Prob > F	=	0.0000
Residual	145.345192	369	.39388941	R-squared	=	0.4935
				Adj R-squared	=	0.4743
Total	286.958333	383	.749238468	Root MSE	=	.62761

MARKETOUTLET	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Gender	.0847549	.0759452	1.12	0.265	-.0645847	.2340945
Age	-.005463	.003924	-1.39	0.165	-.0131791	.0022532
HHSIZE	.0308487	.0212428	1.45	0.147	-.0109233	.0726208
EDUCATION	-.0325514	.0127626	-2.55	0.011	-.0576479	-.0074548
YIELD	-.0000638	.0000185	-3.44	0.001	-.0001002	-.0000273
PLUCKGUIDE	.2408342	.0775994	3.10	0.002	.0882416	.3934268
PRICESATIF	.0208734	.0703874	0.30	0.767	-.1175373	.1592842
INPUTSS	.4485926	.0773613	5.80	0.000	.2964683	.6007168
DISTMARKET	-.0357838	.0051244	-6.98	0.000	-.0458605	-.025707
EXPERIENCE	.0065289	.0058878	1.11	0.268	-.0050491	.0181068
CRDTACC	.296169	.0826226	3.58	0.000	.1336988	.4586391
GRPMEMBERSHIP	-.5945845	.1019098	-5.83	0.000	-.7949813	-.3941876
MRKTINFO	.31398	.0848571	3.70	0.000	.1471159	.4808441
ACCEXTENSIONSERVICES	.5774327	.0941083	6.14	0.000	.3923768	.7624886
_cons	.8183529	.3366569	2.43	0.016	.1563462	1.48036

```
. vif
```

Variable	VIF	1/VIF
ACCEXTENSI~S	2.12	0.471938
Age	2.00	0.499059
EXPERIENCE	1.80	0.555446
GRPMEMBERS~P	1.72	0.582947
DISTMARKET	1.71	0.585424
HHSIZE	1.53	0.653413
MRKTINFO	1.38	0.725748
YIELD	1.34	0.748362
INPUTSS	1.33	0.754420
EDUCATION	1.28	0.784247
CRDTACC	1.24	0.807025
PLUCKGUIDE	1.23	0.811967
PRICESATIF	1.19	0.840215
Gender	1.18	0.847726
Mean VIF	1.50	

Appendix C: Covariance matrix SPSS Output

Correlations

		Age of the household	What is your household size	Number of years did you spend in formal schooling	Total size of land in acres	Total size of land under tea in acres	Production of green tea in kgs	What is the time taken to get to this collection centre in minutes	For how long have you been in tea farming in years?
Age of the household	Pearson Correlation	1	.506**	-.121*	.036	-.029	-.033	-.067	.542**
	Sig. (2-tailed)		.000	.018	.477	.577	.524	.190	.000
	N	384	384	384	384	384	384	384	384
What is your household size	Pearson Correlation	.506**	1	-.117*	-.006	-.087	-.117*	-.062	.212**
	Sig. (2-tailed)	.000		.022	.900	.089	.022	.228	.000
	N	384	384	384	384	384	384	384	384
Number of years did you spend in formal schooling	Pearson Correlation	-.121*	-.117*	1	-.213**	.082	.121*	.021	-.037
	Sig. (2-tailed)	.018	.022		.000	.108	.018	.678	.466
	N	384	384	384	384	384	384	384	384
Total size of land in acres	Pearson Correlation	.036	-.006	-.213**	1	.658**	.660**	.009	.114*
	Sig. (2-tailed)	.477	.900	.000		.000	.000	.860	.025
	N	384	384	384	384	384	384	384	384
Total size of land under tea in acres	Pearson Correlation	-.029	-.087	.082	.658**	1	.975**	-.197**	.256**
	Sig. (2-tailed)	.577	.089	.108	.000		.000	.000	.000
	N	384	384	384	384	384	384	384	384
Production of green tea in kgs	Pearson Correlation	-.033	-.117*	.121*	.660**	.975**	1	-.161**	.236**
	Sig. (2-tailed)	.524	.022	.018	.000	.000		.002	.000
	N	384	384	384	384	384	384	384	384
What is the time taken to get to this collection centre in minutes	Pearson Correlation	-.067	-.062	.021	.009	-.197**	-.161**	1	-.208**
	Sig. (2-tailed)	.190	.228	.678	.860	.000	.002		.000
	N	384	384	384	384	384	384	384	384
For how long have you been in tea farming in years?	Pearson Correlation	.542**	.212**	-.037	.114*	.256**	.236**	-.208**	1
	Sig. (2-tailed)	.000	.000	.466	.025	.000	.000	.000	
	N	384	384	384	384	384	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix D: Independence of Irrelevant Alternatives (IIA)

```
. test [xx1_Agripreneur = yy2_Agripreneur] , cons notest

 ( 1)  [xx1_Agripreneur]Gender - [yy2_Agripreneur]Gender = 0
 ( 2)  [xx1_Agripreneur]Age - [yy2_Agripreneur]Age = 0
 ( 3)  [xx1_Agripreneur]HHSIZE - [yy2_Agripreneur]HHSIZE = 0
 ( 4)  [xx1_Agripreneur]EDUCATION - [yy2_Agripreneur]EDUCATION = 0
 ( 5)  [xx1_Agripreneur]YIELD - [yy2_Agripreneur]YIELD = 0
 ( 6)  [xx1_Agripreneur]PLUCKGUIDE - [yy2_Agripreneur]PLUCKGUIDE = 0
 ( 7)  [xx1_Agripreneur]PRICESATIF - [yy2_Agripreneur]PRICESATIF = 0
 ( 8)  [xx1_Agripreneur]INPUTSS - [yy2_Agripreneur]INPUTSS = 0
 ( 9)  [xx1_Agripreneur]DISTMARKET - [yy2_Agripreneur]DISTMARKET = 0
 (10)  [xx1_Agripreneur]EXPERIENCE - [yy2_Agripreneur]EXPERIENCE = 0
 (11)  [xx1_Agripreneur]CRDTACC - [yy2_Agripreneur]CRDTACC = 0
 (12)  [xx1_Agripreneur]GRPMEMBERSHIP - [yy2_Agripreneur]GRPMEMBERSHIP = 0
 (13)  [xx1_Agripreneur]MRKTINFO - [yy2_Agripreneur]MRKTINFO = 0
 (14)  [xx1_Agripreneur]ACCEXTENSIONSERVICES - [yy2_Agripreneur]ACCEXTENSIONSERVICES = 0
 (15)  [xx1_Agripreneur]_cons - [yy2_Agripreneur]_cons = 0

. test [xx1_KTDA  = zz3_KTDA], cons acc

 ( 1)  [xx1_Agripreneur]Gender - [yy2_Agripreneur]Gender = 0
 ( 2)  [xx1_Agripreneur]Age - [yy2_Agripreneur]Age = 0
 ( 3)  [xx1_Agripreneur]HHSIZE - [yy2_Agripreneur]HHSIZE = 0
 ( 4)  [xx1_Agripreneur]EDUCATION - [yy2_Agripreneur]EDUCATION = 0
 ( 5)  [xx1_Agripreneur]YIELD - [yy2_Agripreneur]YIELD = 0
 ( 6)  [xx1_Agripreneur]PLUCKGUIDE - [yy2_Agripreneur]PLUCKGUIDE = 0
 ( 7)  [xx1_Agripreneur]PRICESATIF - [yy2_Agripreneur]PRICESATIF = 0
 ( 8)  [xx1_Agripreneur]INPUTSS - [yy2_Agripreneur]INPUTSS = 0
 ( 9)  [xx1_Agripreneur]DISTMARKET - [yy2_Agripreneur]DISTMARKET = 0
 (10)  [xx1_Agripreneur]EXPERIENCE - [yy2_Agripreneur]EXPERIENCE = 0
 (11)  [xx1_Agripreneur]CRDTACC - [yy2_Agripreneur]CRDTACC = 0
 (12)  [xx1_Agripreneur]GRPMEMBERSHIP - [yy2_Agripreneur]GRPMEMBERSHIP = 0
 (13)  [xx1_Agripreneur]MRKTINFO - [yy2_Agripreneur]MRKTINFO = 0
 (14)  [xx1_Agripreneur]ACCEXTENSIONSERVICES - [yy2_Agripreneur]ACCEXTENSIONSERVICES = 0
 (15)  [xx1_Agripreneur]_cons - [yy2_Agripreneur]_cons = 0
 (16)  [xx1_KTDA]Gender - [zz3_KTDA]Gender = 0
 (17)  [xx1_KTDA]Age - [zz3_KTDA]Age = 0
 (18)  [xx1_KTDA]HHSIZE - [zz3_KTDA]HHSIZE = 0
 (19)  [xx1_KTDA]EDUCATION - [zz3_KTDA]EDUCATION = 0
 (20)  [xx1_KTDA]YIELD - [zz3_KTDA]YIELD = 0
 (21)  [xx1_KTDA]PLUCKGUIDE - [zz3_KTDA]PLUCKGUIDE = 0
 (22)  [xx1_KTDA]PRICESATIF - [zz3_KTDA]PRICESATIF = 0
 (23)  [xx1_KTDA]INPUTSS - [zz3_KTDA]INPUTSS = 0
 (24)  [xx1_KTDA]DISTMARKET - [zz3_KTDA]DISTMARKET = 0
 (25)  [xx1_KTDA]EXPERIENCE - [zz3_KTDA]EXPERIENCE = 0
 (26)  [xx1_KTDA]CRDTACC - [zz3_KTDA]CRDTACC = 0
 (27)  [xx1_KTDA]GRPMEMBERSHIP - [zz3_KTDA]GRPMEMBERSHIP = 0
 (28)  [xx1_KTDA]MRKTINFO - [zz3_KTDA]MRKTINFO = 0
 (29)  [xx1_KTDA]ACCEXTENSIONSERVICES - [zz3_KTDA]ACCEXTENSIONSERVICES = 0
 (30)  [xx1_KTDA]_cons - [zz3_KTDA]_cons = 0

           chi2( 30) =   16.78
         Prob > chi2 =    0.9752
```

Appendix E: Goodness of fit tests Stata Output

```
. fitstat

Measures of Fit for mlogit of MARKETOUTLET

Log-Lik Intercept Only:     -398.811     Log-Lik Full Model:         -235.677
D(339):                      471.354     LR(28):                      326.267
                                         Prob > LR:                     0.000
McFadden's R2:                 0.409     McFadden's Adj R2:             0.296
Maximum Likelihood R2:         0.572     Cragg & Uhler's R2:            0.654
Count R2:                      0.492     Adj Count R2:                  0.000
AIC:                           1.462     AIC*n:                       561.354
BIC:                       -1545.913     BIC':                       -159.649
```

Appendix F: Heterosceskadicity Tests Stata Output

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of MARKETOUTLET

        chi2(1)      =     0.24
        Prob > chi2  =   0.6273
```

Appendix G: Abstract Paper

Journal of Economics and Sustainable Development
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Is It Formal or Informal? Choice of Market Outlets for Unprocessed Tea in Nandi County, Kenya

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Abstract
The tea industry plays a key role in the agriculture sector and the economy at large with tea output contributing about 11% of the agriculture sector's contribution to Gross Domestic Product. Like many other crops in Kenya, tea is produced both on small and large-scale basis. Smallholder farmers in Kenya make a significant contribution to the industry producing 61% of the total national production and with 66% of tea acreage. Formal market outlets are more profitable than informal ones. However, small tea agri enterprises in Nandi County prefer selling their unprocessed tea to informal market outlets. Empirical evidence on what motivates these agri-enterprises to sell most of their tea to these outlets is scanty. The main objective of this study was to compare the profitability of formal and informal market outlets for unprocessed tea in Nandi County. Multistage sampling procedure was employed and 384 respondents interviewed using semi-structured questionnaire. Data were analysed using gross margin analysis. Formal market outlets are more beneficial because of higher gross margin rate of 12.71% compared to informal market outlets having the gross margin rate of 1.08%.The findings are helpful in guiding smallholder tea farmers in information on the most profitable and efficient market outlets and informing policy makers on how to improve the efficiency of market outlets.
DOI: 10.7176/JESD/11-22-10
Publication date: November 30th 2020

Appendix H: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **696438**

Date of Issue: **23/August/2019**

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