

**ANALYSIS OF CONSUMER CHOICEBASED ATTRIBUTESOF
RICE IN THE MARKET
A CASE OF MOROGORO URBAN MARKET**

By

Lauwo Godfrey Ephraim

**A Dissertation Submitted in Partial Fulfilment of the Requirements for Award
of the Degree of Master of Science in Economics (MSc ECONOMICS) of
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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled "***Analysis of consumer Choice Based Attributes of Rice in the Market: Case of Morogoro Urban Market***" in partial fulfilment of the requirements for the award of the degree of Master of Science in Economics of Mzumbe University.

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I, **Lauwo Godfrey Ephraim**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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DEDICATION

This work is dedicated to my lovely Family, my father Flexon Lauwo, my late mother Esther Flexon Lauwo and my siblings Neema Lauwo and Mary Lauwo who have given me strength and courage during my dissertation.

LIST OF ABBREVIATIONS AND ACRONYMS

ACT	Agriculture Council of Tanzania
ARC	Africa Rice Center
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
GAWU	General Agriculture Workers Union
GTZ	German Technical Cooperation
ITC	International Trade Center
JICA	Japan International Cooperation Agency
MAFSC	Ministry of Agriculture Food Security and Cooperatives
MOFA	Ministry of Food and Agriculture
NBS	National Bureau of Statistics
NERICA	New Rice for Africa
NGO's	Non - Government Organization
NRDS	National Rice Development Strategy
NSCA	National Survey and Census for Agriculture
OXFAM	Oxford Committee for Famine Relief
RLDC	Rural Livelihood Development Company
SACCOS	Savings and Credit Cooperative Society
SPSS	Statistical Package for Social Science
UGARS	University of Ghana Agriculture Research Station
URT	United Republic of Tanzania
USAID	United States Agency for International Development
WARDA	West Africa Rice Development Association
WTO	World Trade Organization

ABSTRACT

In a globalized markets where most individuals are employed and level of income is high due to rapid growth of industrialization and urbanization food market are more complex and competitive where consumer have more power to demand for specific attributes in terms of health, safety and quality of the food. The major challenge is to produce appropriate and affordable rice which suits the preference of its people. The main aim of the study was to analyze factors influencing consumer choice on rice product attributes in Morogoro urban. Also the specific objectives are to describe rice consumers socio-economic characteristics, to identify important attributes considered by consumer and to determine the factors influencing perception of decision to purchase rice in the study area. Primary data was collected from three urban markets of Mawenzi, Mwembesongo and Boma in Morogoro municipal and a cross-sectional study design was applied due to limited resources. A sample of 120 consumers and retailers residing from three wards of Morogoro Municipal were randomly selected. Also 6 individuals were purposively selected for key informant interview who were used for obtaining information about rice market in the study area.

Data analysis was conducted by using Statistical package for social science (SPSS) and Stata software using factor analysis and multinomial logit regression. The results from the study obtained from factor analysis model showed that aroma, taste and cohesion loads higher in component one and grain and texture loads higher in component two as these are the main attributes which consumer considers when purchasing rice product in the market. Also results of marginal effect obtained after multinomial logit for Mbeya rice shows that age, income and sex are significant while for rice attributes aroma taste and cohesion are significant. Likewise for Morogoro rice the results shows that sex and age are significant and for rice attributes aroma and taste are significant. Similarly for Shinyanga rice the results revealed that sex and income are significant and for rice attributes grain and cohesion are significant. This will help to increase the supply of rice product and decrease the loss occurred in the rice value chain from the producer to the retailer. It is recommended that, local markets and shops in Morogoro urban should sell rice with better taste since it is highly demanded by most consumers compared to other attributes.

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CHAPTER ONE

1.1 Introduction

This chapter introduces the study on consumer choice based rice product attributes in the market and states the motive which the study addresses. It commences by providing the background of the problem. Also it provides a brief summary of information which relates to the study by associating with the statement of the problem.

1.2 Background Information

Rice is a cereal crop which is consumed by majority of the people in the world. About 60% of the world population consumes rice mainly in China, India and Asian countries where rice demand is high compared to other nations (ITC, 2016). Also over 85% of the rice is produced and consumed in Asia-Pacific region. This is due to rapid growth of urbanization and industrialization which increase income to the majority of the people (USAID, 2016). In Africa rice is the source of food energy and its demand increase due to preference of the consumer. Total rice consumption in Africa is estimated about 21.18 Mt in 2015 on average and annual rice consumption is 20.36 Mt in 2013-2015 compared to 16.87Mt over the period 2008-2011 (ARC, 2012). From these observations it is clearly the demand for rice is growing at a relatively high rate in West Africa. The product is consumed by majority of the citizen especially during big events and festivals in the country.

Africa depends much on the importation of rice product and in 2008 African imports decreased to 32% from 50% (ARC, 2011). This has led to an increase in production within Africa as the product is consumed by different people in regards to its preference taste and flavor of rice product. Africa approximately consumes about 15millions tons of rice per year where about half of the tons of rice are imported to Africa continent. Asia countries export about 10 million tons of rice products to Africa (FAO, 2013). Importation of rice product is conducted through shipment were millions tons of rice are imported to Africa due to rise in demand (OXFAM, 2016). Also the value of African imports decreased by an average of 22.7% since 2013

where rice purchases valued at \$24.3billions.From 2014 to 2015 imported rice depreciated by 17.9% due to an increase in domestic production which encourage export by 1.7% (ITC, 2016).

Rice is the second most significant food and commercial crop in Tanzania after maize(FAOSTAT, 2010). Rice has the following importance; it provides employment to the people, it helps to generate income to the individuals and provides food security for Tanzania farming households. Tanzania is the second largest producer of rice in Southern Africa after Madagascar with production level of 818,000 tones (FAO, 2013). The cultivated part is 681,000 hectares which represents 18 % of Tanzania's cultivated land. Most of the rice produced in Tanzania is under rain fed conditions and irrigated land. About 71% is produced under rain fed and the remaining 29% is produced by irrigation (URT, 2013b). Farmers use traditional varieties which have long maturity but produce low harvest about 1-1.5 per hectare due to occurrence of pests and diseases which contribute to low harvest (NRDS, 2009).

In Tanzania the regions which produce rice are Morogoro, Tabora, Rukwa, Mbeya, Ruvuma, Mwanza and Shinyanga which accounts about 72% of the rice produced in the nation (URT, 2013a). Also rice is produced in the lowland areas of Manyara, Singida and Dodoma. Rice is an essential crop in the central Corridor where about 48% of the rice is produced (URT, 2014b). Production of rice is mainly produced in small holder households and about 17% of the farmers are small-scale and small amount of rice is produced under large scale rice irrigation schemes that were previously public possessed and managed like Mbalali, Dakawa, Kilombero and Ruvu (NBS, 2007). Rice statistics shows that about 24% of the overall nation production area is in the Southern Highlands and produce approximately 33% of the national rice produce (NRDS, 2009). Mbeya by itself has almost 135,214 hectares under rice production, which is around 8.4% of the overall national land under rice production (URT, 2014b). Rice product produced from large scale is mostly traded to large urban areas of Dar es Salaam and Tanga. About 60% of the rice produced from large scale irrigation farming is traded to coastal areas of Dar es Salaam and Tanga

(Kawamala, 2013). However the demand for rice is not constant for all varieties and brands. Rice marketing is influenced mainly by the attributes observed from the rice product as consumer is more attentive on the quality attributes of rice product for his health and safety.

In Tanzania there is high demand of rice product which cannot be accomplished by local production. The government allowed importation of rice product in 2012/2013 due to rise in consumption by 50% which created deficit in rice production (URT, 2014a). Rice importation was obtained in the nearby countries and about 30% of the rice imported brought competition to the local producers in export and import market (URT, 2014b). Rice with quality attributes was most preferred and the imported rice didn't have much threat to the local rice as local rice was most preferred compared to imported rice (Kawamala, 2013).

Decision making of the consumer depends much on the attribute of the product. The main criteria of the consumer has been the food quality where the consumer prefer rice with good cooking, physical and eating attributes which is demanded much in the market. Physical, cooking and eating attributes has influenced consumer's choice on the product (Jang and Silkes, 2009). Both intrinsic and extrinsic attributes has major influence on consumer insight on the quality of food. Basically quality of the product is determined at the purchase point where there is both intrinsic and extrinsic attributes which influence the consumer to demand the product (Banovic, *et al* 2009).

Agriculture share of Tanzania in gross domestic product (GDP) was 31.2% in 2013 with an increase of 3.2% per year (URT, 2014a). Food crops offer about 64% of agriculture GDP and rice which is considered as an essential product provides about 20% of agriculture GDP (URT, 2014b). Rice product covers about 40% of the total arable land and provides nearly 45% of rural cash income to most of the individuals who depend much on agriculture activities (URT, 2014a). Coastal areas of Dar es Salam, Pwani and Bagamoyo are considered as the major market as it accounts nearly 58% of national consumption and contributes about 15% to the gross domestic product (URT, 2014b).

Rice value chain is faced with many difficulties and hindrances from supply to marketing of the product. It is disorganized due to the fact that is dominated by large number of small and medium manufactures whose level of income is low and less management of the product to increase production. Rice value chain includes primary manufactures, traders of rice product, processors, wholesalers, retailers and consumers (FAOSTAT, 2010).

Despite the rise in rice productivity still most of the producers are not aware of the important attributes which influence consumer to purchase rice product. Approximately 65% of the rice producers are not aware of the important attributes which influence consumer to purchase rice product (URT, 2014b). Producers are faced with difficulties due to demand of the consumer on certain type of rice product which maximizes its utility. The pressure of consumers has made suppliers to think of an alternative way to obtain the rice product in order to meet consumer satisfaction (Kemp and Knight, 2010).

In Tanzania rice is been demanded by most of the people within the nation. Rice sector has provided employment to the people in Tanzania who engaged in productive activities and has contributed about 8% to the economy of the nation (ACT, 2007; NBS, 2007). It is produced much in Mbeya, Morogoro and Shinyanga where its consumption is high and farmer's benefits much from this product. Consumer is faced with difficulties in the choice of the rice product which have different attributes in order to attain maximum satisfaction. The presence of rice with different attributes from other regions has influenced consumer choice on the brands of rice in order to maximize its utility. The major challenge for Tanzania is to produce appropriate and affordable rice that suits the preference of its people (MOFA, 2009).

Most of the studies piloted in Tanzania have concentrated much on agronomic concept and development of new rice varieties for patience to abiotic restrictions. Numerous varieties have been created including WAB450, BLI, NERICA 1, 2, 4, 7 and DV4 (ARI-KATRIN, 2012). These studies have aimed only on development of

new varieties and agronomic ideas on the rice product but still consumer needs, wants and preference has received little emphasis. Different studies from the Ministry of Agriculture Food Security and Cooperatives have emphasized on consumer demand for rice is not uniform for all varieties and brands. Most of the consumers are more attentive to the brand and type of rice they purchase depending on different characteristics observed from the market (MAFSC, 2009).

In a globalized markets where most individuals are employed and level of income is high due to rapid growth of industrialization and urbanization food market are more consumer oriented where wealthy consumers have more power to demand for specific attributes in terms of health, safety and quality of the food. The marketing situation of rice product is more difficult where consumers decide on the type of rice product they prefer hence market of rice should be in accordance to the consumer needs and wants (Carr *et al* 2006).

Today's market is more consumer oriented where wealthy consumer has the power to demand for quality attributes for his health and safety in order to maximize its utility or satisfaction. Rapid industrialization and urbanization has created opportunity for most of the people to engage in production activities thus income of most individuals increased. In order to increase profit of the producers, suppliers and retailers of rice product the producers should be familiar with the important attributes which influence consumer to purchase rice product. This will help to minimize loss occurred from producers, suppliers and retailers of the rice product who purchase rice product with different varieties from the producers. Rice product which is mostly preferred by the consumers will be produced in order to increase the marginal profit of the producers, suppliers and retailers. This study will help to identify important attributes which consumer considered when purchasing rice product.

1.3 Problem Statement

Since globalization consumer preference for rice has changed due to physical attributes, cooking attributes and eating attributes which contributes much to the purchasing power of the consumer. Many individuals are aware of the quality attributes of rice which play a significance role in choosing the product. Eating

attributes consist of taste, aroma, flavor and texture, physical attributes also include impurities, grain shape, color and cooking attributes comprise of easy to cook, swelling capacity, grain size, and grain cohesion (Mergenthaler *et al* 2009).

Consumer's choice on rice product is influenced mainly by the attributes obtained from the rice product. Consumer is willing to pay for specific type of attributes in terms of its quality, health and safety even when the price is high in order to attain maximum utility or satisfaction. Some individual prefer eating attributes like taste and flavor of the rice while others prefer physical attributes like grain shape breakage and impurities. Consumer is faced with difficulties in the selection of alternatives among different brands or types of rice with different varieties or attributes. Despite the rise in demand of the rice product in the market still change in consumer taste and flavor of rice product has brought huge challenge in the market. This study analyzed important attributes which consumer considered when purchasing rice product in Morogoro urban.

1.4 Research Gap

There is very little research on consumer food quality preference in developing countries and, since research outcomes from developed countries cannot be shifted to other countries because of its values, principles, taste favorites and observations differ within countries (Grunert, 2005). In this context, the researcher tried to analyze the consumer preference on rice product with different attributes which favors majority of the citizen within the nation. My focus is on the major attributes of consumer on the rice product by considering cooking, eating and physical attributes which is produced by different producers.

Also by considering different studies within developing nations the findings of the related literature revealed that little emphasis has been shown in East Africa but most studies have been conducted in West Africa on the analysis of consumer choice on rice product attributes. Also different studies had aimed at consumer preference for locally produced rice versus imported and willingness of the consumer to pay on rice

attributes but little has been done on important attributes in attainments of maximum satisfaction or utility of a consumer.

1.5 Objectives of the Study

1.5.1 General objectives

The general objective of the study was to analyze factors influencing consumer's choice on rice product attributes in Morogoro Urban.

1.5.2 Specific objectives

- i. To describe rice consumers socio-economic characteristics in the study area
- ii. To identify important rice attributes considered by consumer in the study area
- iii. To determine the factors influencing perception of decision to purchase rice in the study area

1.6 Research question

- i. What are socio-economic characteristics of rice consumers in the study area?
- ii. What are important rice attributes valued the most by consumers in the study area?
- iii. What are the factors influencing decision of purchasing certain type of rice?

1.7 Significance of the study

In Tanzania, rice is consumed by majority of the population. This study analyzed food self-sufficiency and food security through evaluating and assessing the important attributes which influence consumer to purchase the product. The study findings may help the government to implements its goal through increasing rice production and encourage participation on food security.

Consumers are usually derived from the variety of attributes and have maximized utility of most users. Through understanding these attributes it may encourage policy makers to identify and induce quality attributes which are preferred by the consumer. This will also contribute to policy reform on agriculture and industrial sector hence increase in productivity of rice product.

1.8 Scope or Organization of the Dissertation

This study is organized in five chapters; chapter one presents background information, statement of the problem, general and specific objectives of the study and significance of the study. Chapter two provides the review of Literature which is divided into section of definition of key terms and concepts, theoretical framework, empirical review and conceptual framework. Chapter three presents methodology which explains the description of the study area, research design and sampling methods, methods of data analysis and processing and analytical framework. Chapter four presents the results and discussion of findings obtained from the field. Chapter five presents the summary, conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews some of the concepts and theories and provides empirical evidence on the matters related to the topic and clear understanding of the factors influencing the consumer choice of rice product attributes in the markets. This chapter has organized two major parts that is empirical part and theoretical part.

2.2 Definition of key terms and Concepts

Burns and Grove (2003) define theory as an integrated set of defined concepts and statements that present the view of phenomenon and can be used to describe, explain, predict or control the phenomenon. In this section we describe the theory which will be dominant and that supports the study.

This section provides operational definition of terms as key concepts used in this study which include consumer choice, market, rice marketing and import and export market of rice. These concepts are elaborated as follows.

2.2.1 Consumer Choice

According to Oxford dictionary consumer choice is defined as decisions or judgments that consumer makes with respects to products and services. Consumer selects among the best alternatives from several choices in order to attain maximum satisfaction or utility. The consumer decides which products or goods to consume over time (Silberberg & Suen, 2001).

The consumer is supposed to select among existing choices in such a manner that the level of satisfaction derived from consuming these commodities is the highest (Henderson and Quandt, 1980). Grunert, (2005) considers product traits as one of the views to increase understanding of user or buyer's choice. The attributes of rice on the consumer on the rice product has been the major determinants for the level of satisfaction of the user. The level of satisfaction of the consumer is derived from the

quality attributes of the consumer like eating cooking and physical attributes which maximizes the utility level of the user (Bateman, *et al* 2002).

2.2.2 Market

This can be defined as the situation where by buyers and sellers interact(Calpe, 2006). Market is usually an area where goods and services are sold and transaction of commodities takes place. Most of the markets have heterogeneous products which increase the level of transaction in the market and encourage producers to increase its supply. Markets with agricultural products are affected by variation in the price of goods and services but a market where the price of goods is low transaction usually is very high due to the level of income of most of the households.

2.2.3 Rice Marketing

Rice is regarded as a finest staple food which consumers are desired to exchange as the income rises (FAO, 2013). According to Gabagambi *et al.* (2014), rice has high income elasticity of demand and its local prices are influenced by international prices. The price of rice is higher than other cereals such as maize, thus consumer preference for rice has grown in line with disposable income and urbanization is preferred among the Tanzania middle class.

The growth of rice industry has been driven in part by increasing urbanization and population. Rice is popular in urban areas as it symbolizes increased status and is easy and quick to prepare (Gabagambi *et al* 2014). For instance rice produced in Mbeya and Morogoro is largely supplied to Dar es Salaam markets (Tandale and Tandika) due to rise in urbanization, incomes and rapid population growth. Almost 71% of rice produced in Tanzania is supplied in Dar es Salaam which is considered as the trading zone in Tanzania (Eskola, 2005).

2.2.4 Import and Export of rice in Tanzania

Tanzania is related to the World market through importation and exportation of rice product in different countries within and outside of Africa. Statistics shows that Tanzania is a net importer of rice. Gabagambi *et al.* (2014) recommended that in order to meet the local demand imports are necessary. The gap is a result of serial

poor harvest by small and large scale producers (FAO, 2013). For instance in order to meet domestic demand in 2001-2005 about fifty thousand milled rice was imported mostly from Asia (NRDS, 2009).

However the country exported rice from 1998 and 2004 to Rwanda, Kenya, Uganda, Comoros, Democratic Republic of Congo and Burundi. During this period, 98.7% of rice exported from Tanzania was bought by African countries. Generally, Tanzania rice industry supported by government policies has grown rapidly over the last decade and is largely self-sufficiency (NRDS, 2009). Its productivity has doubled in the last decade supported by import tariffs and supportive policies. Good quality rice (aromatic, 20% broken) captures 70% of national rice consumption. Local production meets 92% of consumption despite a 215 price premium over imported rice giving it a competitive in meeting consumer demand (aromatic, fresh, clean and 20% broken). Local production is expected to triple by 2020 due to rise in urbanization, incomes and population (Minot, 2010).

2.3 Theoretical Review

2.3.1 Consumer behavior theory

Consumer behavior theory usually intends to explain the concept of consumer preference, utility maximization and demand function. Personal choice is influenced by the habit, inertia, familiarity with the product, promotion, peer pressure, environmental limitations, accumulated opinion, household and family restrictions (Louviere *et al* 2000). Traditional approach on consumer theory assumes that choices of goods and services are made not based on a simple marginal rate of substitution between commodities. Consumer choice is induced with the quality of the product and not on a mere substitution effect of the commodities. Substitution effect occurs greatly on low income earners where the income generated cannot afford to purchase quality product which is usually expensive (Ehmke, *et al* 2008).

The new approach is induced on the preference for the attributes of the goods where consumer demand the product with quality attributes. Rice markets do not value quality attributes which are usually induced to safety of the product. Food security is

the most important aspect in the demand of the product (Dalton, 2003). Rice with good cooking attributes (easy to cook, grain, cohesion, swelling capacity and grain size) and also eating attributes (taste, aroma, texture and flavor) usually is consumed by majority of the people. Quality attributes of this product is mostly consumed by rich and employed individuals for their health and safety purpose (Curtis *et al* 2004).

Lanchaster (1966) proposed a new approach to consumer demand theory which asserts that consumer derive utility from attributes of goods rather than the goods itself. In other words product attributes is the one which derive the consumer to purchase the product with no exception. Preference of the consumer is derived from the quality attributes obtained from the product. Eating attributes are the ones which increase the purchasing power of the consumer as the rice with nice taste and texture is consumed much in the market even when the price is high.

Consumer choice is derived with the highest level of utility obtained from the product. The choice problem is regarded as the selection of one object from a given set of alternatives on each trial. Product quality characteristics are influenced by innovation of the producer with objective of consumer satisfaction. The level of utility of the consumer is influenced by the quality attributes from the product. Consumers have alternative choices on the product produced with the correspondence price difference in the market which lowers the purchasing power of the commodity. Consumer places hidden value on the product consumed and characteristics of each commodity is placed on the user of the product (Cicia and Colantuoni, 2010).

2.3.2 Lanchaster Characteristics Theory

There exists number of models which tried to explain purchases of the consumer based on the quality attributes of the product (Housthakkar, (1952); Lancaster, (1966). The models are denoted as Lanchaster characteristics demand model or Lanchaster's characteristics theory of value. Lancaster's characteristics theory of value postulated that any good can be defined in terms of its attributes or characteristics observed. This is usually effective for many goods and services but

the effectiveness is doubtful for certain goods because of the level of satisfaction of the consumer. Utility which the user receives does not depend much on the observable attributes but also in all types of hard to measure facts. There is a huge chance of making mistake in assessing the characteristics and people opinions on the standard of the product. In this situation, Random Utility Theory suggests a theoretical base for choice experiments (Bateman, *et al* 2002; Lancaster, 1966).

2.3.3 Random Utility Theory

From the observed information the data are choice-based where most researchers use random utility theory in which the basic knowledge is the theory of the utility maximization (Hauser and Rao, 2002). Numerous stipulations of random utility models advance themselves to maximum likelihood estimation. The most common models are logit models, probit model (multivariate normal errors) and nested logit model (generalized extreme value errors).

2.3.4 Hedonic Theory

Hedonic theory is based on the quality aspect of the product where the product with quality attributes is consumed more by users of rice product. In current world we are challenged with goods with heterogeneous characteristics which need a more comprehensive study than a simple view of the products. The main concept is to show the relationship between the price of the product and its hidden attributes or quality. The price of the product is determined by quality attributes observed from the product. The product with good attributes for safety reasons usually is consumed much for the health of the users (Henson *et al* 2006).

From the observed theories almost all of the theories have explained well how consumer choice is influenced by product attributes in order to attain maximum satisfaction with exception of Random utility model which have elaborated on the best choice models to be used. Consumer behavior theory, Lancaster characteristic theory and Hedonic theory have provided a brief understanding of the product attributes which derive the consumer to purchase the product.

2.4 Empirical Review

Waugh (1929) using hedonic pricing in agriculture products as his impact was on the quality factors (color, size and uniformity) which influence the consumer to purchase the product. It was observed that market price of the products vary with physical attributes that the user has associated with its value. Also there exists other applicants of hedonic pricing model in agricultural products which includes Diako *et al* 2008, Colombo *et al* 2007 and Diako *et al* 2010.

Ara, (2003) studied on consumer willingness to pay for multiple attributes of organic rice in Philippines and used conjoint analysis to measure the willingness of the consumer to pay for organic rice. The variables included were eating quality, price, reduced health risk level, environmental quality, and type of organic certification. Organic certification was found to be the most important factor for consumers in Manila and enhancement of farm environment was the second essential factor in Naga city. Also the results observed consumers who live further from the production site have higher demand for certification compared to consumers who live nearby the farms, who care much on farm environment.

Walisinghe and Gunaratne (2012) studied on consumer preference for quality attributes of rice in Sri Lanka using conjoint analysis to measure the important attributes of rice product. The growth of urbanization and improvement of technology has provided income to young generation which enhanced quality attributes of rice product. The important attributes were identified using focus group discussion and a sample of 185 consumers were analyzed. The results revealed four attributes which are type, color and purity were significant and only price was insignificant. Also part worth estimation observed purity is the most important attribute in identifying the type of rice.

Gurung, (2013) studied the hedonic price model for Bhutan and analyzed domestic rice by the use of market price as 11 different characteristics was observed. The study also developed a hedonic model of import and domestic rice consumed by majority of people in Bhutan. Ordinary least square (OLS) has identified relationship

between price paid by consumers and attributes of rice. The study also revealed Bhutanese consumer has less preference for foreign materials, whiteness of the rice and less broken rice while cohesion and reddish color are significant in purchasing decision of rice product. Most consumers have derived satisfaction of the goods characteristics which shows positive and negative implicit prices.

Anang *et al.* (2011) studied consumer preference for quality characteristics of rice in Accra and the effects of these preferences on price using descriptive statistics and hedonic price model. The results revealed that income and education have significant effect on consumer preference. Also, taste absence of foreign matter aroma and retail price are the quality attributes that most consumers prefer. Similarly, hedonic price approximation showed that consumers of rice in Accra pay high premium for taste, aroma and shape

Khanal *et al.* (2017) studied evaluation of smallholder farmer's demand for rice variety attributes in Nepal and the data was analyzed using multinomial logit model in order to estimate farmers demand on rice varieties. The results revealed significant demand from farming households for an increase in yield, upgrade cooking and eating quality, tolerant to drought and short maturity. For a wider approval of crop varieties, variety development programs should give importance to above mentioned attributes rather than only increasing crop productivity.

Naseem *et al* (2013) examined economic analysis of consumer choice based on rice attributes in the food markets of West Africa and hedonic pricing and discrete choice models was used to identify consumer preference for rice attributes in Benin. The results observed variability in consumer preference for different rice attributes. Also rural and urban consumers prefer imported and parboiled rice to domestic and raw rice. Further, implicit prices paid by the consumers for both imported and domestic was based on quality perception of rice attributes.

Othman *et al.* (2011) examined on the determinants of consumer purchasing behavior for rice in Malaysia and factor analysis was used to identify the important factors affecting the consumer purchasing decision. Through factor analysis,

observation revealed important factors affecting purchasing decision of the consumer are age, marital status, gender, income and household size. The results also observed the important attributes like taste, grain size, price, cohesion and location has significant effect on purchasing behavior of the consumer. Furthermore majority of the people prefer white rice instead of imported rice and most of the consumers were loyal to the brand name.

Abdullahi *et al.* (2011) examined the socio demographic factors on product attributes of rice by Malaysian consumer using multinomial logit model to measure the purchasing behavior of special rice. Socio demographic factors like marital status, household size, level of income and number of children were observed to have significant effect on purchasing decision of rice. Also rice attributes like flavor taste and aroma were found to be significant effect purchasing decision of rice in Malaysia. Price and easy preparation were not significant on purchasing decision of rice product due to awareness of the consumers on the price of rice product.

Mubarick *et al.* (2014) studied the determinants of consumer preference for domestically processed rice in Tamale metropolis in Ghana using logistic regression model and discrete choice model to measure these determinants. The key variables influencing consumer preference on local rice were observed and age, household size monthly expenditure on food and taste had significant effect on consumer preference. Also the results observed that about 64% of the respondents agreed on poor packaging of local rice which hindered consumer on purchasing the rice product. The study suggested on the crucial need to invest on upgrading and organization of rice varieties to improve its taste.

Muhammad *et al.* (2012) studied consumer demand and willingness to pay for rice attributes in Malaysia and conjoint analysis was used to identify consumer demand for rice attributes. The results were analyzed and observed that important attributes were food safety followed by taste and the size of the grain. Also consumers were willing to pay for premium prices for demanded attributes.

Danquah and Egiyr (2014) examined on the factors that influence household demand for locally produced brown rice in Ghana and the data was analyzed using simple descriptive statistics, tobit model and chi square test. The results had observed taste as an important attribute which influenced consumers to purchase brown rice. Also the results of Tobit regression model shows acceptability ratio of brown rice to be low due to the price and technical attributes of both brown and white rice (taste, color, texture, nutritional content). The results obtained from the chi-square test indicate that the local institutions that were essential in brown rice advancement were the University of Ghana Agriculture Research Station (UGARS), Ministry of Food and Agriculture (MOFA), German Technical Cooperation (GTZ), Japan International Cooperation Agency (JICA), and General Agriculture Workers Union (GAWU). Also for the awareness of Brown rice for safety reasons the media should be used more to advance knowledge to the people.

Akpoyomare, *et al* (2012) examined on the effect of product attributes on consumer purchase decision in the Nigerian food and beverages industry in Lagos Metropolis and the data was analyzed using descriptive statistics and Pearson correlation coefficient. A sample of four hundred consumers was analyzed and data was collected through questionnaire which was administered to each respondent. The results of the analysis revealed a positive correlation between product attributes and consumer purchase decision.

Tamakloe, *et al* (2007) studied the sensory evaluation, acceptability, affordability and market price of rice in Accra Ghana using descriptive sensory evaluation and central location testing were used to evaluate consumer acceptance on the market price of rice product. Affordability and acceptability have influenced the market price of rice product. Higher prices of rice product were recommended in acceptance scores as extent depended on affordability and consumers discounted prototype rice. Market price of rice product is positively related to sensory attributes associated with quality but negative related with the affordability. Purchasing behavior of the consumer and rice consumption are related to the acceptability while gender, income and quality perception are related to affordability.

Opeyemi *et al.* (2015) studied the analysis of consumer preference in patronizing locally produced and imported rice in Niger State using descriptive statistics and inferential statistics (Logit) analysis. Primary data was collected with a sample of 100 respondents who were randomly selected (50 locally and 50 foreign rice consumers) from Niger state. The results showed that demographic factors like household size, income are significant related to locally produced rice. Also, taste cleanliness of rice and absence of stones in the rice was found to be significant with the imported rice in the study area.

Azabagaoglum and Gaytancioglu, (2009) studied the analysis of consumer preference to different rice varieties in Turkey and used focus group discussion and face to face interview was conducted to investigate consumer preference and its sensory attributes. The results revealed that Baldo and US Calrose are significant different from ordinary rice as regards to its cleanliness palatability and cooking. Also the results obtained from face to face interview were similar as Baldo is observed different from other varieties with exception of the price and consumption of Baldo is higher than US Calrose. Likewise the results obtained from Hierarchical cluster analysis showed that US Calrose is regarded as the best imported rice in Turkey as most of the consumers purchase due different sensory attributes in the rice product.

Diako *et al.* (2010) studied on consumer perceptions, knowledge and preferences for aromatic rice types in Accra Ghana using descriptive and inferential statistics on measuring demographic variables and attributes of rice types. The results showed that about 94.9% of the consumers are aware of the imported rice in Accra Ghana. Also both cooked and raw attributes of rice influence consumer choice on types of rice in Accra. Similarly through Friedman test taste and aroma has major influence on consumer choice for cooked rice.

2.4.1 Empirical evidence on demographic variables and attributes of rice

Due to significant of the rice product in the markets, most emphasis has been towards the attributes that consumer value in different markets. Holcomb, (1997) scrutinized on the marginal prices of hidden rice attributes on a number of rice variability in the United States and observed that all the attributes color, texture, flavor and taste has no single variability. He found that each variable had positive and negative marginal imbedded prices.

Juliano, *et al* (1992) on the study of grain quality characteristics of rice in Philip-pine retail markets showed the relationship between price and quality attributes of rice in high income markets namely Hong Kong, Bonn and Rome. It was observed that marketing variability has hidden values in all the markets inspected but cooking attributes is significant in traditional rice markets.

Attributes like taste, cooking quality and aroma are the most essential attributes preferred by the consumers in Tamale metropolis in Ghana. Rice with these attributes has been consumed much by the people who made the producer to increase its productivity in order to earn more profit. Consumers were willing to pay at any price for extrinsic features like cleanness and whiteness for their safety (Anang, *et al* 2011).

In the southern province of Togo consumers were willing to pay for whiteness, ease of cooking, taste, swelling capacity and breakages of the product. The most essential factor is the texture which influences the people to purchase the product in the market. Consumers with low income also agree to pay for the product even when the price of rice is high. Also in the Eastern province of Togo all the variables have positive association with exception of the taste which is negative related. On the other hand cohesion has a significant effect on the price of the product. In the Northern Province of Togo consumers appreciate cohesion and texture than taste and swelling capacity which has been dominant in the market. Finally on the western province consumers seem to focus on the shape of the product (Fiamohe *et al* 2013).

Demand for rice is affected by the demographic factors like age, education, level of income and employment. Older people are more selective on the attributes of food due to safety of their health and dietary intakes. Level of income is a good determinant of purchasing behavior of the consumer. Educated individuals are more sensitive in their health which makes them to be selective in the required attributes for their safety compared to uneducated people. More readings should be conducted and make emphasis on these demographic variables (Demont, *et al* 2013).

Mostly demographic factors have a major influence on the purchasing behavior of the consumer. Peterson and Yoshida, (2004) analyzed the association of the demographic factors (gender, marital status, working status, and age of the respondents) using Chi-Square and observed that gender, marital status, working status and the age of the respondents had a significant relationship with the frequency of purchasing rice. On the other hand large number of household size has been a good determinant of the purchasing power of the consumer. Usually the larger the household size the larger the quantity of rice purchased by the household. This is due to difference in the per capital income of the consumers.

Different attributes of rice has been the main judgment of consumer in purchasing decision of rice product. The quality of rice taste and texture are the main reasons which stimulate the consumer to purchase the product. Most individuals would like to purchase particular type of rice due to its taste and flavor. Apart from taste and flavor but aroma, easy to cook and less starch content are the other attributes which stimulates the consumer. Price of rice does not affect much if the product has these important attributes (Hudson, 2007).

There are different attributes like purity and the type of rice whether samba, nadu or raw which stimulate the demand of rice product in the market. The study has observed that the consumer has placed much emphasis on the purity than the type of rice. There are some people who are most favored by the samba type compared to raw rice because of its grain. There are also other people who consume rice for their health as they eat red rice and the most preferred grain color is white. The interaction

of several attributes has been the major determinant of the purchasing behavior of the users. The price of the product has been insensitive to the quality attributes of rice (Khor, 2006).

Imported rice in Nigeria has been consumed much compared to the locally produced rice due to different attributes like taste flavor cleanliness swelling capacity and grain shape. These attributes are mostly preferred by the fast food industries and restaurant service in their commercial activities. It has increased the profit margin of the business people as it is consumed by majority of the travelers in the nearby country (Akaeze, 2010).

Urban dwellers consume rice with quality attributes due to their level of income and education. They favor different attributes based on their nutrient contents and safety of their health (Tomlins, *et al* 2005). Also Caswell and Joseph, (2007) observed that income, age of the consumers and the frequency of purchase are important aspects that influence household consumption. Consumers purchase rice brand with different attribute which favors their growth. Producers ensure the brand is available in the market in order to increase its profit margin.

Consumers of rice in Japan demand different attributes and addition values in the product. These attributes includes rice nutrients, food texture (stickiness and hardness) and constituents (protein, amylase allergens). Also there is aroma, color, size shape of the rice kernel which favors their dietary intakes (Jafry, *et al* 2004).

Globalization and the structural change in today's World rice should be made available in different forms (pre-cooked, easy to cook and ready meal and packaging). This is due to change in the lifestyle of the consumers who demand the product. The purchasing behavior of the consumer is influenced by different attributes within the product which changes the taste of rice product. Most of the young men prefer to eat outside rather than cooking at home due to time constraints. At this rate rice brands are prepared with different attributes which are consumed much by young men (Khor, 2006).

Each individual prefer specific type of quality attributes of rice which are usually heterogeneous in nature. Some individuals prefer eating attributes like taste and flavor of the rice while others prefer physical attributes like grain shape breakage and impurities. Most individuals prefer rice with good eating attributes which is highly consumed in the market compared to physical attribute which is only observed by our naked eyes. These attributes will contribute, in differing proportions, to the overall level of satisfaction derived from purchasing or consuming the product. (Rohr, *et al* 2005).

Decision making of the consumer depends much on the attribute of the product. The main criteria of the consumer has been the food attribute where consumer prefer rice with good cooking, physical and eating attributes which is demanded much in the market. Physical, cooking and eating attributes has influenced consumer's choice on the product. According to Jang and Silkes (2009) both intrinsic and extrinsic attributes have major influence on consumer insight on the quality of food. Basically quality of the product is determined at the purchase point where there is both intrinsic and extrinsic attributes which influence the consumer to demand the product (Banovic, *et al* 2009)

2.4.2 Synthesis of Empirical Review

Consumer is most interested in different attributes of the rice product which maximizes its satisfaction or utility. Attributes like taste, texture and aroma are the most important attributes which influence consumer to purchase rice product. The supply of rice product depends much on different attributes of the consumer and these attributes have huge impact on consumer choice. Consumer choice is influenced mainly by attributes like taste texture and aroma which maximizes its utility or satisfaction.

Consumer is willing to pay for the rice product with important attributes to maximize his utility and for his safety. Employed and educated people prefer rice with long grain taste and aroma for their safety. Older people also prefer rice with nice taste aroma and long grain size for their safety and dietary intake. These attributes have major influence in the purchasing decision of the consumer in the market.

Most of the studies have ignored the impact of demographic variables on the attributes of the consumer. Caswell and Joseph (2007); Demont *et al.* (2012) and Othuman *et al.* (2011) have neglected the impact of demographic variables on the attributes of the consumer and has also advised for further research on the impact of demographic variables in attributes of the consumer. These studies have only focused on the attributes of the consumer on the rice product and the type of rice which maximizes utility. Also Lancon *et al* 2003 have only measure the impact of price on the attributes of rice product and observe that price has little impact on the purchasing decision of the consumer. Decision of the consumer on the type of rice mostly depends on the attributes.

Different scholars from different countries mostly from West Africa have elaborated clearly the attributes and methods used to obtain the results on the preference of consumer on different attributes found on rice product. They have shown the major attributes which influence the choice of rice product and other studies have compared imported and locally produced rice in attainment of maximum satisfaction or utility

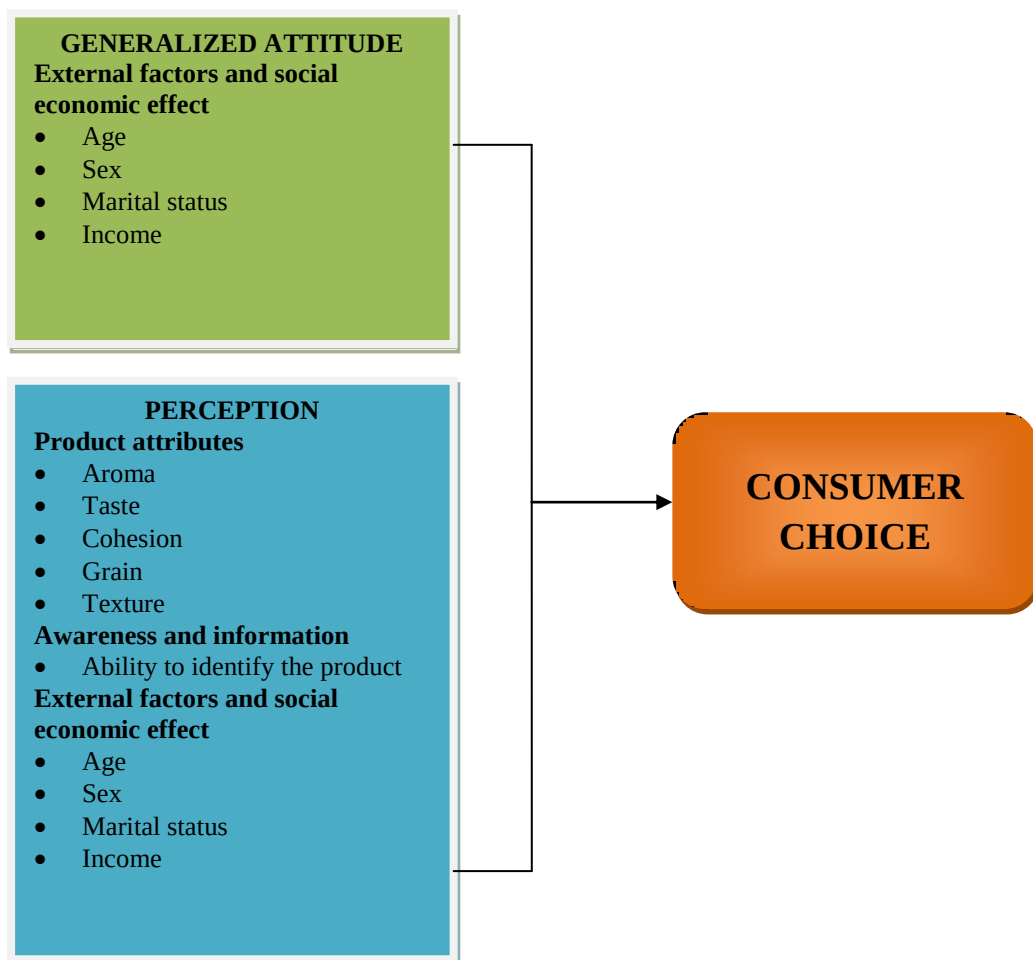
This study therefore, has shown the impact of demographic factors on the purchasing decision of the consumer in order to attain maximum utility. Age, Sex and level of income will be measured to see the effect of demographic factors on purchasing decision of the consumer.

2.5 Conceptual framework

Based on different theories of choice behavior consumer preference is influenced by habit, inertia, familiarity with the product, promotion, peer pressure, environmental limitations, accumulated opinion, household and family restrictions. From Fig 2.1 below consumer choice is influenced by the perceptions and generalized attitude of the consumer. Perception mainly is enhanced by marketing information which has created an opportunity for consumer to make decision on the type of rice product which maximizes its utility or satisfaction. It has made consumer to have knowledge on the product due to different attributes like aroma, taste, grain size, cohesion and texture.

Generalized attitude mainly is influenced by external and socio economic factors like age, sex, marital status, and income. Age may induce consumer to prefer certain type of rice for safety or nutrient content. Older people are more selective on the attributes of the food due to the safety of their health and dietary intakes compared to young individuals. Income of the consumer also influences the purchasing decision of the rice product. Low income earners don't focus much on health, safety and diet compared to high income earners as other factors remain constant. In term of sex female are more selective compared to male and most women are influenced by different varieties which are present in the rice product.

Figure 2.1: Conceptual Framework on Consumer choice



Source: Researcher Own construct (2017)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section presents the methodology which was used to analyze the study objectives. The first subsection provides a detailed description of the study area followed by a subsection of a research design and sampling procedures. Finally the chapter ends up with analytical framework which describes methods of data analysis.

3.2 Description of the study area

3.2.1 Location

The study was conducted in Morogoro urban markets of Mawenzi, Mwembesongo and Boma market where all these markets are in Mazimbu, Mwembesongo and Sabasaba wards of Morogoro municipal. Morogoro municipality is divided into 29 administrative ward and 295 streets. The municipal is located 196 west of Dar es Salaam the country business capital and 260 kilometers east of Dodoma which is a country capital. The area is located between 5° 58"S and 10° 0"S and longitude 35° 25"E and 35° 30"E. The municipality has a total land area of 531 square kilometers which is equivalent to 0.4% of the region area. This land coverage constitutes 0.4% of the total regional area. The major physical features are Uluguru Mountains ranges which lie in the South-Eastern part.

3.2.2 Demographics

According to 2012 population and housing census Morogoro municipal has an estimated population of 315 866 of which 47% are males and 53% are females (URT 2013); during the time the municipal growth rate was 4.7% per annum. The average income of individual per annum is approximately TZS 539 375.

3.2.3 Transport and communications

The municipality is connected by a network of all-weather roads which make easy transport and communication in and out of the municipality. Also the municipality is connected to the central railway which is currently being upgraded to standard gauge. For this the municipality is well connected to hinterland and business hubs in the country. Communication services which are available include postal services, mobile and landline telephones, private carriers and internet.

3.2.4 Financial institutions

In the municipality there is a large concentration of financial institutions including commercial banks, co-operative banks, non-bank financial institution, insurance companies, NGOs SACCOS and rotating savings and credit schemes. These financial institutions create conducive area for business activities.

3.3 Research Design and Sampling Procedure

The study used a cross-sectional research design in which data from respondents were collected within same period of time. From 29 wards in Morogoro municipality, 3 wards were randomly selected to be included in the study. Furthermore within each ward 3 streets were also randomly selected and from which 10 households were randomly selected in each street in the sample. The total number of respondents interviewed in the research was 120.

In addition, 6 individuals were purposively selected for key informant interviewees who were used for obtaining information about rice market in the study area. The individuals included shopkeepers and sellers in the market.

3.4 Data Collection and Analysis

Primary data were collected from 120 individuals using questionnaire interview. The questionnaire collected information from individual characteristics including age, sex, marital status, education level, income. Also questionnaire collected information of individual perception of rice attributes of aroma, taste, cohesion, grain and texture. Furthermore, information on knowledge about rice characteristics and areas where

they purchase rice were included in the questionnaire. Furthermore, key informant interview was conducted including 3 shopkeepers and 3 sellers from market to provide general information about rice marketing which was useful in developing the study.

The data was analyzed using Statistical Package for Social Science (SPSS) and Statistical Tool of Analysis (STATA) software where SPSS was mostly used in data management and coding and STATA was used in the analysis of the data.

3.5 Analytical Framework

3.5.1 Description of socio-economic characteristics of rice consumers in the study area

In order to well understand the factors influencing consumer's choice on rice product attributes, it is important to understand socio-economic characteristics of rice consumers in the study area. In achieving that descriptive statistics will be used which measures of central tendency such as mean, mode and median will be used also measures of dispersion including variance and standard deviation will be used to summarize consumer's socio-economic characteristics.

Variables that will be used in this analysis will include consumer's demographic characteristics of age, sex, education, marital status and family size; also the analysis will include information on consumer's economic characteristics such as income level, occupation and consumer preferred market for rice.

3.5.2 Identification of important rice attributes valued by most consumers in the study area

According to McFadden (1986) when consumer makes decisions to purchase any commodity the decisions is guided by certain attributes which is based on perception built through various factors such as socio-economic environment, historical experience and information; decision to purchase is a result of these inputs which are based among other thing the characteristics of the product itself. According to studies such as Jang and Joseph (2009) and Banovic *et al.* (2009) individual preference on

food item such as rice includes physical, cooking and eating attributes. Therefore, this objective focused on analyzing the rice characteristics of taste, aroma, texture, cohesion and grain size to determine which matter the most for the consumers in the study area. In doing so factor analysis method was used to identify important rice attributes valued the most by consumers in the study area.

The model for factor analysis for this study is derived by assuming that with each variety of rice, consumer chooses basing on a number of factors; now supposing that there are p variables (factors) f_1 to f_n with means μ_1 to μ_n respectively. Also assuming there are unknown constraints z_{ij} ($i \in 1, \dots, p$) and k unobserved random variables CF_j ($j \in 1, \dots, k$) also known as common factors and $k < p$, then the factor analysis model will be as shown in equation (1) or as in matrix in equation (2).

$$p v_i - \mu_i = z_{i1} CF_1 + \dots + z_{ik} CF_k + \eta_i \quad (1)$$

$$V - \mu = ZCF + \eta \quad (2)$$

The assumption of the equation is that unobserved random variables CF independent with error term η_i , expected value of CF equals zero and covariance of CF is an identity matrix. The solution of the set of equations is the factors and z is the loading matrix.

3.5.3 Determining the factors influencing of decision to purchase rice in the study area

In modeling a choice of consumer on whether to purchase a given rice variety or not; and a consumer is faced with more than two alternatives, the selection become multinomial. Therefore, in determining the factors influencing decision to purchase given rice variety in the study area the multinomial (MNL) logit model will be used similar to that developed by McFadden (1986). The formulation of the model equation is as shown below starting by equation (3).

$$P_A = \frac{\exp(u_i)}{\sum_{j \in A} \exp(u_j)} \quad (3)$$

Where,

A = A set of available alternative indexed $\{1, 2, \dots, N\}$

P = Probability of an individual choosing alternative i when present with set A

u_i = Scale values (strict utilities) which summarizes desirability of alternatives

According to McFadden (1986) the scale values are the function of attributes of the available alternatives and often interact with consumer's characteristics and features of the choice as whole.

In most of applications scale values are assumed to be additive in separable linear form as shown in equation (4).

$$u_i = \delta_{i1}\beta_1 + \delta_{i2}\beta_2 + \dots + \delta_{iK}\beta_K \quad (4)$$

Where,

δ = Measured attributes and characteristics

β = Coefficient of measured attributes and characteristics

As can be seen in equation (4) is the scale value is a utility associated with consumer i choosing outcome k . Therefore the equation can be written as a score function which can easily be converted into probability of consumer i choosing outcome k given the measured characteristics of the consumer and the product itself. Therefore the score function can be written as shown in equation (5).

$$A_i = f(k, i) = \delta_{i1}\beta_1 + \delta_{i2}\beta_2 + \dots + \delta_{iK}\beta_K \quad (5)$$

Now, for k possible outcomes, running $k - 1$ independent binary logistic regression in which among the outcomes one is chosen as a pivot and others are separately regressed against the chosen pivot outcome; to reach multinomial regression of k outcomes computations of can proceed as follows.

$$\ln \frac{P(A_i = 1)}{P(A_i = k)} = \delta_1 \beta_i$$

$$\ln \frac{P(A_i = 2)}{P(A_i = k)} = \delta_2 \beta_i$$

... ..

$$\ln \frac{P(A_i = k - 1)}{P(A_i = k)} = \delta_{k-1} \beta_i$$

Now exponent both sides we have,

$$P(A_i = 1) = P(A_i = k) e^{\beta_1 \delta_i}$$

$$P(A_i = 2) = P(A_i = k) e^{\beta_2 \delta_i}$$

... ..

$$P(A_i = k - 1) = P(A_i = k) e^{\delta_{k-1} \beta_i}$$

Given that the sum of all probabilities must equal to one, therefore we have the expression given below.

$$P(A_i = k) = 1 - \sum_{k=1}^{k-1} P(A_i = k) e^{\beta_i \delta_i} = \frac{e^{\beta_k \delta_i}}{1 + \sum_{k=1}^{k-1} e^{\beta_i \delta_i}}$$

Applying natural logarithm to the above expression the equation becomes as shown in equation (6) below.

$$M = \beta_0 + \sum_{k=1}^{k-1} \delta_i \beta_i \quad (6)$$

Equation (6) can be expanded to include variables that will be used specifically for this study as shown in equation (7) below.

$$M = \beta_0 + \delta_1\beta_1 + \delta_2\beta_2 + \delta_3\beta_3 + \delta_4\beta_4 + \delta_5\beta_5 + \delta_6\beta_6 + \delta_7\beta_7 + \delta_8\beta_8 + \delta_9\beta_9 + \mu \quad (7)$$

Where,

Variable	Description		
Age	δ_1	=	Age of the respondent
Sex	δ_2	=	Gender (1=female; 0=male)
Education level	δ_3	=	Years of schooling
Income	δ_4	=	Average monthly income
Marital status	δ_5	=	A dummy variable representing marital status (1=Married; 0=Not married)
Taste	δ_6	=	A dummy variable representing taste (1=very important; 0=not important.)
Aroma	δ_7	=	A dummy variable representing aroma (1=very important; 0=not important.)
Texture	δ_8	=	A dummy variable representing texture (1=very important; 0=not important.)
Cohesion	δ_9	=	A dummy variable representing (1=very important; 0=not important.)
Error term	ε	=	Stochastic error term

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents a thorough analysis of the study basing on its objective. The first subsection presents description of rice consumers' socio-economic characteristics in the study area followed by identification of important rice attributes considered by consumer in the study area and finally the chapter ends with a subsection presenting the factors influencing perception of decision to purchase rice in the study area.

4.2 Rice consumer's socio-economic characteristics in the study area

4.2.1 Socio-economic characteristics

In the study area there are three types of rice commonly sold in shops and markets including Mbeya rice, Morogoro rice and Shinyanga rice as shown in Table 4.1. These are the types of rice which are found in Morogoro urban and they have different characteristics or attributes which influence the choice of the consumer. To make analysis robust each characterization of rice consumers was made by grouping individuals under the rice type they strongly prefer and consumer and comparison using chi-square was made to see if there is a statistically significant difference between different types of rice.

Results from the study area shows 44% of the respondents being males and 56% females; among them 13% of males and 21% of females prefers to consume Mbeya rice, 23% of males and 13% of females prefer Morogoro rice while 9% of males and 23% of females prefer Shinyanga rice. As can be seen there is a high statistically significant difference between sex of the individual and preference of rice type. From the results it's advised to produce Mbeya rice since about 44% of both male and female consume it. This is due to different attributes present in the rice product like aroma and taste. Also, female prefer rice with quality attributes like Mbeya and Shinyanga due to different varieties present in the rice product.

In the study area 29% of the respondents had primary school education, 36% had secondary school education and 24% had post-secondary school education. 7%, 13% and 11% of individuals with primary, secondary and post-secondary school prefer Mbeya rice; while 10%, 12% and 8% prefer Morogoro rice and 13%, 12% and 5% prefer Shinyanga rice. At 10% level there is a statistically significant difference between education and individual preference on the rice type. Also it is observed that education level had influence on the preference of the type of rice. Primary level prefer much Shinyanga rice while secondary and post-secondary individuals prefer most Mbeya rice.

From that 61% of the respondents were married while 39% not married. Among them 11% of non-married and 23% of married prefers Mbeya rice, 12% of non-married and 23% of married prefers Morogoro rice and 17% of non-married and 15% of married prefers Shinyanga rice. It is observed from the study area most of non-married individuals prefer Shinyanga rice and married individuals mostly prefer Mbeya and Morogoro rice. Non married individuals are most young men who don't care much of their health and safety since they are energetic and don't have knowledge on the rice nutrients.

Similarly 29% of respondents were of age between 15-30 years, 36% were of age between 31-45 years, 24% were of age 46-60 years and 3% were above. However for two variables there is no statistically significant difference with preference of rice type.

Table 4.1: Social economic characteristics of rice consumers in the study area

Variables	Mbeya Rice	Morogoro Rice	Shinyanga Rice	Total	P-value
Sex					***0.004
Male	13%	23%	9%	44%	
Female	21%	13%	23%	56%	
Education level					*0.072
Primary	7%	10%	13%	29%	
Secondary	13%	12%	12%	36%	
Post-secondary	11%	8%	5%	24%	
Age					0.457
15-30 years	7%	10%	13%	29%	
31-45 years	13%	12%	12%	36%	
46-60 years	11%	8%	5%	24%	
60 and above years	3%	5%	3%	11%	
Marital status					0.339
Single	11%	12%	17%	39%	
Married	23%	23%	15%	61%	
Total	33%	35%	32%	100%	

Source: Stata output, 2017

4.2.2 Location of purchasing and ability to recognize rice type

As can be seen in Figure 4.1 about 58% of the respondents purchase their rice from main local markets located in various locations in Morogoro town; 33% of the respondents purchase from shops nearby their households, 8% purchase from super markets located in town center and remaining 8% acquires rice from other sources such as buying from farmer or cultivating the crop themselves. In Morogoro most of the rice is consumed in the local markets where there are different types of rice with different varieties which influence the choice of the consumer. Households nearby the market purchase rice product easily and are able to obtain different types of rice product with different attributes. Rice obtained from the supermarkets is usually processed and have different varieties in accordance to the preference of the consumer. Also rice product in Morogoro is found in the machines where there are

different types of rice with different varieties and attributes which is good for the health and safety of the user.

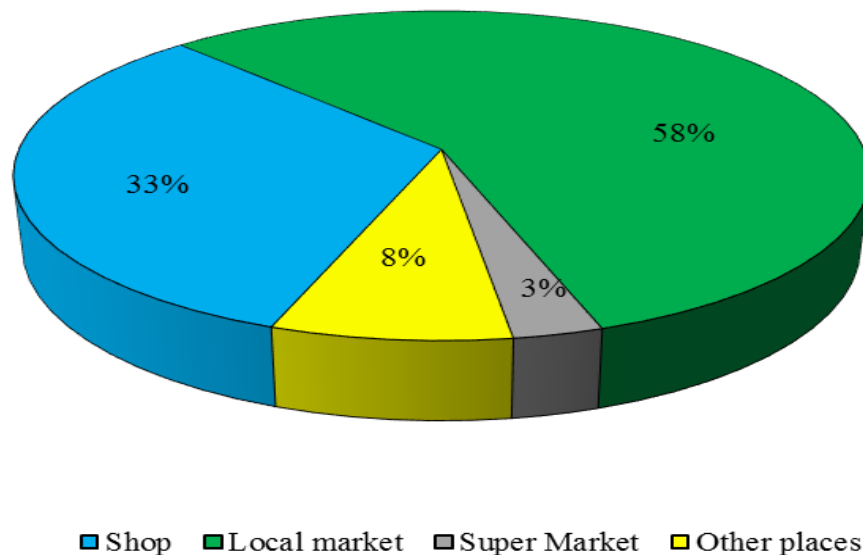


Figure 4.1: Location of purchasing rice

Source: Excel output, 2017

Also Figure 4.2 shows 57% of the respondents knew the characteristics of the rice type they preferred and were able to identify by themselves type of rice they preferred without assistance of anyone basing on physical characteristics while 43% knew the characteristics of rice they required but needed assistance to identify the rice type they wanted to buy at a purchasing point. In Morogoro most of the consumers are aware and are able to identify the type of rice product they prefer. Different individuals have knowledge of quality attributes of the rice product for their health, safety and dietary intake. Likewise some individuals needed assistance on the type of rice product they prefer as they had knowledge on the attributes or characteristics of rice but were not able to identify.

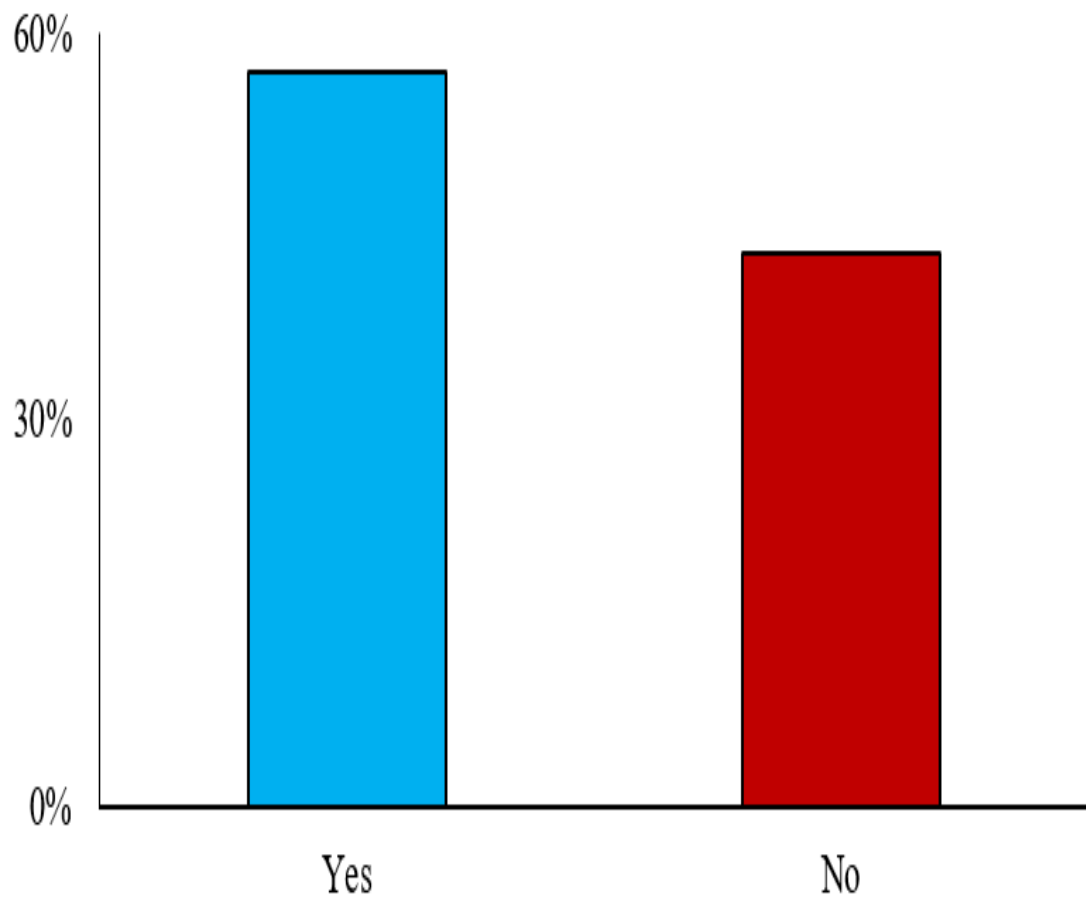


Figure 4.2: Ability to recognize rice types

Source: Excel output, 2017

4.2.3 Distribution of consumer's perception on important rice attributes

This subsection presents the summary of consumers perception on important rice attributes of aroma, taste, cohesion, texture and grain.

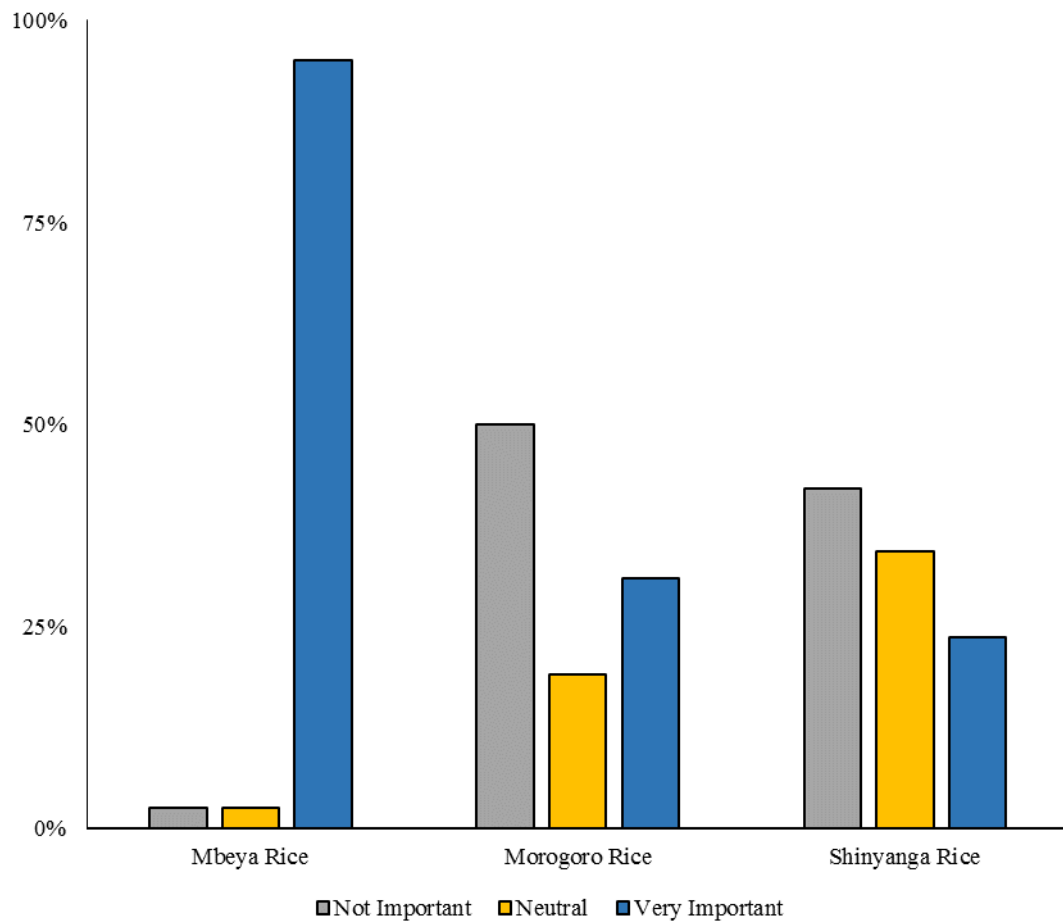


Figure 4.3: Consumer's perception on rice aroma (p-value 0.000)

Source: Excel output, 2017

Figure 4.3 shows consumer perception on rice aroma in the study area in which for consumers who prefer Mbeya rice 95% consider aroma as very important when purchasing rice while only 2.5% think it is not important and 2.5% are neutral on aroma. For consumers who prefer Morogoro rice 31% consider aroma as very important when purchasing rice while 50% think rice aroma is not important to them and 19% were neutral on rice aroma. Whereas for consumers who prefer Shinyanga rice 42% think aroma is not important while 34% are neutral and only 24% think aroma is very important to consider when purchasing rice. As the p-value of 0.000 shows, there is a high statistically significant difference among consumers of a particular rice type and perception of rice aroma in the study area.

Consumers of Mbeya rice have considered aroma as an important attribute which influence their choice and Mbeya rice has good aroma compared to Shinyanga and Morogoro rice. Also, consumers of Morogoro rice considered rice aroma as not an important attributes since they most prefer rice with long grain size and less stickness which favors their dietary intakes. Likewise for consumers who prefer Shinyanga rice they considered aroma as not an important attribute which favor their choice since they are more considerate on the taste of rice product which has major influence on choice. This has shown how consumers perceive aroma as an important attribute which influence their purchasing decision on rice product in the market.

Figure 4.4 shows consumers perception on rice taste as can be seen consumers of all rice type consider taste to be very important unlike in the case of aroma where there were mixed results.

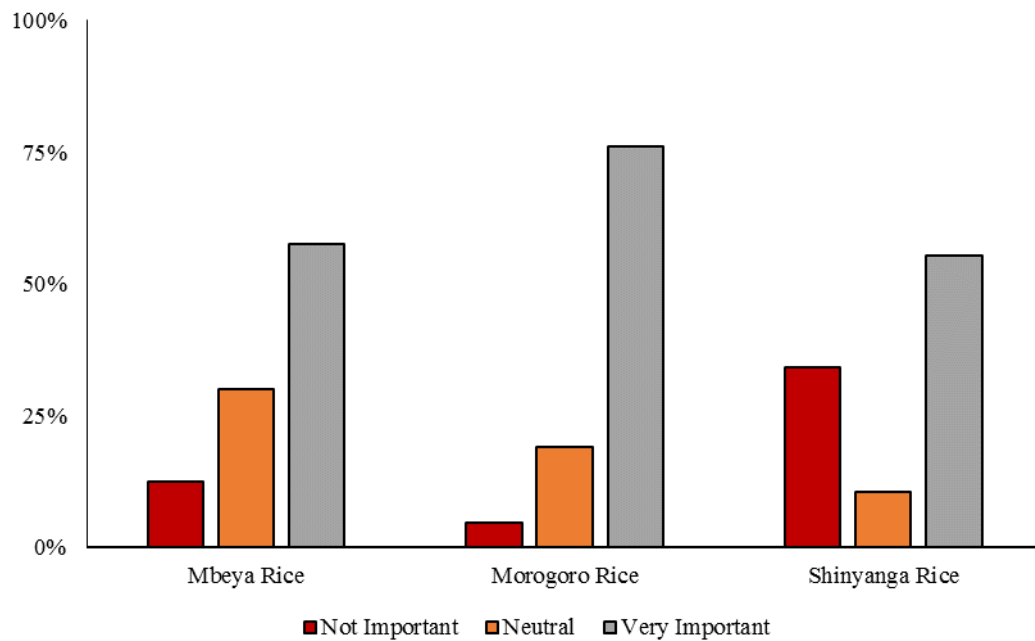


Figure 4.4: Consumer's perception on rice taste (p-value 0.002)

Source: Excel output, 2017

When making rice purchasing decision, consumers who prefer Mbeya rice 58% consider rice taste very important while 30% are neutral and 13% think rice taste is not important. Consumers who prefer Morogoro rice 76% think rice taste to be very important while 19% are neutral and only 5% think rice taste is not important. While, for consumers who prefer Shinyanga rice 55% think rice taste to be very important, 11% are neutral while 34% think rice taste is not important when making rice purchasing decision. Similar to rice aroma, a p-value of 0.002 shows there is a high statistically significant difference among consumers of a particular rice type and perception of rice taste in the study area.

Taste is considered an important attributes influencing purchasing decision of rice product in Morogoro urban. All the consumers have positive influence on the taste of rice product as it is considered to be very important compared to grain and texture. Consumer perception on rice taste is vital as it shows how rice taste is very important compared to grain and texture of rice product.

Figure 4.5 shows consumer's perception on rice grain when making purchasing decision. As can be seen within groups there is almost equal number of those who think rice grain is very important and those who think is not important. For consumers who prefer Mbeya rice 50% consider rice grain as important when making purchasing decision and 45% think rice grain is not important while only 5% are neutral. For Morogoro rice 40% consider rice grain is very important and 40% consider it not important while 20% are neutral. For consumers who prefer Shinyanga rice 37% consider rice grain to be very important while 32% think it is not important and other 32% think it is neutral. Between the groups the p-value of 0.054 shows, there is statistically significant difference among consumers of a particular rice type and perception of rice grain in the study area.

Consumers who purchase Mbeya rice considered rice grain as an important attribute when purchasing rice product in the market. Rice with long grain size is mostly preferred compared to rice with short grain since it is less stickiness and very attractive. Also in case of consumers who purchase Morogoro rice has considered

grain to be neutral as some prefer long grain size while others have no preference on grain size. This shows that consumers who prefer Morogoro rice are interested on other attributes like taste aroma and cohesion than grain size. Also in case of Shinyanga rice most of the consumers considered rice grain as an important attribute which influence purchasing decision of rice product in Morogoro urban market. Most of the consumers prefer Shinyanga rice because of its grain which is less cohesive compared to other types of rice.

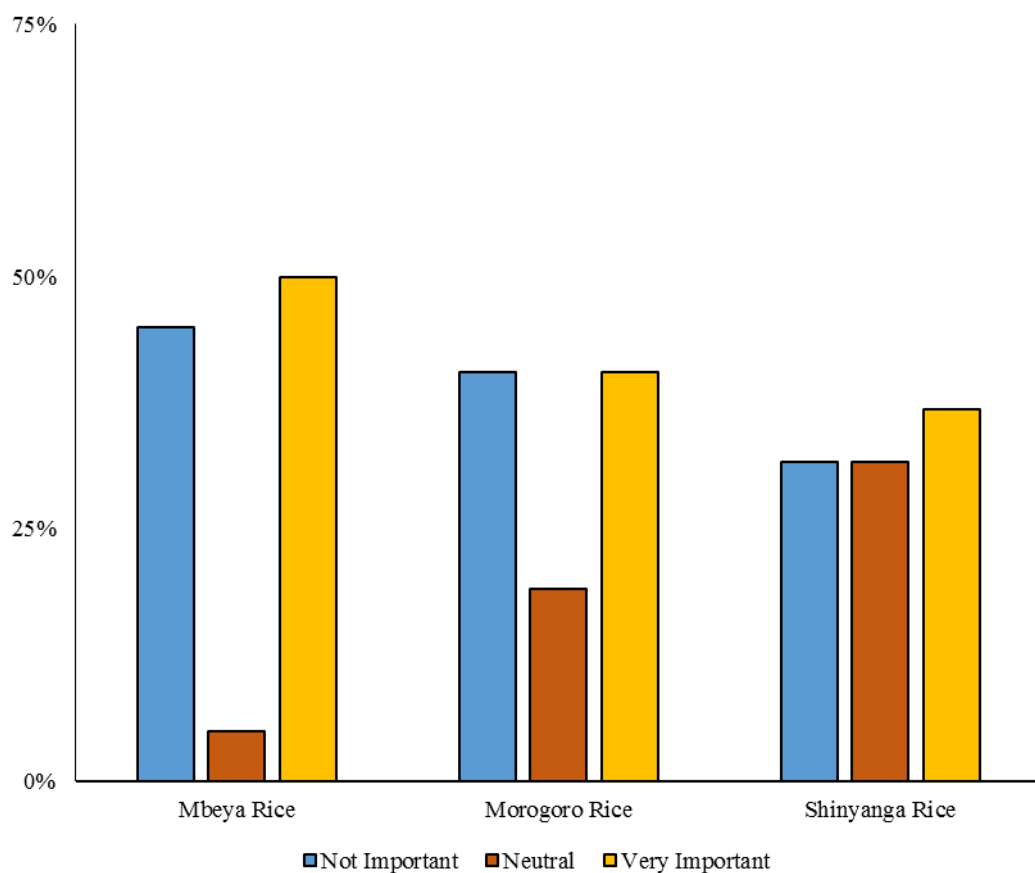


Figure 4.5: Consumer's perception on rice grain (p-value 0.054)

Source: Excel output, 2017

Figure 4.6 shows consumer's perception on rice cohesion when making rice purchasing decision. As can be seen consumers of all rice types perceive cohesion as very important where for consumers who prefer Mbeya rice 50% think cohesion is very important, 40% think cohesion is not important while 10% are neutral. While

67% of consumers of Morogoro rice think cohesion is very important, 26% think cohesion is not important and only 7% are neutral. For Shinyanga rice 47% of consumers think cohesion is very important when making purchasing decision, 34% think is not important while 18% are neutral. However the p-value of 0.275 shows, there is no statistically significant difference among consumers of a particular rice type and perception of rice cohesion in the study area.

From the results obtained shows that most consumers prefer Mbeya Shinyanga and Morogoro rice since is less cohesive. Cohesion is considered an important attribute which influence choice of rice product in Morogoro urban.

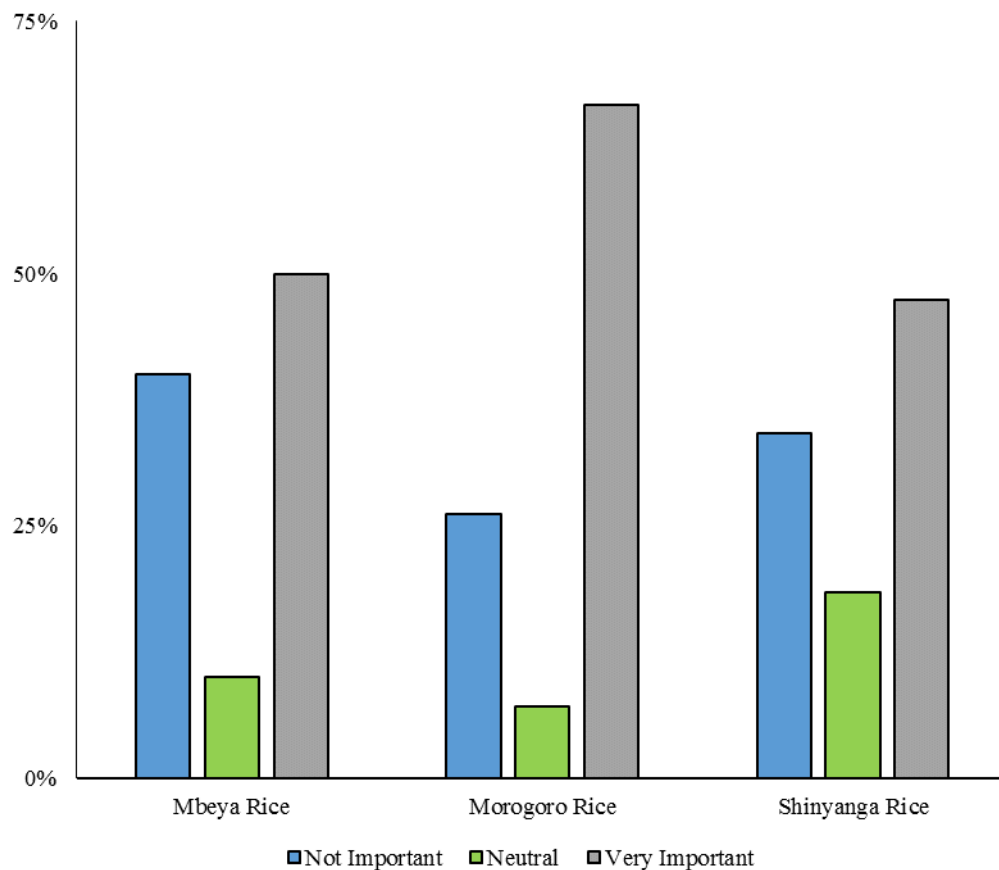


Figure 4.6: Consumer's perception on rice cohesion (p-value 0.275)

Source: Excel output, 2017

Figure 4.7 shows consumer's perception on rice texture in which unlike other attributes consumers of all rice types think, rice texture is not important to them when making rice purchasing decision. Consumers who prefer Mbeya rice 50% think rice texture is not important, 28% are neutral and 23% only think rice texture is important to consider. For consumers of Morogoro rice 60% think rice texture is not important, 24% consider it to be very important while 17% are neutral. Similar to results of rice cohesion the p-value of 0.608 shows, there is no statistically significant difference among consumers of a particular rice type and perception of rice texture in the study area.

From the results it reveals that most of the consumers considered rice texture as not an important attribute which influence purchasing decision of rice product. Consumers have put much emphasis on other attributes like taste aroma and cohesion and none on rice texture

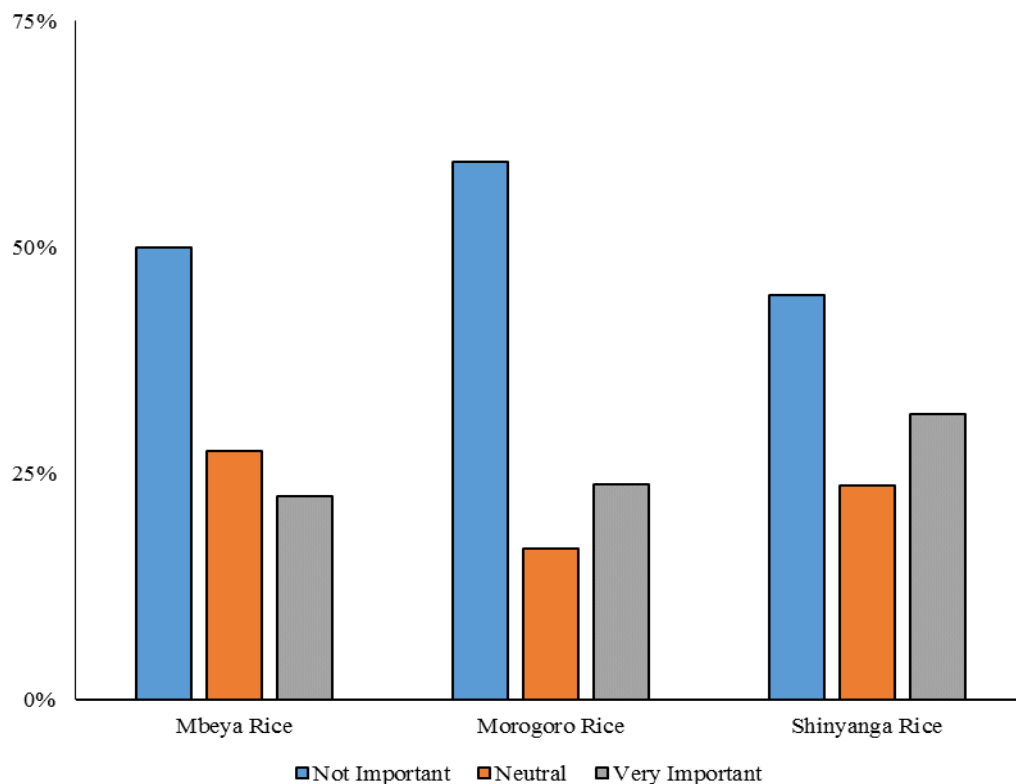


Figure 4.7: Consumer's perception on rice texture (p-value 0.608)

Source: Excel output, 2017

4.2.4 Identification of important rice attributes considered by consumer in the study area

In this analysis the identification of important rice attributes was conducted by using factor analysis model which was used to reduce number of mentioned attributes of rice to the smaller number of key dimensions. In the presence of five observed

variables of rice product only two or three unobserved variables might represent the others which can be regarded as the important attributes which influence the consumer to purchase rice product. Table 4.2 to Table 4.5 and Fig. 4.8 present the factor analysis results from the study. Table 4.2 presents the correlation matrix results which indicate the correlation between two or more rice attributes with aim of finding variables which are correlated with one another at minimum significant level. Significant results from this matrix are important first step of checking existence of correlation within the attributes which will allow proceeding to the level of identifying among the correlated rice attributes which among them can be grouped within one factor.

As can be seen in Table 4.2 there are number of variables which are correlated with different level of significance supported by the results in Bartlett's Test in Table 4.3 show that the rice attributes variables in the matrix are correlated significantly different from zero. From these results the identification of factor proceeds as shown in the results in Table 4.4.

Table 4.2: Correlations Matrix

		Correlations				
		Aroma	Taste	Cohesio	Grain	Texture
		n				
Aroma	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	120				
Taste	Pearson Correlation	0.268**	1			
	Sig. (2-tailed)	0.003				
	N	120	120			
Cohesion	Pearson Correlation	0.229*	0.584**	1		
	Sig. (2-tailed)	0.012	0.000			
	N	120	120	120		
Grain	Pearson Correlation	0.138	0.268**	0.354**	1	
	Sig. (2-tailed)	0.132	0.003	0.000		
	N	120	120	120	120	
Texture	Pearson Correlation	0.108	0.097	0.322**	0.494**	1
	Sig. (2-tailed)	0.239	0.292	0.000	0.000	
	N	120	120	120	120	120

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

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

Source: Stata output, 2017

Table 4.3: Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.621
Bartlett's Test of	Approx. Chi-Square	114.9
Sphericity	Degrees of freedom	10
	Significance level	0.000

Source: Stata output, 2017

According to statistical rule of thumb, the components with eigenvalue greater than one in Table 4.4 indicates the number of factors that should be retain in the analysis. Similarly the number of kinks in the Scree Plot also can be used to show number of factors in the study. As can be seen in Table 4.4 component 1 and 2 has eigenvalue

of 2.190 and 1.105 respectively; this value is greater than one and therefore can be concluded there and only two factors can be retained. This finding is supported by scree plot in Fig. 4.8 which shows two kinks in the plot.

The first component has a percent of variance of 43.803% while the second component has a percent of variance of 22.100% which make a cumulative percent 65.903%. This implies that the two components accounts for 65.903% of the variance.

Table 4.4: Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared			Rotation Sums of Squared		
	Loadings			Loadings			Loadings		
	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent
1	2.190	43.803	43.803	2.190	43.803	43.803	1.693	33.855	33.855
2	1.105	22.100	65.903	1.105	22.100	65.903	1.602	32.048	65.903
3	0.827	16.541	82.444						
4	0.518	10.363	92.807						
5	0.360	7.193	100.000						

Source: Stata output, 2017

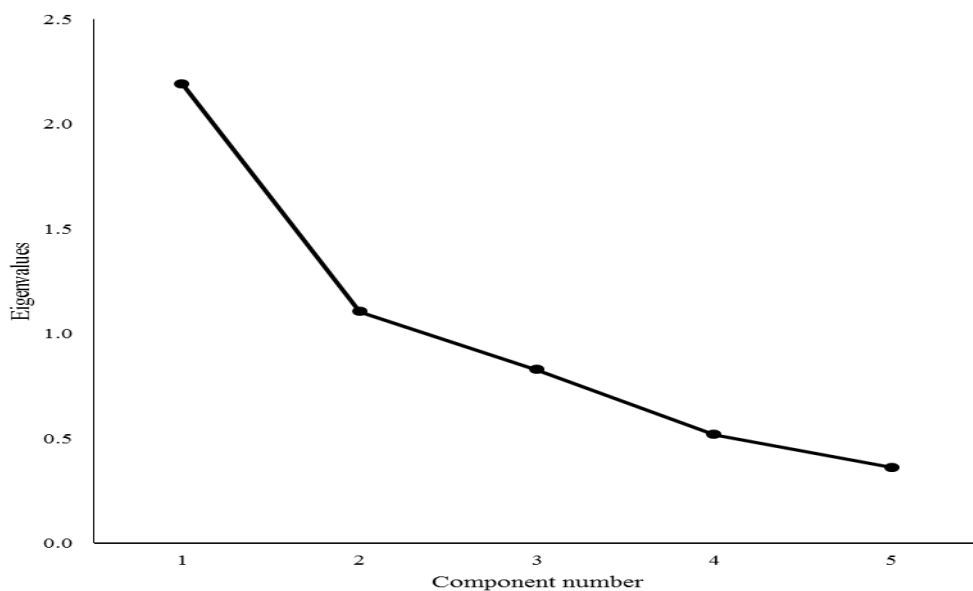


Figure 4.8: Scree Plot

Source: Excel output, 2017

From the initial data there were five attributes which were reduced into two factors. The categorization of each component under a certain group of variables can be performed by using the results in Table 4.5. In the rotated component matrix any value which loads more than 0.5 identifies the category. As can be seen in component 1 taste, cohesion and aroma loads higher than other items while in component 2 texture and grain loads higher than other items. Therefore as it can be seen component 1 is based on rice taste properties and component 2 based on rice physical properties. These results are similar to those found by Boxall and Adamociwz (2002) in Lagos Metropolis who revealed that taste and aroma are the most important factors which influence the consumers to purchase rice product in Lagos Metropolis. Most of the consumers in Metropolis Ghana prefer aroma and taste of rice product in making purchasing decision of rice product in the market.

Also Fiamohe *et al.* (2013) in Togo revealed that texture and cohesion are the important attributes which influence the consumers to purchase the rice product in Northern Province of Togo. Also in the southern province of Togo consumers are willing to pay for taste, ease to cook and whiteness of rice product. These are the important attributes which influence the purchasing decision of consumer in the northern and southern province of Togo.

Similarly, Lancon, *et al* (2003) found American consumers desired rice with specific cooking varieties and menu and processing characteristics. In Middle East they mostly preferred a long grain and well milled rice with strong aroma compared to the Europeans who tend to favor long grain with no scent. The Japanese on the other hand gave high significance on well-milled, very recently processed, short-grain Japonica rice. The well milled and long grain Indica rice, is preferred by consumers in Thailand (Lancon, *et al* 2003; Galawat and Yabe, 2010; Suwannaporn and Linnamenn, 2008).

Table 4.5: Rotated Component Matrix

Variables	Component	
	1	2
Aroma	0.630	-0.022
Taste	0.851	0.109
Cohesion	0.728	0.393
Grain	0.201	0.814
Texture	0.013	0.879

Source: Stata output, 2017

4.2.5 Factors influencing perception of decision to purchase rice in the study area

Table 4.6: Multinomial logit regression results

Number of observations	120.0
LR chi2(30)	145.1
Prob> chi2	0.000
Pseudo R2	0.551

Source: Stata output, 2017

The results in Table 4.6 indicate the multinomial logistic model of the factors influencing choice of rice product in the market. The goodness of the model has been shown by Chi-square Test. The Chi-square test was found to be 145.1 with P-value of 0.000. The model was statistically significant at ($P < 1\%$). The Pseudo R-square was 0.551 equivalent to 55.1%. This implies that independent variables explain the variation in dependent variable by 55.1%. However 44.9% of variation in dependent variable explained by other factors not included in the model. This result indicates that the specified explanatory variables were able to explain variation in choice of rice in study area.

4.2.6 Interpretation of the Marginal effect from Multinomial Logit Regression Model coefficients

We present the marginal effects from the multinomial logistic model of the factors influencing choice of Mbeya rice Morogoro and Shinyanga rice as elaborated in the table below. The estimated probabilities of consumer to purchase either Mbeya

Morogoro or Shinyanga rice are 20.29%, 61.54% and 18.17%, respectively. Of the nine examined explanatory variables, only seven were statistically significant, which are sex age income taste aroma cohesion and grain; also two independent variables were not statistically significance in explaining consumer choice on rice product attributes and these variables are education and marital status.

Table 4.7: Results of Marginal effect after mlogit of Mbeya Morogoro and Shinyanga rice

	Y= Pr(Rice=Mbeya) = 0.20296067			Y= Pr(Rice==Morogoro) = 0.61535751			Y= Pr(Rice==Shinyanga) = 0.18168182		
Variable	Mbeya			Morogoro			Shinyanga		
	dy/dx	Std. Err.	P>z	dy/dx	Std. Err.	P>z	dy/dx	Std. Err.	P>z
Sex (1= Female; 0=Male)	0.2043	0.1035	0.048**	-0.4710	0.1101	0.000***	0.2667	0.1103	0.016**
Age (1= Below 45 years; 0≥ 45 years)	0.4609	0.2031	0.023**	-0.3727	0.1878	0.047**	-0.0882	0.0912	0.334
Education (1=Primary school; 0=Otherwise)	0.1311	0.1452	0.366	-0.1660	0.1494	0.266	0.0350	0.1220	0.775
Marital status (1=Married; 0= Otherwise)	0.2074	0.1479	0.161	-0.1614	0.1618	0.319	-0.0460	0.1071	0.667
Monthly income in TSH	0.00767	0.0000	0.004**	0.00176	0.0000	0.559	-0.00255	0.0000	0.000***
Aroma (1= Very important; 0= Otherwise)	-0.3771	0.1648	0.022**	0.5386	0.1634	0.001**	-0.1615	0.0999	0.106
Aroma (1= Not important; 0= Otherwise)	0.5754	0.1551	0.000***	-0.3889	0.1980	0.050**	-0.1865	0.1251	0.136
Taste (1= Very important; 0= Otherwise)	0.7775	0.2032	0.000***	-0.7842	0.0985	0.000***	0.0067	0.2084	0.974
Taste (1= Not important; 0= Otherwise)	0.2414	0.1585	0.128	-0.1258	0.2058	0.541	-0.1156	0.2156	0.592
Cohesion (1= Very important; 0= Otherwise)	0.5204	0.2202	0.018**	-0.0539	0.2597	0.836	-0.4665	0.1409	0.001**
Cohesion (1= Not important; 0= Otherwise)	0.2770	0.1638	0.091*	0.3183	0.2294	0.165	-0.5952	0.1768	0.001**
Grain (1= Very important; 0= Otherwise)	0.2989	0.2000	0.135	-0.0538	0.2250	0.811	-0.2451	0.1308	0.061*
Grain (1= Not important; 0= Otherwise)	0.2887	0.2631	0.272	0.0270	0.2745	0.922	-0.3157	0.1456	0.030**
Texture (1= Very important; 0= Otherwise)	-0.0234	0.1872	0.900	0.2688	0.2160	0.213	-0.2453	0.1576	0.120
Texture (1= Not important; 0= Otherwise)	-0.1520	0.1651	0.357	0.0583	0.2396	0.808	0.0937	0.1846	0.612

**Significant at the 10% level*

***Significant at the 5% level*

****Significant at the 1% level*

Source: Stata output, 2017

As can be seen in Table 4.7 in the findings of Mbeya rice eight variables were statistically significant at different levels. Among socio-economic variables sex, age and income were significant while for rice attributes variables aroma, taste and cohesion were significant.

a) Sex

The coefficient of sex was positive and statistically significance at 5% level. This means sex had positive relationship with consumer choice of rice. The finding implies that female consumer is more likely by 20.43% to choose Mbeya rice in comparison to male respondents. Most of the female prefer rice with different attributes like taste and aroma which influence their choice. At this rate female are more likely to prefer Mbeya rice because of different varieties or ingredients which are present on the rice product. These results are similar to those of Peterson and Yoshinda (2004) on quality perceptions and willingness to pay for imported rice in Japan observed that female are more selective on the attributes of rice product due to the presence of different ingredients and varieties found on the product.

b) Age

It is observed that age has a positive effect on the choice of Mbeya rice. The study found that coefficient of age is positive and statistically significant at 5% level. This implies that for individuals with age below 45 years are more likely by 46.09% to prefer Mbeya rice compared to those above 45 years. Due to globalization young individuals have great knowledge on the attributes present on the rice product and today's market is dominated by consumer where consumer has the power to demand for quality attributes for his health safety and dietary intake. These results are similar to those of Demont *et al.* (2012) who observed positive impact of demographic factors on purchasing behavior of rice product in Senegal.

c) Income

For income variable as income increase by 1 Tanzania shillings the probability of preferring Mbeya rice is expected to increase by 0.00767 at 5% level of significance. This implies that as income increase an individual is more likely to prefer Mbeya rice

in order to attain maximum satisfaction. These results are similar with those of Kassali *et al.* (2010) on the analysis of determinants of rice in Osun state in Nigeria observed that income of the household head significantly influence consumers demand for rice. This means that the higher the income the higher the demand for rice in the market. This is due to growth of industrialization and urbanization which have provided an opportunity for most of the people to engage in productive activities hence income of most of the people increased. This has provided an opportunity for consumers to have more power in demand for different attributes of rice product for their safety health and dietary intakes.

d) Aroma

In regression for rice attribute variables; for aroma of rice individuals who think aroma is very important in making purchasing decision are less likely to prefer Mbeya rice at 0.05 level of significance holding other factors constant. This implies that consumers who considered aroma to be very important are less likely by 37.71% to prefer Mbeya rice compared to those who considered aroma to be not important. On the other hand for individuals who think rice aroma is not important are more likely to prefer Mbeya rice at 0.01 level of significance holding other factors constant. This implies that consumers who considered aroma to be not important are more likely by 57.54% to prefer Mbeya rice compared to those who considered aroma to be very important. These results are similar to those observed by Anang *et al.* (2011) in Tamale Metropolis Ghana who found out that rice attributes like taste and aroma are most preferred by consumers for their health and dietary intake. This shows that aroma and taste is one of the important attributes which influence the purchasing decision of the consumers in Tamale Metropolis Ghana.

e) Taste

For taste, individuals who think taste is very important were more likely to prefer Mbeya rice at 0.01 level of significance holding other factors constant. This implies that consumers who value highly taste are more likely by 77.75% to prefer Mbeya rice compared to those who do not value taste highly. Also these results are similar to those obtained from Diako *et al.*(2010) on analysis of determinants on consumer

purchasing behavior for rice in Malaysia were taste flavor and price significantly affect the choice of rice brands available in the market. This shows that Mbeya rice has good taste which influence consumer to purchase rice in Morogoro urban. Most of the consumers in Morogoro urban considered taste as an important attribute which influence the choice of rice product in the market.

f) Cohesion

For individuals who think cohesion is very important are more likely to prefer Mbeya rice at 0.05 level of significance holding other factors constant. This implies that for individuals who considered cohesion to be very important are more likely by 52.04% to purchase Mbeya rice compared to those who consider cohesion to be not important. On the other hand for individuals who think cohesion is not important are more likely to prefer Mbeya rice at 0.1 level of significance holding other factors constant. This implies that consumers who considered cohesion to be not important attribute on making purchasing decision are more likely by 27.70% to prefer Mbeya rice compared to those who consider cohesion to be very important. These results are similar to those found by Ehmke *et al.* (2008) shows that most of the Beninese consumers prefer rice with good taste flavor and less cohesive for their health and dietary intakes

As can be seen in Table 4.7 in the findings of Morogoro rice five variables were statistically significant at different levels. Among socio-economic variables sex and age were significant while for rice attributes variables aroma and taste were significant.

a) Sex

The coefficient of sex was negative and statistically significance at 1% level. This means sex had negative relationship with consumer choice of rice. The finding implies that female consumer is less likely by 47.10% to choose Morogoro rice in comparison to male respondents.

b) Age

It is observed that age has a negative effect on the choice of Morogoro rice. The study found that coefficient of age is negative but statistically significant at 5% level. This implies that for individuals with age below 45 years are less likely by 37.27% to prefer Morogoro rice compared to those above 45 years.

c) Aroma

In regression for rice attribute variables; for aroma of rice individuals who think aroma is very important in making purchasing decision are more likely to prefer Morogoro rice at 0.05 level of significance holding other factors constant. This implies that consumers who considered aroma to be very important are more likely by 53.86% to prefer Morogoro rice compared to those who considered aroma to be not important. On the other hand for individuals who think rice aroma is not important are less likely to prefer Morogoro rice at 0.01 level of significance holding other factors constant. This implies that consumers who considered aroma to be not important are less likely by 38.89% to prefer Morogoro rice compared to those who considered aroma to be very important. Similarly Tetteh *et al.* (2011) observed that aroma and taste are the important attributes which influence purchasing decision of rice product in Tamale Metropolis in Ghana.

d) Taste

For taste, individuals who think taste is very important were less likely to prefer Morogoro rice at 0.01 level of significance holding other factors constant. This implies that consumers who value highly taste are less likely by 78.42% to prefer Morogoro rice compared to those who do not value taste highly. Similarly Akaeze, (2010) observed imported rice in Nigeria is mostly consumed compared to locally produced rice due to its taste, cleanliness and grain shape. These attributes are mostly preferred by the fast food industries and restaurant service in their commercial activities.

As can be seen in Table 4.7 in the findings of Shinyanga rice six variables were statistically significant at different levels. Among socio-economic variables sex and income were significant while for rice attributes variables cohesion and grain were significant.

a) Sex

The coefficient of sex was positive and statistically significance at 5% level. This means sex had positive relationship with consumer choice of rice. The finding implies that female consumer is more likely by 26.67%% to choose Shinyanga rice in comparison to male respondents. Most of the female prefer rice with different attributes like taste and aroma which influence their choice. At this rate female are more likely to prefer Mbeya rice because of different varieties or ingredients which are present on the rice product. These results are similar to those of Basorun, (2009) who observed that sex of the consumer has huge impact on the choice of rice product as most of the female are selective on the attributes and quality of rice product for their health safety and dietary intake

b) Income

For income variable as income increase by 1 Tanzania shillings the probability of preferring Shinyanga rice is expected to decrease by 0.00255 at 1% level of significance. This implies that as income increase an individual is less likely to prefer Shinyanga rice in order to attain maximum satisfaction. These results are similar to those of Tomlins *et al.* (2005) who revealed that urban dwellers consume rice with different attributes due to their level of income and education. They favour different attributes based on their nutrient contents, dietary intake and safety of their health.

c) Cohesion

For individuals who think cohesion is very important are less likely to prefer Shinyanga rice at 0.05 level of significance holding other factors constant. This implies that for individuals who considered cohesion to be very important are less likely by 46.65% to prefer Shinyanga rice compared to those who consider cohesion to be not important. On the other hand for individuals who think cohesion is not important are less likely to prefer Shinyanga rice at 0.05 level of significance holding

other factors constant. This implies that consumers who considered cohesion to be not important attribute on making purchasing decision are less likely by 59.52% to prefer Shinyanga rice compared to those who consider cohesion to be very important. These results are similar to those of Asante *et al* (2013) who revealed that Ghanaian consumer mostly prefer imported rice due to absence of foreign material ease on cooking and less cohesive

d) Grain

For individuals who think grain is very important are less likely to prefer Shinyanga rice at 0.1 level of significance holding other factors constant. This implies that for individuals who considered grain to be very important are less likely by 24.51% to prefer Shinyanga rice compared to those who consider grain to be not important. On the other hand for individuals who think grain is not important are less likely to prefer Shinyanga rice at 0.05 level of significance holding other factors constant. This implies that consumers who considered grain to be not important attribute on making purchasing decision are less likely by 31.57% to prefer Shinyanga rice compared to those who consider grain to be very important. These results are similar to those found by Heinemann *et al.* (2005) in Japan who found that most of the consumers of rice product in Japan favor soft texture and grain size which initiated their purchasing decision of rice product. Likewise Jafar and Gorczyca (2008) observed consumers in Japan demanded different attributes and addition values in the product. The important attributes considered when purchasing rice product in Japan market are texture aroma color of rice and size of the grain.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

The general objective of the study was to analyze factors influencing consumer's choice on product attributed in Morogoro region. The study concentrated specifically on physical rice attributes of aroma, taste, cohesion, grain and texture. The study objectives were to describe rice consumers socio-economic characteristics in the study area, secondly to identify important rice attributes considered by consumers in the study area and determining the factors influencing perception of decision to purchase rice in the study area. The following are conclusions and recommendation of the study.

5.2 Conclusions

In a globalized market where most individuals are employed and level of income is high due to rapid growth of industrialization and urbanization food market are more consumer oriented where wealthy consumers have more power to demand for specific attributes in terms of health, safety and quality of the food. The marketing situation of rice product is more difficult where consumers decide on the type of rice product they prefer hence market of rice should be in accordance to the consumer needs and wants (Carr *et al* 2006). This will help to increase the supply of rice product and decrease the loss occurred in the rice value chain from the producer to the retailer. Consumers should be provided with the type of rice which they prefer due to their health safety and dietary intakes. Producers should employ different varieties which will increase the productivity of rice product in order to increase its marginal profit.

The findings from the analysis related to the first objective show that majority of consumer purchase their rice from local markets located in various points in town followed by small majority of other consumers who purchase from shops nearby their households. Moreover the findings related to this objective show that majority

number of consumers know the characteristics of rice they want and are able to identify rice variety they prefer.

Also, consumers are able to identify different attributes of rice product and most of the consumers are aware of the type of rice product they prefer in order to attain maximum utility or satisfaction. Each consumer has specific type of attributes which maximizes its utility or satisfaction and food market are dominated by consumer where consumer has the power to demand for quality attributes for his health and dietary intakes.

Moreover, for rice attributes in the study area significant number of consumers perceive aroma, taste cohesion and rice grain as very important attribute of rice; while for rice texture significant number of individuals perceive it not important attribute to them when making purchasing decision. This is observed from all types of rice whether Morogoro, Mbeya or Shinyanga whereby rice product with good taste aroma and long grain size are purchased highly in the market, shops and supermarket. Most of the consumers have recognized taste aroma cohesion and grain size as an important attribute which influence purchasing decision of rice product in the market shops and supermarkets.

The findings from the analysis related to the second objective show that from the factor analysis model all attributes can be reduced into smaller dimension of two factors which are important considered by consumers. The two factors can be grouped into first components of taste properties and second component of physical properties. This approach has enabled to identify which rice attribute loads higher than the other and it provide clear observation on which rice attribute has major influence on purchasing decision of rice product in the market, shops and supermarket

The findings from the analysis related to the third objective show that sex of the consumer influence significantly choice of particular rice variety in which females prefers Mbeya rice Morogoro and Shinyanga rice. This is due to the varieties present in Mbeya Morogoro and Shinyanga rice and also most of the consumers in Morogoro

perceive taste aroma and grain as an important attribute which influence purchasing decision of rice product in the market shops and supermarket.

Also income is another important factor that influence the choice of a given variety in which an increase in income favors consumption of Mbeya and Morogoro rice.. The growth of industrialization and urbanization has resulted to different individuals to engage in productive activities hence income of the people rises. An increase in income has made most of the people to prefer Mbeya and Morogoro rice due to its taste aroma and grain size. Taste aroma and grain is regarded as an important attribute which influence purchasing decision of the consumers in the study area.

Taste of rice favors consumption of Mbeya and Morogoro rice where consumer who value taste is regarded to purchase Mbeya and Morogoro rice than Shinyanga rice. This is due to Mbeya and Morogoro rice have nice taste compared to Shinyanga rice and also Mbeya is regarded as the best rice which have nice taste in Morogoro markets shops and supermarket

Also in the study area aroma favors consumption of Morogoro and Mbeya rice. Similarly aroma is perceived as an important attribute which favors consumption of Morogoro and Mbeya rice.

While rice cohesion and grain both significantly favors consumption of Shinyanga and Mbeya rice. In case of rice cohesion and grain most consumers prefer Morogoro and Mbeya rice due to its long grain and less stickiness which favors its consumption.

5.3 Policy Implications

Centering on the major findings of the study the following are recommendations

- i. Local markets and shop in Morogoro urban should priorities selling rice with better taste since Morogoro urban consumers strongly prefer taste higher than other attributes. Also market segmentation should put much emphasis on

middle income customers who had great influence on purchasing decision of rice product.

- ii. The players in Morogoro urban rice supply chain should supply smartly rice with strongly preferred attributes by mixing varieties of rice type which serves different consumers need since different consumers has different constrains such as income, gender and preference.
- iii. Government should provide knowledge to the producers or manufacturers through different Cooperative unions of agriculture like National Food Reserve Agency (NFRA), Agriculture Seed Agency(ASA) and Agriculture Inputs Trust Fund(AGITF)and through different Universities like Sokoine University of Agriculture in Morogoro, and Tengeru University of Agriculture in Arusha on the important attributes which influence purchasing decision of rice product and enact policy which will protect rice value chain from producers, suppliers and retailers in order to encourage productivity of rice product.

5.3.1 Limitation of the study

From the research study there are some limitations. For instance consumer choice is influenced by many attributes of rice product. It was very difficult to choose the main attributes to include in the study. From this study the attributes were based from the literature and market survey where different consumers of rice product were interviewed through focus group discussion on what attributes influence their purchasing decision. Most likely there are other important attributes which are not considered in this study which also influence consumer choice like flavor, cleanliness of rice and non-broken rice which has huge impact on purchasing decision of rice product. Therefore for further studies should also consider above attributes in their research findings.

Also due to the problem of limited time and resources the research has incurred it has provided results finding within the month of February and March. Therefore for further research studies should focus on the months of harvest where there are many

types of rice in the market with different varieties and attributes in order to provide precise outcome.

Similarly this study has been conducted on a small portion of the country which is Morogoro urban, hence for further studies it will be great to include vast portion of Tanzania especially on areas where the rice productivity and consumption is large like Shinyanga and Mbeya which has high productivity and Dar es Salaam which is the center for consumption in order to hear different opinions and ideas on the main attributes which influence purchasing decision of rice product in shops market and supermarket.

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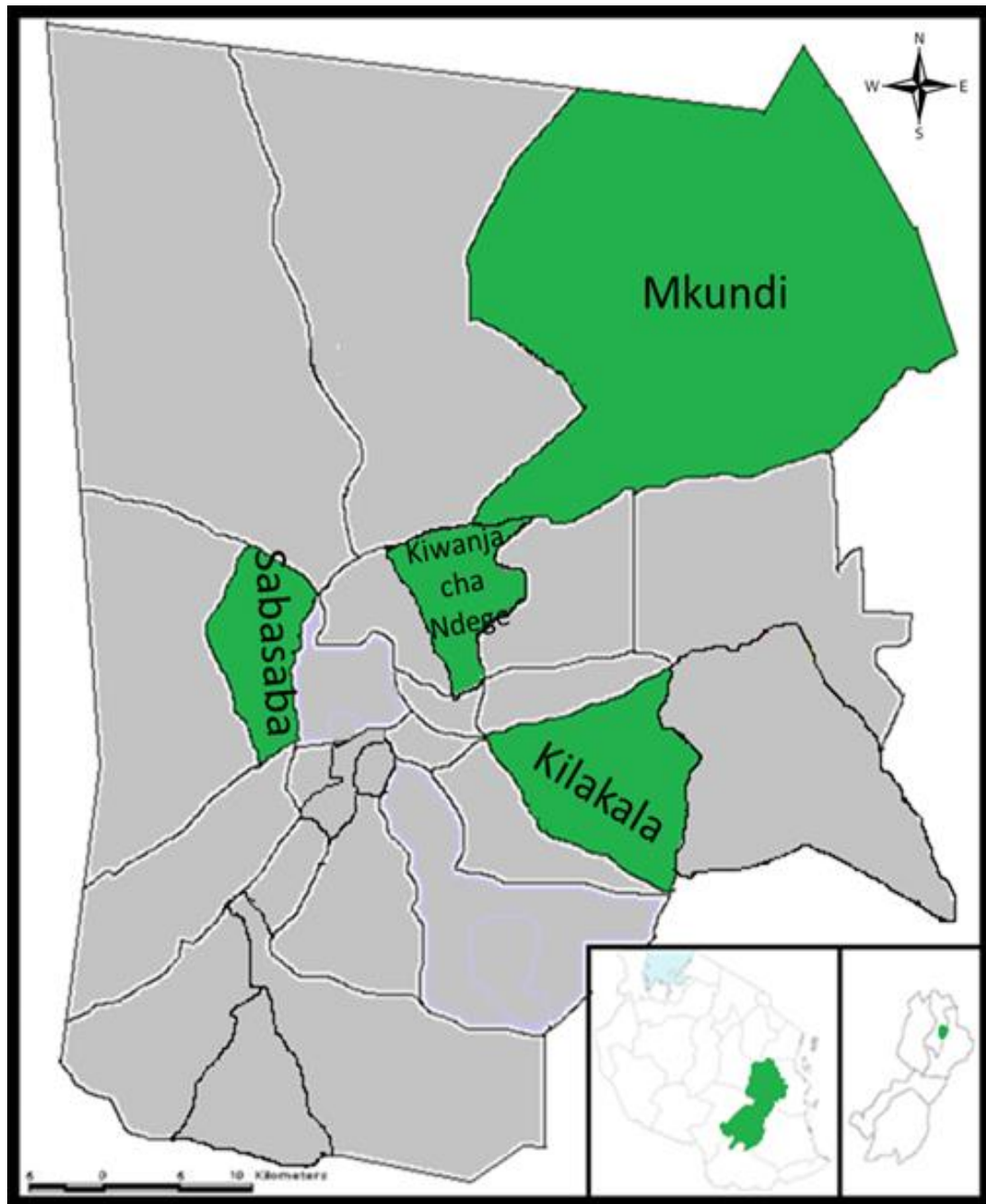
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APPENDIX

PPENDIX

PENDIX

A MAP OF STUDY AREA



A. Introduction

My name is Godfrey Ephraim Lauwo and currently pursuing my Masters of Science in Economics (MSc ECO) at Mzumbe University Morogoro main campus. One of the requirements is to carry out field work and write dissertation/thesis during the third semester of the study in partial fulfillment of this program. This is the questionnaire which you are humbly requested to respond on the analysis of consumer choice based attributes for rice in the market

Name of the interviewer..... Date of
interview..... Name of the respondent.....

Section B: Personal and household characteristics

- 1) How old are you?
a) 15-30 b) 30-45 c) 45-60 d) 60 and above ()
2. What is your marital status?
a) Single b) Married c) Widowed d) Divorced ()
3. What is your highest level of education?
a) Primary b) Secondary c) Graduate d) None ()
4. What is your main employment? ()
a) Government b) Self-employed c) Non-government d) Student e) None
5. What is your income level per month?
- . What is your income level per month?
- What is your income level per month?
- What is your income level per month?
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at is your income level per month?

SECTION C: Consumer purchasing behavior for rice

5) How often do you eat rice?

- a) Once a week b) 2 to 4 times a week c) Everyday d) Rarely ()

6) What type of rice do you like?

- a) SupaKyela b) Ifakara rice c) Mpanda rice d) Kilombero rice e) None
()

If none specify

7) Are you able to recognize whether this type of rice is the one you prefer?

- a) Yes b) No ()

8) Where do you purchase rice product?

- a) Shop b) Market c) Super market d) None ()

9) Please can you rank, (in the order of importance) the characteristics you consider when buying rice in general (please use the codes). Enter a ranking for each, with 1= most important, 2=second most important . . . and 3=least important

Taste Grain size Texture

Price Aroma

10) How is the taste, aroma, texture and cohesion of the rice product you like to purchase?

Taste a) Good b) Bad ()

Aroma a) Good b) Bad ()

Texture a) Tender b) Hard ()

Cohesion a) sticky b) Not sticky ()

11) What is the grain size of rice product you like to purchase?

a) Long b) Short ()

12) What is the price of rice product you like to purchase?

13) Does price affect your purchasing decision on the rice product you like?

3) Does price affect your purchasing decision on the rice product you like?

) Does price affect your purchasing decision on the rice product you like?

Does price affect your purchasing decision on the rice product you like?

Does price affect your purchasing decision on the rice product you like?

oes price affect your purchasing decision on the rice product you like?

a) Yes b) No ()

14) How do you perceive domestic produced rice and rice from other regions?

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.....