

**MARKET INTERGRATION BY SMALL-SCALE RICE FARMERS IN KILOSA
DISTRICT, TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

Market intergration and access, are critical and important aspects to rural poor households. They are a pre-requisite for enhancing agriculture based economic growth through the improvement of competitiveness of farming enterprise and improving rural incomes. Several studies have been conducted on participation and access of small-scale farmers in rice and other crops marketing in Africa, but, specific information on the extent to which small-scale rice farmers are integrated into different markets and factors that influence choice of rice marketing outlet in Kilosa District is not readily available. This study aimed at examining market intergration by small scale rice farmers in Kilosa District. Specifically the study evaluated the extent to which small-scale rice farmers are integrated into different markets, determined factors influencing the choice of rice marketing outlet among small scale rice farmers and identified major problems facing small-scale rice farmers to access lucrative markets in Kilosa District. A purposive and random sampling procedures were employed in selecting the respondents. The data collected data, were analyzed using descriptive statistics, chi-square test and the multinomial logistic regression model. Results show that socio-economic, institutional and market characteristics of the small-scale rice farmers varied greatly across markets. The multinomial logistic regression results show that age, level of education, distance to markets, and quantities of rice produced, price information and contract marketing were key factors that influence choice of marketing outlet for small-scale rice farmers in Kilosa District. The problems facing small-scale rice farmers were low price and lack of reliable markets. In view of research findings, several policy proposals are suggested. These include disseminating knowledge to rice farmers, forming formal small-scale rice farmer's organizations and improving price information system.

DECLARATION

I, MKALI MBWANA MLANZI, do hereby declare to the Senate of Sokoine University of Agriculture that, this dissertation is my own work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

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Date

Above declaration is confirmed:

Prof. R. M. J. KADIGI
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Date

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DEDICATION

This work is dedicated to God under whose care I was able to finish the work successfully, to my lovely wife Maria Mlanzi and my daughter Macklina Mlanzi.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACDI	Agricultural Cooperative development International
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAADP	Comprehensive African Agriculture Development Programme
CRS	Conservation Resource Centre
DAEA	Department of Agricultural Economics and Agribusiness
DED	District Executive Director
EAGC	East African Grain Council
EUCORD	European Cooperative for Rural Development
FAO	Food and Agriculture Organization
FEWS NET	Famine Early Warning System Network
GDP	Gross Domestic Product
iAGRI	Innovative Agricultural Research Initiative
IIA	Independent of Irrelevant Alternative
IITA	International Institute of Tropical Agriculture
KDC	Kilosa District Council
Km	Kilometers
MII	Market Intergration Index
MIS	Marketing Information System
NBS	National Bureau of Statistics
NGOs	Non-Government Organizations
NSCA	National Sample Census of Agriculture
OCHA	United Nations Office for the Coordination of Humanitarian Affairs

OLS	Ordinary Least Square
PSM	Polychotomous Selection Model
RATIN	Regional Agricultural Trade Intelligence Network
RLDC	Rural Livelihood Development Company
SNAL	Sokoine National Agricultural Library
TCE	Transaction Cost Economics
URT	United Republic of Tanzania
USAID	United State Agency for International Development
VOCA	Volunteers in Overseas Cooperative Assistance

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

In Tanzania, rice is one of the most important food and commercial crops. An estimated 18% of farming households grow rice and the sub-sector contributes 2.7% of the National GDP (EUCORD, 2012). The sub-sector is also one of the major sources of employment, income and food security for Tanzanian farming households and ensures staple food supply for the urban population (EUCORD, 2012). Rice has progressively become an important source of nutrition, with the average Tanzanian sourcing 8% of total calorific intake from it. The nutritional intake from rice is significantly above average (8%) amongst smallholder rice producers who consume most of what they produce, and also among high-income urban households for whom rice is a 'preferred' grain (EUCORD, 2012).

In the central zone of Tanzania, rice is extensively produced in three regions namely; Tabora, Shinyanga and Morogoro where there are favorable growing conditions. Manyara, Singida and Dodoma have some supplementary production in their low lands. Rice is particularly an important crop in the central zone with 48 % of the rice cultivated land in Tanzania found in this zone. According to the RLDC the crop is grown by approximately 230 000 smallholder households in Tanzania. These smallholders hire substantial amounts of labor to work in the fields, employ people to move the paddy, they subcontract small mills to mill the paddy into rice (for own consumption) and sell the rest as paddy to local traders. The paddy is usually sold to local agents and traders who transport and sell the rice into regional centers where the bigger millers run (RLDC, 2009).

Statistics from the National Sample Census of Agriculture (NSCA) 2002—2003 show that rice is more commercialized than other staple crops, with 42 percent of produce marketed (compared with 28 percent of maize and 18 percent of sorghum). The figures may, however, be misleading by larger rice growers who account for the bulk of sales. The NSCA found that only a small proportion of small-scale grower's rice; the rest use their crop entirely for their own consumption (FAO, 2015).

1.2 Problem Statement and Justification

Market intergration and access, are critical and important aspects to rural poor households. They are a pre-requisite for enhancing agriculture based economic growth through the improvement of competitiveness of farming enterprise and improving rural incomes (Makhura, 2001).

Several studies have been conducted on participation and access of small-scale farmers to competition markets for rice and other cereal crops. Most of these studies have focused on either evaluating the determinants or factors that affect market-access and participation for different crops (Hlongwane *et al.*, 2014; Komarek 2010; Mesay *et al.*, 2013; Ohen *et al.*, 2013). Specific information on the extent to which small-scale rice farmers are integrated into different markets and the factors that influence the choice of rice marketing outlet is not readily available.

This study, therefore, intended to fill the knowledge gap by evaluating the extent to which small-scale rice farmers are integrated into different rice markets. In addition the study determined the factors that influence the choice of marketing outlet and identified problems facing small-scale rice farmers in Kilosa district. Findings from this study are intended to furnish information that will assist policy makers, NGOs and other

stakeholders to improve the performance of rice marketing and livelihood among small-scale rice farmers in Kilosa and Tanzania in general.

1.3 Objectives

1.3.1 General objective

The overall objective of the study was to examine the extent of market intergration by small-scale rice farmers in Kilosa District, Tanzania.

1.3.2 Specific objectives

- i) To evaluate the extent to which small-scale rice farmers are integrated into different markets in Kilosa District
- ii) To determine factors influencing the farmers choice of rice marketing outlets among small-scale rice farmers in Kilosa District.
- iii) To identify problems facing small-scale rice farmers in Kilosa District.

1.4 Hypotheses

- i. The extent to which household's social-economic, market and institutional characteristics do not vary across market intergration.
- ii. Household's social-economic, market and institutional characteristics do not influence choice of rice marketing outlet among small-scale rice farmers in Kilosa District.

1.5 Organization of the Study

This study is organized into five chapters. The first Chapter presents a general background to the study, problem statement of the study, study objectives and hypotheses. The second chapter gives a critical review of literature relevant to the study, the third chapter presents a detailed description of the study area and methodology employed. The fourth chapter presents results and discussion and the last Chapter presents conclusions and recommendations drawn from the study findings.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Rice Market in Tanzania

Rice is a staple food and is consumed in both urban and rural areas. The urban area of greater Dar es Salaam is the principal end market and accounts for about 60 percent of national consumption whereby Mbeya and Morogoro Regions are the main sources of supply (FAO, 2015). Dar es Salaam has Tanzania's highest Gross Domestic Product (GDP) per capital (US\$ 1741 compared to the national average of US\$ 1471 in 2010), the highest urban population and the third largest total population in the country (FAO, 2015).

2.2 Rice Import Market in Tanzania

There were significant imports in the early 2000s before a duty of 75 percent was imposed in 2005. This caused a drop in imports and was the basis for a major increase in internal rice production (there are still considerable imports from Pakistan, India and Vietnam, however). Imports accounted for 16.45 percent of domestic consumption between 2001 and 2004, but only 5.2 percent between 2005 and 2011. Reduced imports means that domestic prices are less subject to the volatility of world prices yet more vulnerable to variations in domestic production. Except for a brief period in 2008, rice prices in Dar es Salaam were higher than world prices, which means that Tanzanian consumers are paying a significantly higher price than consumers in many other parts of the world (FAO, 2015).

2.3 Rice Export Market in Tanzania

Exports accounted for only about 5 percent of rice production during the 2000s (FAO, 2015). Exports are principally to neighboring countries (including Uganda, Rwanda, Kenya and Burundi) and occasionally to Malawi and Zambia. Tanzania official export figures are wildly at variance with official data from the importing countries. Informal trade is quite considerable, certainly under reported and takes place via unauthorized tracks that bypass customs posts (FAO, 2015). The export markets are in the main producing areas, and are very close to the neighboring importing countries. Good quality Tanzanian rice is preferred in these markets (where it has a 15 percent price premium over other imported rice) but is only irregularly available as a result of export bans and high export tariffs imposed by the Tanzania authorities (FAO, 2015).

The rice deficit is expected to rise from 1.15 million tonnes in 2009 to 2.84 million tonnes in 2020, with a rising trend forecast to continue until beyond 2025 (FAO, 2015). A critical factor in terms of exports, however, is the rate of rice production growth in Tanzania. Production in the decade starting from 2001 to 2011 grew at 6.99 percent per annum but, because of a rapidly growing domestic demand, Tanzania will find it difficult to achieve and sustain an export surplus. If the rice sector was to achieve a 10 percent annual growth rate, there would be surplus available for export, a 5 percent annual growth rate would, conversely, result in increasing trade deficits (FAO, 2015).

2.4 Market Information

Linking farmers to markets is one of the main keys to promoting agricultural growth and reducing poverty. Smallholder competitiveness, facilitation of market entry, improved market access, and the establishment of efficient value chains are critical factors in agricultural development. Pillar 2 of the Comprehensive African Agriculture

Development Programme (CAADP) entitled ‘market access’ and most African governments, including Tanzania’s, have been developing policies and programmes to link farmers to domestic, regional and international markets (FAO, 2015). Improving the quantity and reliability of agricultural data available to decision makers and stakeholders (including both public and private sector actors), are thus preconditions for formulating effective agricultural and rural sector investments that will allow farmers to access market opportunities (FAO, 2015).

Market data have been collected in Tanzania over many years but have seldom been put to proper use (usually they are not used at all) (FAO, 2015). The National Bureau of Statistics (NBS) is the main source of market data for Tanzania but the quality of its information remains a major concern. Many of the collected (and sometimes collated) data are inadequate, lack consistency (through time and between sources) and are full of gaps. (FAO, 2015) Data collection is not embedded in the national awareness. There is inadequate responsibility for verification in order to establish accuracy at all levels. In addition, data are often not readily accessible to users for a variety of reasons and, if available, are not always put to optimal use as they are not presented in a timely manner, are not in the form required or are not disaggregated to appropriate levels (FAO, 2015).

There is increasing awareness of the need for accurate, consistent, timely and accessible market information. To address this, large-scale rice producers and traders in Tanzania have constructed their own intelligence networks (FAO, 2015). In addition, several international organizations have set up, or are in the process of setting up, market information systems (MIS). Those relevant to the future of rice production include the MIS of:

- Foodnet — a partnership between IITA, CRS, ASARECA, Agricultural Cooperative Development International (ACDI) and Volunteers in Overseas Cooperative Assistance (VOCA).
- The Famine Early Warning Systems Network (FEWS NET) — funded by USAID, monitors trends in the prices of staple foods in those East African countries that are vulnerable to food insecurity. The FEWS NET price bulletin shows monthly prices for the current marketing year in selected urban centres. This allows users to compare current trends with five-year average prices (indicative of seasonal trends) as well as prices in the previous year.
- Regional Agricultural Trade Intelligence Network (RATIN) — a service provided by the Eastern Africa Grains Council (EAGC) which shows time-series data on prices, storage facilities, cross border trade and food balances.
- ReliefWeb — a specialized service provided the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

These networks undoubtedly provide useful information on prices and trends but are not necessarily easy to access or use by small producers, the majority of whom continue to obtain their information from more traditional sources (such as neighbors, local traders, shops and markets). Inevitably, this means that producers remain price takers not price makers (FAO, 2015).

2.5 Importance of Farmers Accessing and Integrating in Markets

Market participation by farmers plays a crucial role in that human derives benefit such as income and rural employment in the farming (Ngqangweni, 2000). According to Makhura (2001) the rural employment derives from market participation includes sorting, grading,

transportation among other activities. Market participation has motivated farmers to move from subsistence farming to commercial farming.

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

In summary, marketing plays a crucial role in meeting the overall goal of food security, poverty alleviation and sustainable agriculture, especially among smallholder farmers in developing countries (Jari, 2009).

2.6 Strategies for Improving Market Access among Small-scale Farmers

Technology affects market participation directly. A household's production technology choice affects its market participation choice by affecting its productivity (Barrett, 2009). Lack of storage facilities, most smallholder producers are keen to sell produce almost immediately after harvest in order to ease congestion, leading them to sell their produce at lower prices (Wilson *et al.*, 1995).

Improved market access result in the production of marketable surplus and hence gain in income from agriculture and higher revenues, saving and hence investment in productivity enhancing technologies. Investment in public goods such as telecommunication, a road, an efficient legal system, and farmer support service

(extension, marketing information, and research) would raise farm and non-farm income by reducing transaction costs (Matungul *et al.*, 2002).

Contract system is another strategy to enhance market participation. Contract farming provides the basis for sharing values, risks and decision-making power between farmers and processors in a way that is mutually beneficial (Eaton and Shepherd, 2001).

Across many developing countries, contract farming has been found to play an important role in the commercialization of smallholder agriculture through the provision of an assured market, high prices, critical inputs and knowledge of new agricultural technologies for farmers as a driver of a rural development strategy (Elupe and Nalukenge, 2007).

Collective action is also an important strategy in agricultural marketing because it contributes towards reduced transaction costs and it strengthens the farmer's bargaining and lobbying power (Sigei *et al.*, 2014).

2.7 Empirical Literature

2.7.1 Empirical literature on market access and participation

Most empirical studies on output marketed supply or input demand have used the famous Heckman's (1979) sample selection model or its variants of double hurdle and switching regression models while some used the more restrictive Tobit model to analyze output marketed supply (Arega *et al.*, 2007).

Hlongwane *et al.* (2014) used logit regression model in analyzing factors affecting the market participation of small-scale maize farmers in Great Giyani Municipality in South Africa. The results revealed that out of twelve variables considered in the analysis seven

of them were found to be significant while five of them were insignificant. Gender, farmers access to credit, marital status, market information and infrastructure were found to be positively significant, while distance to the market and external sources of income were negatively significant. Farmer's level of education and age of farmers were positively insignificant. The authors recommended that the government can increase market access of small-scale maize farmers through encouraging group market participation, upgrading of roads to enable smooth accessibility of farmers to output market and establishment of local point of sales in farming areas.

In analyzing the determinants of banana market commercialization in western Uganda Komarek (2010) used Tobit and double hurdle model to identify factors that influence market participation decisions among Ugandan banana growers.

Also Mesay *et al.* (2013) uses double hurdle model in identifying the determinants of farmer's participation in local seed multiplication and to assess the levels of farmer's participation in wheat and potato seed multiplication in Amhara region Ethiopia.

In the study of investigating the factors influencing mainstream market access among small-scale farmers in the Northern Cape Province, Uchezuba *et al.* (2009) used Logistic regression, and the result showed that farming experience, extension visits and infrastructure have a profoundly positive effect on the probability of small-scale farmers marketing their animals to the mainstream markets. The result also showed that household size, distance to the nearest market, and whether or not farmers have outstanding debts have a negative impact on the probability of them selling their animals to the formal markets. Finally the authors suggested that an intervention policy is needed to alleviate these constraints that are impeding participation in the mainstream markets.

Omiti *et al.* (2009) used a truncated regression model in examining factors that influence the intensity of market access among smallholder farmers in Kenya. The result showed that farmers in peri-urban areas sold higher proportions of their output than those in rural areas, distance from farm to point of sale is a major constraint to the intensity of market access. The authors argued that there is a need to strengthen market information delivery systems, upgrade roads in both rural and peri-urban areas, encourage market integration initiatives, and establish more retail outlets with improved market facilities in the remote rural villages in order to promote production and trade in high value commodities by rural farmers.

Fertő and Szabó (2002) investigated factors that influenced farmers' choice of supply chain in Hungarian fruit and vegetable sector using a multinomial logit model. In this study farmers had three possible choices; wholesale chain, marketing cooperative chain and producer organization chain. The results indicated that, the farmer's decisions with respects to supply channels were influenced differently by transaction costs. Decisions among producers selling to wholesale market were negatively affected by the farmer's age, information costs as well as bargaining power and monitoring costs. Producers' choices to sell to marketing cooperative or producer organization were different. Moreover, the probability that farmers would sell their products to marketing cooperative was found to be positively influenced by the age and information costs, whereas asset specificity and bargaining power affected it negatively. The results indicated a similar picture for producer organizations without significance, except for asset specificity though unexpected with opposite sign.

Jari and Fraser (2009) also used the multinomial logistic model to identify institutional and technical factors that influence market participation choices amongst smallholders.

The model was used to assess the odds of: informal market participation versus not participating; and formal market participation versus not participating. The results of the logistic regression model revealed that market participation choices were influenced by technical and institutional variables. The statistically significant variables were access to market information, expertise on grades and standards, availability of contractual agreements, existence of extensive social capital, availability of good market infrastructure, group participation and reliance on traditions. Jari and Fraser (2009) concluded that the significant predictor variables that had a higher probability of shifting households from non-market participation to informal marketing were access to market information, availability of good market infrastructure, existence of extensive social capital, group participation and guidance from tradition.

Woldie and Nuppenau (2009) analyzed factors affecting the selection of marketing channels among banana farmers. The main channels included sales to wholesale traders, sales through cooperative marketing groups and sales through village retailers to local consumers. The study hypothesized that transaction costs affect channel choice decision as they were different in alternative channels. The study used a Transaction Cost Economics (TCE) to explain the use of wholesale traders and marketing cooperatives by farmers. By using a Tobit model an attempt was made to demonstrate the empirical application of TCE and measure transaction costs that influence smallholder markets.

Mzyece (2011) employed the probit model to identify factors that influence cowpea producers' market participation decisions as well as their choice of marketing channels in Zambia. The results showed that cowpea producers sold to a particular channel as long as it presented a ready market to the seller. The factors that influenced the producers' market

participation decisions included price, inventory, transport, level of mechanization and marital status.

While considering the dynamic changes in agri-food systems in developing countries, Blandon *et al.* (2009) used a stated choice model to explore the marketing preferences of small-scale producers of fresh fruits and vegetables in Honduras. The results suggest that farmers have strong marketing preferences associated with new supply chains, such as prearranging prices and quantities with buyers, but have remaining preferences for some attributes of traditional spot markets, such as the lack of grading produce, receiving cash payments, lack of delivery schedules, ability to sell at the farm gate, and ability to sell individually. Further, farmers preferred market channels that did not require major upfront investments.

Chalwe (2011) aiming at understanding Zambian smallholder bean producers and the factors that influence their choice of marketing channels used a probit. Results from the probit model indicated that the choice of marketing channel was directly influenced by the price of beans, scale of operation (as measured by the quantity of beans harvested, and quantity sold), distance to the market, farming mechanization used and livestock ownership. On the other hand probit results for decision to sell indicated that price, mechanization and farmer's age significantly affected farmers' decision to sell. Meaning that price was very important in stimulating both selling decisions and channel selection. Vergara *et al.* (2004) used a multinomial logit model to analyze farmers' preferences of market contracts. The findings show that farm size can favor pooling than cash sales. Producers willing to incur higher transaction costs tend to choose futures/options contracts and forward pricing. It was also found that risk-averse producers did not prefer pooling contracts. On the other hand, producers who aimed at abnormal gains through

speculation tend to choose pooling contracts. Finally, producers who perceive markets as being price-efficient prefer cash sales.

Ogunleye and Oladeji (2007) in their study entitled “Choice of Cocoa Market Channels among Cocoa Farmers in ILA Local Government Area of Osun State, Nigeria” used logit model and found that the cocoa farmers in the study area made their choice of market channels for their produce based on time of payment, mode of payment, price of product, distance from farm, transportation cost and grading of product. Majority of the farmers involved in the study patronized itinerant buyers, cocoa merchant, other farmers and cooperative society store in that decreasing order. They conclude that the delay between when produce are sold and when payment are made is an important negotiation cost that influences the choice of an outlet for cocoa farmers. Delay in payment discouraged farmers from the choice of an outlet. Transportation cost increases with increased distance from farm and also related to the condition of road. Bad road tends to increase the transportation cost and so farmers will prefer a very low transportation cost if they cannot completely avoid it. Uncertainties are attached to grading of produce because farmers stand the chance of their produce being rejected or the price being brought down and so farmers will tend to prefer a situation of not facing either of the two consequences attached to grading of produce.

A study by Wojciech *et al.* (2003) “Marketing portfolio Choices by Independent Peach Growers: An Application of the “Polychotomous Selection Model (PSM)” showed that in selecting a marketing channel for fresh peach sales, Georgia commercial peach growers choose the channel after accounting for buyers’ preferences for quality attributes. Using the PSM and survey data it was identified that both external and internal quality attributes were essential factors influencing the choice of a marketing channel and the share of the

crop marketed. Other factors that influenced the choice and the volume sold through each marketing channel included orchard characteristics and the variety-determined fruit maturity.

Proper method to analyze the choice of rice market outlets is the multinomial Logit model. Multinomial logistic regression is useful in analyzing data where the researcher is interested in finding the likelihood of a certain event occurring. In other words, using data from relevant independent variables, multinomial logistic regression is used to predict the probability (p) of occurrence, not necessarily getting a numerical value for a dependent variable (Gujarati, 1992). The procedure for formulating a multinomial logistic regression is the same as for a binary logistic regression. Whereas in binary logistic regression, the dependent variable has two categories, in multinomial logistic regression, it has more than two categories. Thus, multinomial logistic regression is an extension of binary logistic regression (Dougherty 1992). OLS cannot be used because it violates the fact that the probability has to lie between 0 and 1, if there are no restriction on the values of the independent variables hence the multinomial logistic regression guarantees that probabilities estimated from the Logit model will always lie within the logical bounds of 0 and 1 (Gujarati, 1992).

The multinomial Logit model is therefore used to model choices in this study because it relies on the assumption of independent of irrelevant alternative (IIA) which is not always desirable. This assumption states that the odds of preferring one class over another do not depend on the presence or absence of other “irrelevant” alternatives. It also assumes that data are case specific that is each independent variable has as a single value for each case. The advantage of the Multinomial Logit model is that it permits the analysis of decisions across more than two categories, allowing the determination of choice probabilities for

different categories (Woodridge, 2002). On the contrary, the binary Logit models are limited to the maximum of two choice categories (Maddala, 1983).

2.8 Theoretical Framework

2.8.1 Utility maximization theory

The decision on whether or not to integrate in different market was considered under the general framework of utility or profit maximization (Sigei *et al.*, 2014). Within this framework, economic agents are small-scale rice farmers whose integration decisions are to be measured by perceiving utility or net benefit from any option. Although utility is not directly observed, the actions of economic agents are observed through the choices they made.

2.8.2 Random utility theory

Random utility theory views the choices that are observed. The decision maker is faced with a situation or set of alternatives and reveals something about their underlying preferences by the choice that he or she makes. The choice(s) made will be affected by observable influences; this is, of course, the ultimate objective of advertising and by unobservable characteristics of the chooser (Greene, 2012).

Farmers are rational decision makers who want to maximize utility relative to their choices as shown in equation 1. It is assumed that given farmer i in making a decision considering exclusive alternatives that constituted the choice set I^i of rice marketing outlet, the choice set may differ according to the decision maker. The farmer i assigns each alternative j in his choice set of perceived utility U_j^i and selects the marketing outlet that maximizes his utility. The utility assigned to each choice alternative depends on a

number of measurable attributes of the alternative itself and the farmer who is the decision maker.

$$U_j^i = U^i X_j^i \dots\dots\dots (1)$$

In equation 1, U^i is the perceived utility and X_j^i is a vector of attributes relative to alternative j and to decision maker i , utility is not known with certainty and it must be represented in general by a random variable. Equation 2, shows the probability that the farmer will select alternative j conditional of his choice set I^i ;

$$P^i(j/I^i) = P^i(U_j^i > U_k^i), \forall k \neq j, k \in I^i \dots\dots\dots (2)$$

The perceived utility U_j^i can be expressed as the sum of two terms: a systematic utility and a random residual. Systematic utility V_j^i represents mean of all farmers having the same choice context as decision maker i . ε_j^i captures the combined effects of the various factors that introduce uncertainty in choice modeling, as expressed in equation 3,

$$U_j^i = V_j^i + \varepsilon_j^i \forall j \in I^i \dots\dots\dots (3)$$

With $V_j^i = E(U_j^i)$, then $E(V_j^i) = V_j^i$, $\text{Var}(V_j^i) = 0$ and $E(\varepsilon_j^i) = 0$, $\text{Var}(U_j^i) = \delta_{ij}^2$ and

this yields,

$$P^i(j/I^i) = \text{Prob}(V_j^i - V_k^i > \varepsilon_k^i - \varepsilon_j^i) \forall k \neq j, k \in I^i \dots\dots\dots (4)$$

Where P^i , is the choice probability and equation 4 gives the probability of farmers selecting alternative j and it suggests that the choice of a given alternative depends on the systematic utilities of all competing alternatives and on the law of the joint probability of random residual ε_j . A farmer is likely to choose an option that gives a higher utility among the alternatives.

CHAPTER THREE

3.0 RESEARCH APPROACH AND METHODOLOGY

3.1 Conceptual Framework for the Study

A conceptual framework is a guideline in identifying important variables and for effective and efficient data collection. Scarborough and Kydd (1992) suggest that such a framework should help to indicate the most useful area in which to focus the limited research resources and ensure that data collected are relevant to meet the objectives of the research. In this study, it is assumed that independent variables such as social economic, market and institutional factors influence the choice of market outlets among small-scale rice farmers. The conceptual framework for this study is shown in (Figure 1).

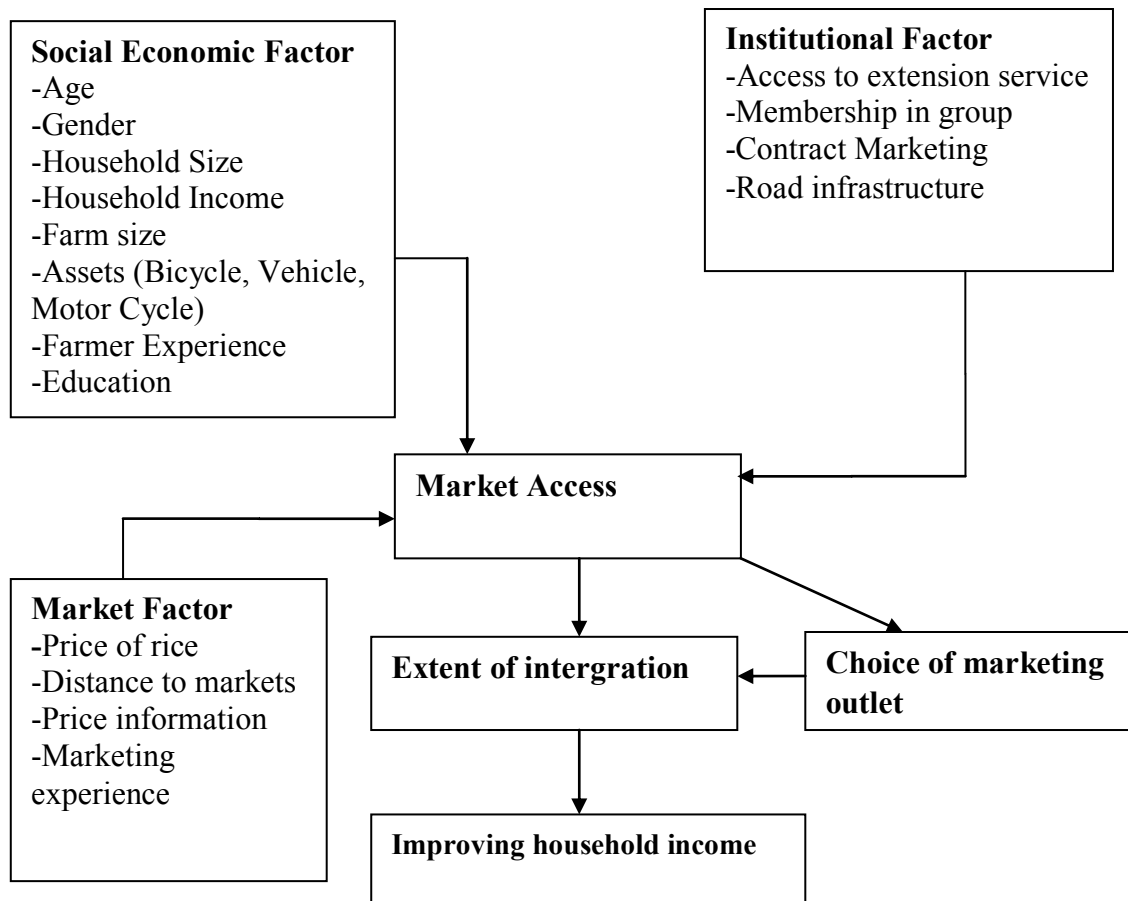


Figure 1: Conceptual framework for the study

3.2 Description of the Study Area

3.2.1 Justification for the selection of the study area

The study was conducted in Kilosa Districts, Morogoro region on small-scale rice farmers. More than 80% of people in Kilosa depend on agriculture, and with its varied conditions, ranging from a plateau characterized by seasonally flooded plains, to mountainous areas with altitudes surpassing 2000m, Kilosa District offers a variety of agro-ecological conditions for farming, and variety of crops is grown in the district including rice (KDC, 2010).

Small-scale farming, where the average farmland is less than one hectare – represents 90% of agriculture in Kilosa district, with large scale farming representing the other 10%. The small-scale farm holders are subsistence farmers who produce mostly for domestic use, selling only their surplus (Kajembe *et al.*, 2013). The map of Kilosa District is shown in the Figure 2.

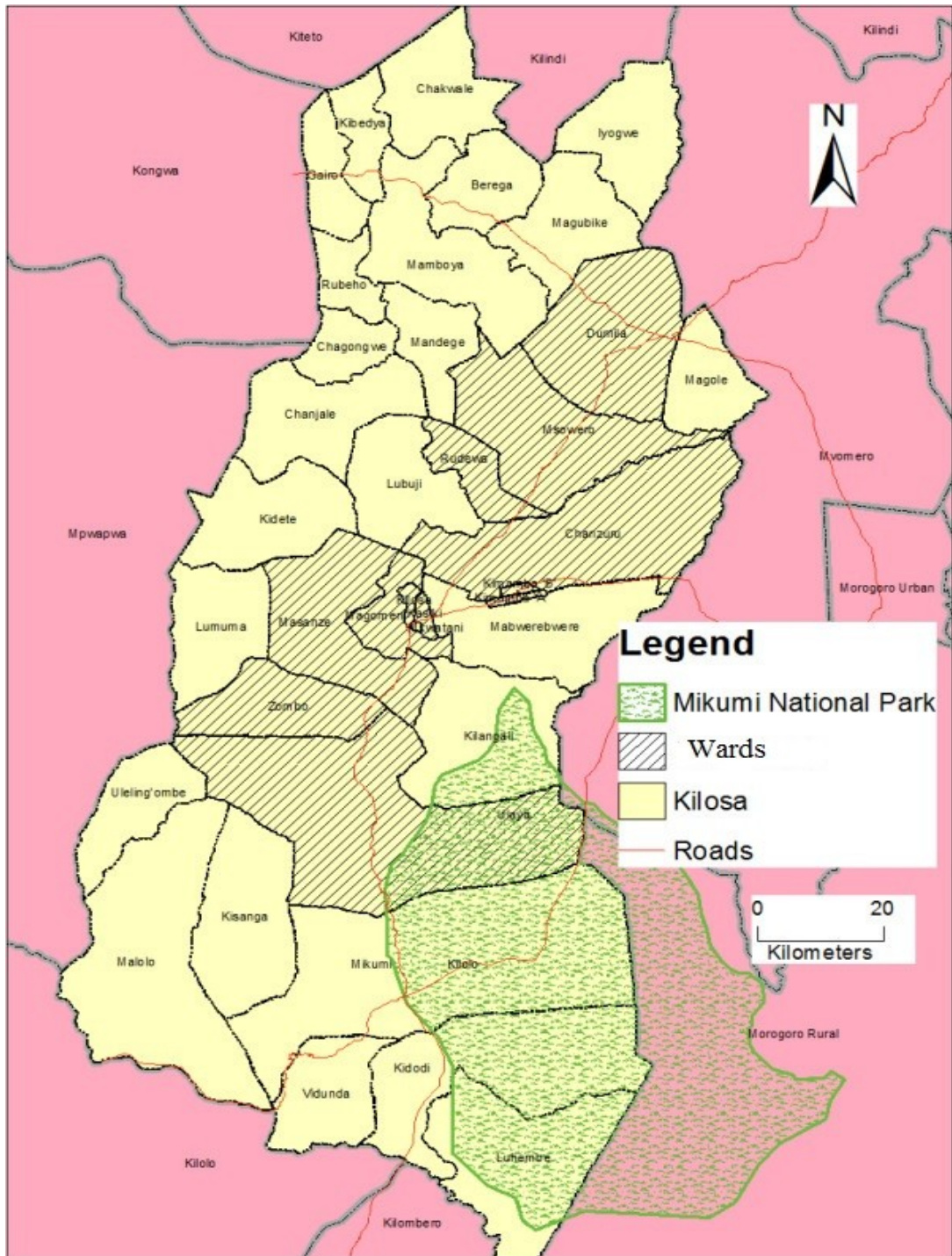


Figure 2: Map of Kilosa District.

3.2.2 Location and size

Kilosa District is the oldest district in Morogoro region, located approximately 300 km inland from the coast and Dar es Salaam, along one of the old East African caravan routes stretching from Bagamoyo to the eastern part of the Democratic Republic of Congo (Benjaminsen *et al.*, 2009). Kilosa has 14 245 km² making up about 20% of the Morogoro region. The district lies between 6° South and 8° south, and 36°30' East and 38° east. It borders the Tanga Region to the north and Morogoro District to the east. In the south, it is bordered by the Kilombero District and part of Iringa Region (KDC, 2000).

3.2.3 Population size

According to the 2002 census, there were 489 513 people living in Kilosa, distributed over 105 635 households (average household size of 4.6). The District has three major ethnic groups: Wakaguru in the North, Sagala in the central zone and Vidunda in the south. However, many people from other ethnic groups have migrated to the area over the last decades (URT, 2002).

3.2.4 Climatic conditions

The area is characterized by semi humid climate, receiving an average rainfall of 800 mm annually. The district receives rainfall in eight months (October-May) with highest levels between February and March. Temperature ranges from 18°C in the hills to as high as 30°C in the lowlands. Although Kilosa district has two rain seasons, the pattern and amount of rainfall allow for one harvest of the main staples per cropping season. The early rains start in November and end in January followed by the period of heavy rainfall between March and June. The district experiences a long dry season in June to October (KDC, 2010).

3.2.5 Land use

Land in Kilosa can basically be divided into five uses: agricultural (37.5%), natural pasture (33.5%), Mikumi National Park (22.5%), forest reserves (5.5%) and urban areas, water and swamps (1%). Both agriculture and livestock grazing are practiced on general, village and private lands, while Mikumi National Park and forest reserves are controlled areas and state owned. There are a few village forests established from general lands and are included in the pasture land category (KDC, 2010).

3.2.6 Socio- economic activities

The main economic activity in the District is crop production and livestock keeping. Over 77% of the people in Kilosa District fully depend on agricultural activities (KDC, 2010). Major crops cultivated include maize, rice, sorghum, cassava, and legumes. Major cash crops are cotton, sisal, sugarcane and oilseeds. Livestock keeping is also an important economic activity in the region. Kilosa is the most favored District in terms of densities of tarred roads in the region when compared to other districts. However, feeder roads are not passable during the rainy season thus cutting the remote areas from other parts of the Districts (KDC, 2010).

3.3 Research Design

The research design for this study was cross sectional. This is a kind of research design in which the data are collected at a single point in time from a sample to represent a large population. The design is suitable in descriptive study and for determination of the relationship between and among variables. It is also economical in terms of time and financial resources (Babbie, 1993). However more triangulation and probing was needed to get accurate information.

3.3.1 Sample size and sampling procedures

The target population was the small-scale rice farmers in Kilosa District. Both purposive and simple random sampling techniques were adopted in this study. Purposive sampling technique was used to select four wards that are growing rice with A multi-stage sampling procedure was used in the selection of representative sample. The selected wards were the main rice growing wards in Kilosa District. The selected wards include Chanzuru, Kimamba A, Mvumi and Msowero. Secondly, five villages (Chanzuru, Ilonga, Kimamba, Mvumi and Karadasi) selected using simple random sampling, and finally 150 farmers from selected villages were also selected using simple random samplings, who were ultimately interviewed. The required sample size was determined by Cochran's proportionate to size sampling methodology (Mugenda and Mugenda, 2003). The aim of the calculation is to determine an adequate sample size which can estimate results for the whole population with a good precision. In other words, one has to draw inference or to generalize about the population from the sample data. The inference to be drawn is related to some parameters of the population such as the mean, standard deviation or some other features like the proportion of an attribute occurring in the population (Mugenda and Mugenda, 2003). From the pilot study of market access for small scale rice farmers conducted previously to select a preliminary sample, sample standard deviation for rice price obtained was 0.312. Therefore minimum sample size necessary to produce 95% confidence that the sample mean is ± 0.05 of the true population were calculated using equation 5.

$$n = \frac{Z_{\alpha/2}^2 \delta^2}{E^2} \dots\dots\dots (5)$$

Where; n = Sample size; Z = confidence level ($\alpha = 0.05$), δ = Standard deviation, and E = Margin of error, Therefore $Z = 1.96$; $\delta = 0.312$, $E = 0.05$. This resulted in a sample population of 150 respondents as shown in equation 6.

$$n = \frac{1.96 \times 0.312^2}{0.05^2} = 150 \dots\dots\dots (6)$$

3.3.2 Data collection method and sources of data

Primary data were collected through interviews using semi structured questionnaire with both open ended and close ended questions (Appendix 1). Secondary data were collected from different sources including books, research reports and journals from internet and Sokoine National Agricultural Library (SNAL).

3.4 Analytical Framework

3.4.1 Objective I: Extent to which small-scale rice farmers are integrated in different markets in Kilosa District

To evaluate the extent to which small-scale rice farmers were integrated into different markets in Kilosa District, the respondents asked to state the markets they used to sale their produce and each farmer assigned a score depending on the type of market chosen. The score for not choose to sale, sale in farmgate, sale in district market and sale outside market were 0, 1, 2 and 3 respectively.

Where farmers sold their produce in different markets the final score was weighted according to proportions (percentages) that were sold in each market to arrive at a market integration index (MII). For example, a farmer who sold 20% of his/her produce on farm/farm gate; 30% in district market; and the rest (50%) outside district markets, then final score or MII was $(0.2 \times 1) + (0.3 \times 2) + (0.5 \times 3) = 2.3$. The higher the value of MII

the higher the extent of integration to markets for the farmer/household. The results of analysis were presented using descriptive statistics and Chi-square test.

3.4.2 Objective II: Factors influencing the choice of rice marketing outlet among small-scale rice farmers in Kilosa District

To determine the factors influencing the choice of rice marketing outlet in Kilosa District, the multinomial Logit model was used. The choice of a given marketing outlet is discrete because it is chosen among other alternative outlets (Greene 2012). Let P_{ij} represent the probability of choice of any given market outlet by rice farmers as shown in equation 7;

$$P_{ij} = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k + e \dots \dots \dots (7)$$

Where i takes values (1, 2, 3), each representing the choice of marketing outlet (farm gate =1, District market =2, outside district market=3). X_i 's are factors affecting choice of a market outlet, β are parameters to be estimated and e is randomized error. With j alternative choices, the probability of choosing outlet j is given in equation 8;

$$Prob(Y_i = j) = \frac{e^{z_j}}{\sum_{k=0}^j e^{z_k}} \dots \dots \dots (8)$$

Where Z_j is a choice and Z_k is alternative choice that could be chosen (Greene, 2000). The model estimates are used to determine the probability of choice of a market outlet given j factors that affect the choice X_i . With a number of alternative choices log odds ratio is computed as shown in equation 9;

$$\ln \left(\frac{P_{ij}}{P_{ik}} \right) = \alpha + \beta_1 X_1 + \dots + \beta_k X_k + e_i \dots \dots \dots (9)$$

P_{ij} and P_{ik} are probabilities that a farmer will choose a given outlet and alternative outlet respectively. $\ln \left(\frac{P_{ij}}{P_{ik}} \right)$ is a natural log of probability of choice j relative to probability choice k , α is a constant, β is a matrix of parameters that reflect the impact of changes in

X on probability of choosing a given outlet, e is the error term that is independent and normally distributed with a mean zero. The parameter estimates of the Multinomial Logit model provide only the direction of the effect of the independent variable on the dependent (response) variable but do not represent either the actual magnitude of change nor probabilities. The marginal effects or marginal probabilities in equation 10 are functions of the probability itself and measure the expected change in the probability of a particular choice being made with respect to a unit change in an independent variable from the mean (Green, 2012). Marginal effects of the attributes on choice are determined by getting the differential of probability of a choice and it is given by,

$$(\delta) = \frac{\partial P_i}{\partial X_i} = P_i(\beta_j - \sum_k^j P_k \beta_k) = P_i(\beta_j - \beta) \dots\dots\dots (10)$$

The multinomial Logit model is given in equation 11;

$$P_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots \beta_n X_n + \epsilon_i \dots\dots\dots (11)$$

Then equation 12 shows choice of marketing outlet

$$P_{ij} = \beta_0 + \beta_1 age + \beta_2 educ + \beta_3 Distmkt + \beta_4 Ricqty + \beta_5 prInf + \beta_6 gend + \beta_7 Cont + \epsilon_i \dots\dots\dots (12)$$

Table 1: Variables used in the multinomial logit

	Variable	Measurement	Expected Sign
Dependent Variable	Household choice of rice marketing outlet	(Farmgate=1 District market=2 Outside district market=3)	+
	Independent Variables		
	Age in years	In years (Continuous)	±
	Gender	Dummy (1=Male, 0=Female)	±
	Number of years in schooling	In years (Continuous)	+
	Distance to the market	In Kilometers (Continuous)	-
	Quantity of rice	In Kilograms (Continuous)	+
	Contract arrangement	Dummy (1=Yes,2=No)	±
	Price Information	Dummy (1=Yes, 2=No)	±

3.4.3 Objective III: Problems facing small-scale rice farmers in accessing market in Kilosa District

To identify problems facing small-scale rice farmers in accessing market in Kilosa District, farmers asked to choose eight problems that hindering them in accessing rice marketing in the order of their importance's, and descriptive statistics used to present the results.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Sample Households

Socio-economic characteristics are important in any agricultural marketing system since they influence the decision making process of an individual farmer and the household at large. The statistic as in gender, experience, education and household size as shown in Table 2, were important socio-economic characteristics of sample households. Sex has an implication on the roles and responsibilities in the society, and therefore can influence households' abilities to generate income. Results show that, 42% of the respondents in the area surveyed (Kilosa District) were males and 58% females. This indicates that, female and male respondents were closely involved in rice production as well as rice marketing, though the participation of female percentagewise is more compared to male respondents. Years of experience in rice marketing is very important aspect that helps farmers in making marketing decision. Farmers who were experienced enough were risk takers and willing to transport farm produces to distant places while farmers who were not experienced enough were risk averse, always resort to sell at farmgate (Montshwe, 2006). Results indicate that, 45.3% of the respondents had more than ten years of experience in rice marketing, 38% of the respondents were in between 5-10 years of experience in rice marketing and only 16.7% of the respondents had less than five (5) years of experiences in rice marketing.

Level of education as measured by number of years spent in formal education, is a very important attribute in accessing and integrating into market. Education enhances skills and ability to utilize better market information, which may in turn reduce marketing costs and make it more profitable to participate in the market (Sigei *et al.*, 2014).

The results show that 94% of the respondents attended formal education with 73.3% attending primary education, 20.7% secondary education (Ordinary level and Advanced level) and only 6% did not attend any formal education.

The results of analysis indicate that 38% of the respondents had a household size of less than five (5) members, 56.7% had five (5) up to ten (10) members and 5.3% had more than ten (10) members. The household size explains the family labor supply for production and household consumption levels, the more number of members in a family represent more supply of labour and consumption level (Alene *et al.*, 2008).

Table 2: Socio-economic characteristics of the sample households

Socio-economic characteristics	Percentage (n=150)
Gender	
Male	42.0
Female	58.0
Years of experience in rice marketing	
<5	16.7
5-10	38.0
>10	45.3
Level of education (Years spent in formal education)	
0	6.0
1-7	73.3
8-13	20.7
Household size	
<5	38.0
5-10	56.7
>10	5.3

4.2 Market Intergration

Descriptive statistic results in Table 3, indicate that 17.3% of the respondents had the highest MII value, representing group of farmers who were highly integrated into

different markets. Also results indicate that 62.7% of the respondents had the lowest MII value, representing the group of farmers who were less integrating into different markets

Table 3: Market Integration Index results of the sample households

MII value	Percentage (n=150)
1	62.7
2	20.0
3	17.3

MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))

General results indicate that few respondents are integrated into different market. The decision on whether or not to integrate in different market was considered under the general framework of utility or profit maximization (Sigei *et al.*, 2014). Within this framework, economic agents are small-scale rice farmers whose integration decisions are to be measured by perceiving utility or net benefit from any option. Although utility is not directly observed, the actions of economic agents are observed through the choices they made.

4.2.1 Relationship of Social-economic characteristics and market intergration of the sample households

Chi-square test was used to determine the association between sexes of the respondent and market intergration of the sample household. Chi-square results was not significant in 1% level as shown in Table 4, meaning that there is no association between sexes of the respondents and market integration of the sample households. However the disproportionate observed in the medium MII value (2), 72.7% of the female headed household had this value compared to 27.3% of the male respondents.

Table 4: Relationship between sex and market intergration of the sample households

Variable name		Market intergration index value			χ^2 value (n=150)
		1	2	3	
Sex (%)	Male	42.5	27.3	60.0	3.964
	Female	57.5	72.7	40.0	

MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))

Table 5 presents the association between years spent in school and market intergration of the sample household. Level of education was measured by number of years spent in formal training by the respondents. Chi-square results in Table 5 show associations in the level of education and market intergration at 1% level of significance. Results also show that 46.2% of the respondents attended secondary education, had highest MII value, 64.9% attended primary education had lowest MII value. These results can be supported by Kumar (2010) who said that, in both theoretical and practical situations, education level plays an immense role in ensuring household access to basic needs such as food, shelter and clothing. Skills and education amplify the working efficiency resulting into more income and food security. Furthermore education is important to manage the business as well as in decision making. Education is one of the long term strategies that may be used to acquire marketing information and accessing better market (Kumar, 2010).

Table 5: Relationship between levels of education and market intergration of the sample households

Variable name		Market intergration index value			χ^2 value (n=150)
		1	2	3	
Level of education (%)	No formal education	9.6	30.0	34.6	24.562***
	Primary education	64.9	46.7	19.2	
	Secondary education	25.5	23.3	46.2	

*** Significant at 1% level

MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))

Table 6 presents the result of Chi-square test of the association between experiences in rice marketing and market intergration index value. The Chi-square results shows no significant associations between experiences in rice marketing and market intergration index value at 1% significance level. The results also show that 13.3% less experienced sample household had the highest value of MII, and 15.9% had the lowest MII value.

Table 6: Relationship between experience in rice marketing and market intergration of the sample households

Variable name		Market intergration index value			χ^2 value (n=150)
		1	2	3	
Years of experience (%)	Low level experience (<5 years)	15.9	22.7	13.3	8.015
	Experienced (5-10 years)	33.6	59.1	40.0	
	High level experience (>10 years)	50.5	18.2	46.7	

MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))

4.2.2 Relationship between institutional characteristics and market intergration of the sample households

Chi-square test was used to determine associations between membership and non-membership of marketing groups and marketing intergration of the sample households. Results of chi-square in table 7 show associations between members and non-members of marketing to be significant at 5% level. Results also show that 75% of the respondents who were members of marketing group had highest MII value, while 50.9% of respondents who were non-members of marketing group had the lowest MII value. Membership in a market group is essential because it facilitates information exchange among members which in turn reduces the transaction costs increases the extent of the

market intergration. Results are in line with Poulton *et al.* (2006) who argued that belonging to a group, empower farmers to bargain and negotiate for better trading terms.

Table 7: Relationship between Membership of marketing group and marketing intergration of the sample households

Variable name		Market intergration index value			χ^2 value (n=150)
		1	2	3	
Members of marketing group (%)	Yes	49.1	68.2	75.0	6.311**
	No	50.9	31.8	25.0	
** Significance at 5%		MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))			

Table 8 indicates the relationship between price information's access and market intergration of the sample household. Chi-square results show significant variations between accessing price information and market intergration value at 5% significance level. Also results show that 78.9% of respondents accessing price information had the highest value of MII compared to 21.1% of respondents without accessing price information. Generally respondents with little or no price information had the lowest MII compared to those with price information access. Price information plays the crucial role of informing the farmers on pricing condition. Therefore, farmers accessing price information had more propensity of integrating in the rice market than those without. Farmers' marketing decisions are based on accessing market price information, and poorly integrated markets may convey inaccurate price information, leading to inefficient product movement (Bhuyan, 2009).

Table 8: Relationship between accessing price information and market intergration of the sample households

Variable name		Market intergration index value			χ^2 value (n=150)
		1	2	3	
Price Information (%)	Yes	48.6	54.5	78.9	5.993**
	No	51.4	45.5	21.1	
** Significance at 5%		MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))			

Table 9 presents the result of Chi-square test on the relationship between respondents with or without marketing contract and market intergration of the sample household. Chi-square results show relationship between marketing contract and market intergration at 1% significance level. Results also show that 65.2% of the respondents with marketing contract had highest MII value, while 94.9% of the respondents without marketing contract had lowest MII value. Marketing contract arrangement guarantees farmers a ready market. Farmers tend to choose and integrate into the outlets that have a ready market either farmgate or market place. In most cases, the farmer chooses farmgate because it incurs no transaction cost (Minot, 1999).

Table 9: Relationship between marketing contract market intergration of the sample households

Variable name	Market intergration index value			χ^2 value (n=150)	
	1	2	3		
Contract marketing (%)	Yes	5.1	46.4	65.2	51.345***
	No	94.9	53.6	34.8	
*** Significant at 1%		MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))			

Chi-square was used to test relationship between respondents with or without accessing extension services and market intergration. The results in Table 10, indicate that there is associations between respondents with or without accessing extension services and market intergration at 1% significance level. This can be supported by Sigei *et al.* (2014) who argued that an access of extension service through extension officers plays an imperative role of empowering the farmers with marketing information and ability.

Table 10: Relationship between accessing extension service and market intergration of the sample household

Variable name	Market intergration index value			χ^2 value (n=150)	
	1	2	3		
Access to extension service (%)	Yes	39.5	50.0	85.7	10.985***
	No	60.5	50.0	14.3	
*** Significance at 1%		MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))			

4.2.3 Relationship between distance to the market and market intergration of the sample household

Chi square test was used to determine the associations between distances travelled to access market distances and market intergration. The results in Table 11 show that there is significant relationship between distances covered to access market and market intergration at 1% level of significance. 86.7% of the respondents who covered less than 10 Km to sale rice produce, had lowest MII value, and there is only 34.4% of the respondents who cover more than 20 Km to sale rice had highest value of MII. The distance to the market has been found to have a negative impact on market intergration. These finding similar to that of Ogunleye and Oladeji (2007) who found that, a greater distance to the market increases transportation costs and marketing costs and this hinders the extent of market intergration.

Table 11: Relationship between distance to the market and market intergration of the sample household

Variable name	Market intergration index value				χ^2 value (n=150)
		1	2	3	
Distance to the market (%)	< 10 Km (short distance)	86.7	48.6	28.1	40.759***
	10-20 Km (Medium distance)	7.2	25.7	37.5	
	>20 Km (Long distance)	6.0	25.7	34.4	
*** Significant at 1%		MII (1= (0.1-0.9) 2= (1-1.9) 3(2-3))			

4.3 Factors Affecting Choice of Rice Marketing Outlets

The multinomial Logit model was used to determine the factors influencing the choice of rice marketing outlets in Kilosa District. The variables include in the estimation were: age, level of education (Schooling), distance to the market, quantity of rice sold, price information, gender and market contract. Table 12 presents the result of analysis of the multinomial logit model. The Chi-square value of -70.368 show that likelihood ratio

statistics are highly significant, suggesting that the model had strong explanatory power. The pseudo-R square was 0.5170 indicating the explanatory variable explained about 51.71% of the variable in the choice of market outlets. The coefficients of multinomial logit model provide only the direction of the effect of the independent variables on the dependent variable, but not the actual magnitude of the change of probabilities.

Coefficient of multinomial logit regression can be explained by showing the direction of the effect of independent variable on dependent variables. Results in Table 12 show that age of the respondents influence choice of District market negatively as per expectation, meaning that increase in age lead to the less possibility of selling rice at markets located within district Market.

Results in Table 12 show education of the respondents influences choice of selling rice to the market located outside Kilosa District positively prior to expectation, meaning that the higher the level of education the higher the possibility of selling rice to markets located outside the district (Kilosa, District).

Table 12: Overall estimated results of the multinomial logistic regression (farmgate is the preference choice category)

Marketing outlet	Coef	Robust Std.Err.	Z	P> z
Farmgate (Base outcome)				
Market located at the district				
Age	-0.1370***	0.0485	-2.82	0.005
Education	0.3261	0.3550	0.92	0.358
Distance	-2.1534**	0.9240	-2.33	0.020
Quantity rice	0.00014	0.0001	0.80	0.425
Price information	-2.6462	1.8054	-1.47	0.143
Gender	-0.0304	1.8888	-0.02	0.987
Marketing contract	20.7408***	3.6467	5.69	0.000
Market located outside the district				
Age	-0.014	0.4864	-0.28	0.781
Education	1.3263***	0.4914	2.70	0.007
Distance	-2.1581**	0.9160	-2.36	0.018
Quantity rice	0.00052***	0.0001	3.02	0.003
Price information	18.081***	2.4727	7.31	0.000
Gender	-3.7239	2.1779	-1.71	0.087
Marketing contract	22.1663***	3.2902	6.74	0.000

Number of observation=150; Wald $\chi^2(14)=97.27$; Prob> $\chi^2=0.0000$; log pseudo likelihood=-70.368; Pseudo $R^2=0.5170$, *** (P<0.01), ** (P<0.05)

Table 12 shows that distance to market influences choice of selling rice to markets located at district and outside the district negatively as per expectation. Compared to farmgate market, an increase in distance to the market decreases possibility of selling rice to markets located within and outside Kilosa District respectively. Quantity of rice produced influences choice of selling rice to markets located outside Kilosa District positively as per expectation. Increase in quantity of rice produced increases the possibility of selling rice to markets located outside Kilosa District.

Price information influences choice of selling rice to markets located outside Kilosa District positively as per expectation. Respondents accessing price information are more

likely selling rice to markets located outside Kilosa district than respondents without price information's.

Marketing contracts influences choice of selling rice to markets located within and outside Kilosa District positively as per expectations, farmers with marketing contract are more likely to sell their rice to markets located both within and outside Kilosa District than farmers without marketing contract.

Age of the household influence the choice of farm-gate market as shown in Table 13. An increase in age, decreases possibility of selling rice at farmgate by 30.24%. This might happen because, older people might have accumulated capital or have a long term relationship with their clients or might have preferential access to credit due to their age, availability of land, or family size (Sall *et al.*, 2000; Adegbola and Gardebroke, 2007).

Table 13: Estimated results of the multinomial logistic regression model

Explanatory variable	Farmgate		District Market		Outside district market	
	$\partial y / \partial x$	P-value	$\partial y / \partial x$	P-value	$\partial y / \partial x$	P-value
Age	-0.3024**	0.054	-0.0420	0.763	0.4050	0.292
Education	0.0186	0.220	0.3140**	0.054	0.00346**	0.039
Distance	0.6524***	0.000	-0.4912**	0.029	-0.028	0.678
Quantity rice	0.0073	0.236	0.0122	0.604	0.0013**	0.042
Price information	-0.1026** ^d	0.050	0.1356*** ^d	0.000	0.007 ^d	0.409
Gender	0.0334 ^d	0.52	0.1188 ^d	0.080	-0.012 ^d	0.427
Contract marketing	-0.2408** ^d	0.039	0.027 ^d	0.999	0.074 ^d	0.550

Number of observation=150; Wald $\chi^2(14)=97.27$; $\text{Prob}>\chi^2=0.0000$; log pseudo likelihood=-70.368; Pseudo $R^2=0.5170$,***($P<0.01$)** ($P<0.05$) (^d) $\partial y / \partial x$ is for discrete change of dummy variable from 0 to 1.

Education level of the household head influence choice of selling rice to markets located within and outside as shown in Table 13. A year spent in education increases possibility

of selling rice to markets located at district market by 31.4% and outside Kilosa District market by 0.346%. This was observed by Sigei *et al.* (2014), who found that education enhances the skill and ability to utilize better the market information, which may in turn reduce marketing costs and make it more profitable to participate and integrating in the market.

Distance covered to access market, influence choice of selling rice at farmgate and market located within the district as Table 13 shows. Increase in distance, increases the possibility of selling rice at farmgate by 65.24% and decreases possibility of selling rice to market located within the district by 49.12%. This situation was similar to Minot (1999), who argued that, in most cases, farmers chooses farmgate because it incurs no transaction cost.

Rice yield influence choice of selling rice to markets located outside Kilosa District as Table 13 shows. An increase in kg of rice produced increases possibility of selling rice to markets located outside Kilosa District by 0.13%. This means that the farmers who had more yields had more opportunities of selling rice to markets located outside Kilosa District, than those with little produce.

Price information access influence choice of selling rice at farmgate and to markets located within Kilosa District as shown in Table 13. Increasing in price information access decreases the possibility of selling rice at farmgate by 10.26%, and increases the possibility of selling rice to markets located within District market by 13.56%. Price information enables the farmer to know the prevailing pricing condition.

Marketing contract influence the choice of selling rice at farmgate market as Table 13 shows. A farmer with market contract are likely lower possibility of selling rice at farmgate by 24.8% compared to those without market contract.

4.4 Problems Facing Small-Scale Rice in Kilosa District

To identify problems facing small-scale rice farmers in Kilosa District descriptive statistic (percentage) was used to presents problems which were addressed by farmers in the order of their importance. Table 14 shows percentage of the problems addressed by respondents in the study area. The results indicate that 49.3% of the respondents identified rice price as major problem in accessing market in Kilosa District while 33.3% of the respondents identified market place for selling rice as major problem. About 9.3% of the respondents mentioned standard weighing tool for rice as major problem in accessing and integrating into market.

Table 14: Problems facing small-scale rice farmers in accessing market

Problems	Weighted Percentage (n=150)
Low market price	49.3
Standard market place (Unreliable)	22.0
Standard weighing measurement tools	9.3
Poor road infrastructure	6.0
Buyers price	5.3
Lack of warehouses for storage purposes	3.3
Lack of marketing information	2.8
High transportation costs	2.0

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study aimed at examining market intergration by small-scale rice farmers in Kilosa District. Specifically the study evaluated the extent to which small-scale rice farmers are integrated in different markets, determined factors influencing the choice of rice marketing outlet among farmers and identified the major problems facing small-scale rice in Kilosa District.

5.1.1 Extent to which small-scale rice farmers are integrated into different markets

Descriptive statistics were used to present results of the extent to which small-scale farmers integrated into different markets using MII. The higher the value of MII the higher the extent of integrating into markets. Results show that only 17.3% of the respondent had highest value of MII (3), and majority of them (62.7%) had lowest value of MII (1). This concludes that most small-scale rice farmers are not integrated into different markets.

Furthermore, the Chi-square test statistics used to test the associations, variations or relationship between different social-economic, institutional, marketing factors and market intergration of the sample households. Study findings on socio-economic characteristics of the small-scale rice farmers indicate that there is no significant relationship between sexes, experiences and market intergration of the sample households. Level of education found to have significant relationship with market

intergration. 46.2% of the respondents attended secondary education, had highest MII value, 64.9% attended primary education had lowest MII value.

Institutional factors such as members of marketing group, price information, extension services and contract marketing all found to be significant with market intergration of the sample household. Relationship between distance to the market and market intergration of the sample household found to be significant at 1% level.

5.1.2 Factors influencing the choice of rice marketing outlet among small-scale rice farmers

The study found that, the factors that influenced the choice of rice marketing outlet for small-scale rice farmers in Kilosa District, were age, level of education, distance to the market, quantity of rice produced, price information and contract marketing. The age of the household head influenced the choice of selling rice at farmgate negatively.

Education level of the sample household influenced positively the choice of selling rice to markets located market both within and outside Kilosa District. Education enhances the skills and ability to utilize better the market information, which may in turn reduce marketing costs and make it more profitable to participate in the market.

Distance covered to access market influenced the choice of selling rice to market located within and outside the district negatively. Increase in distance, increases the possibility of selling rice at farmgate market and decreases possibility of selling rice to market located within the district, farmers tend to sell their outputs at farmgate market because there is no transaction cost to be incurred.

Rice yield influenced the choice of selling rice to markets located outside Kilosa District positively. Farmers who had more yields had more opportunities of selling rice to markets located outside Kilosa District, than those with little produce.

Accessing price information influenced the choice of selling rice to markets located within the district positively, and negatively the choice of selling rice at farmgate market. Price information enables farmers to know prevailing pricing condition.

Contract marketing influenced negatively the choice of selling rice at farmgate market. Contract arrangement guarantees the farmers a ready market. The farmers tend to choose the outlets that have a ready market either farmgate or other distant market place.

5.1.3 Identifying problems facing small-scale rice farmers

The study has found several problems that facing small-scale rice in Kilosa District, Low price was identified to be the main obstacle among small-scale rice farmers that hindering them from channeling their rice into different market outlet. Reasons beside price that were identified included; inability to adhere to standards and quality that were attached to rice by buyers of the different market outlets. 49.3% of the respondents identified rice price as major problem in accessing market in Kilosa District while 33.3% of the respondents identified market place for selling rice as major problem. About 9.3% of the respondents mentioned standard weighing tool for rice as major problem in accessing and integrating into market.

5.2 Recommendations

Based on the results of the study, age, education level, distance to the market, quantity of rice produced, price information and contract marketing were significantly found to

influence market intergration and choice of marketing outlet. It is important to discover the ideal socio-economic factors that best fit the small-scale rice farmers. In coming up with different ways of incorporating small-scale rice farmers in mainstream agriculture and rice marketing in particular, it has to be accepted that small-scale farmers cannot individually compete against commercial and large scale farmers in markets. In addition, it is difficult for them to get a better price as well as contractual agreements individually, owing to a small marketable output, therefore study recommend the following:

- (i) Disseminate knowledge to farmers:** Education plays an important role in the adoption of innovations/new technologies and education from this study was significantly found to influence choice of rice marketing outlet. Further, education is believed to improve the readiness of the household to accept new idea and innovations, and get updated price information which in turn enhances the producers' willingness to produce more and increase market participation and intergration. Therefore Kilosa District local authority, through extension services should train small-scale rice farmers to ensure higher supply of rice. Training will help farmers to adopt different production and marketing technologies, increase their ability to better utilize market information, which may in turn reduce marketing cost and make it more profitable to integrate into different markets. Marketing extension services should also be strengthened to enable farmers to make good marketing decisions by enabling them to produce in accordance to marketing requirement, especially on varieties.
- (ii) Formation of formal small-scale rice farmer's organizations:** Most small-scale farmers choose to sell their produce at farmgate market because they incur no transaction cost. Therefore Kilosa District local authorities, should take action by

assisting farmers to form formal organization. These formal organizations will help farmers to share transaction costs towards accessing distant. Individually farmers are producing very little and cannot afford huge cost associating with transactions. Farmers' groups/organizations such as cooperatives can possibly amplify their bargaining power through collective mechanism. Collective bargaining mechanism can make associations to be able to increase negotiation power in setting price. This is because farmers acting individually, become quite impossible to influence the price paid by buyers. In addition, small-scale rice farmers' organizations can be instrumental in linking farmers with markets especially because the farmers are non-entrepreneurial. Contract farming may be one of the mechanisms to propel collective action spirit with this category of farmers. Kilosa District government should also invest in rural infrastructure, especially on the road network to ease conveyance of the rice produce from the area of production to marketing point.

- (iii) Improving dissemination of Price Information:** Improving on delivering of price information's and related factors that affect such variables can help farmers improve participation and encourage them to sell rice through better market outlet. Price factors also play a vital role in market integration as well as the choice of marketing outlet. This implies that farmers with price information are more likely to participate in rice marketing and in the right position to make prudent decisions on an appropriate market outlet. Therefore, farmers should be made to access price information at all time. Kilosa District local authority can disseminate price information through mass media, government administration, extension officers and mobile phone technologies (as we know nowadays most farmers possess mobile phones).

5.3 Further Research

This study evaluated the extent to which small-scale rice farmers are integrated in different markets, determined factors influencing the choice of rice marketing outlet among farmers, the researcher recommends further studies to focus on impact assessment of transaction cost of market participation among rice farmers in Kilosa district. There is need to determine the constraints and barriers that affect the rice farmers as they are reflected in transaction cost.

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APPENDICES

Appendix 1: Questionnaire for small-scale rice farmers

This study was conducted to discover out the Market intergration by small-scale rice farmers in Kilosa District –Morogoro-Tanzania. The information provided will contribute in formulation of policies and program that will improve market intergration and participation by small-scale rice farmers in the district.

Questionnaire Identification

Questionnaire Number.....

Ward.....

Village.....

Name of Enumerator.....

Name of Farmer.....

Section One: Demographic information

S1.1 Gender/sex: () Male () Female (Tick where appropriate)

S1.2 Relation to Head of Household (Tick where appropriate)

Head	Wife	Relative	Others (Specify)

S.1.3 Occupation of the Head (Tick where appropriate)

Farmer	Business	Employed	Others (Specify)

S.1.4 Age of the Farmer.....years.

S.1.5 Marital status of the farmer (Tick where appropriate)

Single	Married	Widowed	divorced

S.1.6 Household size..... (Number of people living and eating together)

S.1.7 The level of education that farmer has completed (Tick where appropriate)

No Formal Education	Primary Level	Secondary level	Tertiary Level	Others (specify)

S.1.8 How many years of schooling.....

S.1.9. Indicate the number of labours who assist you with farm work

Type of Labour	Full time	Part time	Family	Total
Number				

S.1.10 what is your employment status and under which income class do you fall in?

Employment Status		Income class (TShs)						
	Tick	<10,000	10,000-100,000	101,000-200,000	201,000-300,000	301,000-400,000	401,000-500,000	>500,000
Full time								
Part time								
Formally employed								
Pensioner								
Others (specify)								

Section Two: Rice Marketing

S.2.1 How many Kg/Tons of rice are produced in your farm?.....Kg/Tons

S.2.2 Do you sell rice produced in different market? () Yes () No

S.2.3 How many Kg of your total rice do you sell in these Market?

Sales	No	Farm gate	District	Outside	Total

			Market	District	
Quantity (Kg)					
Score	0	1	2	3	

S.2.4 How many Kg of rice do you sell every day.....Kg

S.2.5 where do you sell most of the rice you produce?

Place	Tick where appropriate	Reason
Farm gate		
District Market		
Outside the District		

S.2.6 How many years have you been in rice market.....years.

S.2.7 Do you always find the market for rice produced? () Yes () No

S.2.8 If no what happened to unsold rice produced? (Tick where appropriate)

Eat (family and friend)	Sell at low price	Store and sold later

S.2.9 what is the conditions in finding buyers? (Tick where appropriate)

Easy	Fair	Difficult

S.2.10 is your rice graded before marketing? () Yes () No

S.2.11 Do you have contractual agreement or guaranteed/ready market with any agribusiness outlet? () Yes () No

S.2.12 Do you have regular customer, who always buy from you? () Yes () No

S.2.13 How far is marketing point? Km

S.2.14 How much do you pay for a single trip to the market? TShs

S.2.15 What General problem do you experience in moving your produce?

Lack of transport	Small size of transport	Others (Specify)

S.2.16 how is your produce moved to the marketing point? (Tick where appropriate)

	Bike	motorcycle	pickup	Fuso	Tractor	Other (specify)
Own transport						
Hired Vehicle (individual)						
Hired vehicle (group)						
Public transport						
Buyer transport						

S.2.17 Complete the table below for payments and how long it takes to receive the payments?

List of marketing outlet	How are you paid			Time taken
	Cash	Cheque	Other (specify)	

Section Three: Infrastructure

S.3.1 type of road you use to the market

Tarmac	Rough	Both

S.3.2 In your opinion, how do you rate your road?

Fine	Good	Bad

S.3.3 Are you satisfied with number of road that links you to the market?

() Yes () No

Section Four: Physical Capital/ Assets

	Number	How much	Current value	Source of investment
House (specify)				
Car/motorcycle/bicycles				
Farm size (acre)				
Livestock				
Farm machinery				
TV				
Mobile phone				
Electricity				
Others (specify)				

Section five: Marketing information

S.5.1 Do you have access to market information's? () Yes () No

S.5.2 Do you receive market information prior to sale? () Yes () No

S.5.3 how often do you receive information? (Tick where appropriate)

Daily	weekly	Monthly	Annually	Others (specify)

S.5.4 how do you want information to be delivered. (Tick where appropriate)

Media	Cellphone	Extension officer	Farmers group	Others (specify)

S.5.5 which language is used to deliver information?

S.5.6 Do you consult other farmer before making decision? () Yes () No

S.5.7 what do you normally consult other farmers about.

.....

S.5.8 Do you have farmers group in marketing the rice you produce? () Ye () No

S.5.9 If yes, are you the member in one of the group? () Yes () No

S.5.10 what are your sources of information.

Sources	Type of information provided						
	Rank	prices	Date for sale	Buyer	Market Demand	Market Opportunity	Others (specify)
Public administration							
Buyer							
Extension officer							
Friends							
Co-farmers							
Media							
Others (specify)							

Section six: Extension services

S.6.1 Do you have contact with extension officers during marketing period? () Yes
() No

S.6.2 what services are provided by extension officers? (Tick where appropriate)

Advice on marketing	Advice in planting	Advice in processing	Others (specify)

S.6.3 Are the extension officers always available when you need help? () Yes () No

S.6.4 List problems you encounter when you contacting extension officers.

.....

Section Seven: Pricing

S.7.1 at what price in TShs do you sell one Kg of rice.....

S.7.2 Do you perform price survey before selling? () yes () No

S.7.3 how is price set during sales (tick where appropriate)

I set the price	We negotiate	It is market driven	It is dictated by buyer	Others (specify)

S.7.4 how do you decide the sale price of your produce? (Tick where appropriate)

	Very important	Important	Not important
A. It depends on the price of other local farmers			
B. It depends on the price of international farmers			
C. It depends on the market we sell to			
D. It depends on the production cost			
E. It depends on the concentration of the market			
F. It depends on the transaction costs			

S.7.5 how do the price that the buyer is willing to pay differ from your expectation? (Tick)

Lower than expected	Equal	Higher than expected

S.7.6 when selling who is negotiate on your behalf?

S.7.7 when negotiating which language is used?

S.7.8 List the major problems you face in accessing market.

.....

S.7.9 Suggests ways in which such problems can be addressed.

.....

