

**KNOWLEDGE AND PERCEPTIONS OF CONSUMERS ON SAFETY OF  
ORGANIC VEGETABLES IN TANZANIA: A CASE STUDY OF MOROGORO  
AND KINONDONI MUNICIPALITIES**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF THE MASTERS OF SCIENCE IN  
HUMAN NUTRITION OF SOKOINE UNIVERSITY OF AGRICULTURE.  
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## ABSTRACT

In the previous decades, there has been an upsurge of use of pesticides on food produces. Many consumers now perceive or are knowledgeable that consumption of organic vegetables is healthier than consuming their corresponding items. A cross sectional study was done to assess the awareness and perception of consumers regarding food safety in Morogoro and Dar es Salaam. A total of 200 participants half from each segment were interviewed using a constructed and pretested structured questionnaire. However, the analysis was done to 192 residents, half from each study segment. Data analysis was done through SPSS version 20. Scale liability was tested with Cronbach alpha. Descriptive statistics was conducted to assess knowledge and perception among respondents. Multiple regression analysis was conducted to determine factors that affected the consumers' choice and identify as well as the approaches used by them to avoid the consumption of unhealthy foods. The majority of participants (81%) perceived that organic vegetables had better taste than conventional vegetables. About 45.3% of the respondents perceived that organic vegetables were more attractive than conventional vegetables. Most of them (95.8%) perceived consumption of organic vegetables to be nontoxic than conventional vegetables. There was no significant difference ( $P > 0.05$ ) in perception of organic vegetables among age groups. To avoid consumption of foods that were perceived perilous, physical appearance was a common method used by most (52%,  $\beta = 0.493$ ) consumers compared to reading product labels (45.3%,  $\beta = 0.296$ ), asking product information (38%,  $\beta = 0.434$ ) and product tasting (26%,  $\beta = 0.146$ ). The low purchasing and consumption rates of organic vegetables were significantly different ( $P < 0.05$ ), affected by their perceived low shelf life ( $\beta = 0.108$ ), lack of uniqueness ( $\beta = 0.071$ ) and unavailability in the market ( $\beta = 0.032$ ). Most organic food growers (97%) needed an external participatory guarantee system for liable market so that producers and investors cooperate with organic growers for business-oriented aspects.

## DECLARATION

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

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Date

The above declaration is confirmed by;

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Date

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## **DEDICATION**

I am dedicating this work to my uncle Sprian Mugemuzi and to the memory of my beloved mother Winifrida Mkabuguju Kawemama, my father Kawemama Nsheigili who laid the foundation for my education and who shaped me into what I am today.

## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>ii</b>
<b>DECLARATION .....</b>	<b>iii</b>
<b>COPYRIGHT .....</b>	<b>iv</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>v</b>
<b>DEDICATION .....</b>	<b>vi</b>
<b>TABLE OF CONTENTS.....</b>	<b>vii</b>
<b>LIST OF TABLES.....</b>	<b>xii</b>
<b>LIST OF FIGURES.....</b>	<b>xiii</b>
<b>LIST OF APPENDICES.....</b>	<b>xiv</b>
<b>LIST OF ABBREVIATIONS AND ACRONOMYS .....</b>	<b>xv</b>
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Development of Organic Farming in Tanzania .....	2
1.2 World Organic Production and Economical Value .....	2
1.3 Problem Statement and Study Justification .....	4
1.3 Research Questions .....	5
1.3.1 Objectives .....	6
1.3.2 Overall objective.....	6
1.3.3 Specific objectives.....	6
<b>CHAPTER TWO .....</b>	<b>7</b>
<b>2.0 LITERATURE REVIEW .....</b>	<b>7</b>
2.1 Nutritional and Health Importance of Organic Vegetables .....	8

2.2 Standards for the Production, Storage and Transport of Organic Produces .....	8
2.3 Acquisition of Certificate of Organic Products in Developing Countries .....	9
2.4 The Influence of Internal Market of Organic Food in Tanzania .....	9
2.5 Certified Organic Farmers in Tanzania .....	10
2.6 Consumer Attitude and Behavior .....	11
2.7 Consumer Awareness of Food Safety .....	11
2.8 Methods Consumers Use to Avoid Consuming Food which they Perceive Unhealthy	12
2.9 Factors Affecting Consumers' Choice for Organic Vegetables .....	12
2.9.1 Causes of poor performance of food safety and organic agriculture .....	13
2.9.2 Strategies for strengthening food safety and organic agriculture in Tanzania .....	14
2.10 Participatory Guarantee System (PGS) .....	14
<b>CHAPTER THREE.....</b>	<b>15</b>
<b>3.0 METHODOLOGY .....</b>	<b>15</b>
3.1 Description of the Study Area .....	15
3.2 Study Design.....	16
3.3 Study Population .....	17
3.4 Sampling Techniques .....	17
3.5 Sample Size.....	18
3.6 Questionnaire Pre-testing and Administration.....	18
3.7 Statistical Analysis .....	19
3.8 Ethical Consideration .....	19
<b>CHAPTER FOUR .....</b>	<b>21</b>
<b>4.0 RESULTS AND DISCUSSION.....</b>	<b>21</b>
4.1 RESULTS .....	21



4.1.1 Socioeconomic and demographic characteristics of the farmers and consumers..	21
4.1.1.1 Sex of farmers and consumers .....	21
4.1.1.2 Education level.....	21
4.1.1.3 Age of the respondents .....	21
4.1.1.4 Income levels of consumers and farmers .....	22
4.1.1.5 Occupational of respondents .....	22
4.1.2 Awareness and perception of consumers on safety of organic vegetables in Morogoro municipality and Kinondoni Dar es Salaam.....	23
4.1.2.1 Age and perception among respondents .....	24
4.1.2.2 Perception and education level.....	25
4.1.2.3 Availability of organic vegetables at local market and perception among consumers.....	26
4.1.2.4 Occupation, perception and knowledge on organic over conventional vegetables.....	26
4.1.2.5 Sex, knowledge and perception of organic vegetables over conventional vegetables .....	27
4.1.2.6 Perception, knowledge about organic food from different socio- economic groups.....	28
4.1.2.7 Socioeconomic status and willingness to purchase organic vegetables .....	29
4.1.3 Factors that affect consumers' choice in consumption of organic vegetables .....	30
4.1.3.1 Uniqueness of organic vegetables.....	30
4.1.3.2 The cost of purchasing organic vegetables in Morogoro and Kinondoni markets .....	31
4.1.3.3 Shelf-life and availability of organic vegetables.....	31
4.1.4 Methods used by consumers to avoid consumption of unhealthy food.....	31
4.1.4.1 Reading food product labels.....	31

4.1.4.2 Product information .....	32
4.1.4.3 Looking at physical appearances .....	32
4.1.4.4 Tasting product quality .....	32
4.1.4.5 Socioeconomic status of consumers .....	33
4.1.5 The need of Participatory Guarantee System (PGS) .....	33
<b>4.2 DISCUSSION .....</b>	<b>34</b>
4.2.1 Socioeconomic and demographic characteristics of the farmers and consumers..	34
4.2.1.1 Sex of farmers and consumers .....	34
4.2.1.2 Age of the respondents .....	34
4.2.1.3 Education level.....	35
4.2.1.4 Occupational of consumers and farmers .....	35
4.2.2 Awareness and perception of consumers on safety of organic vegetables in Morogoro municipality and Kinondoni Dar es Salaam .....	36
4.2.2.1 Age and perception among respondents.....	38
4.2.2.2 Perception and education level.....	39
4.2.2.3 Availability of organic vegetables at local market and perception among consumers.....	39
4.2.2.4 Occupation, perception and knowledge on organic over conventional vegetables .....	40
4.2.2.5 Sex, knowledge and perception of organic vegetables over conventional vegetables.....	40
4.2.2.6 Perception, knowledge about organic vegetables from different socioeconomic groups.....	41
4.2.2.7 Socioeconomic status and willingness to purchase organic vegetables .....	41
4.2.3 Factors that affect consumers' choice in consumption of organic vegetables.....	42

4.2.3.1 Uniqueness of organic vegetables.....	42
4.2.3.2 The cost of purchasing organic vegetables in Morogoro and Kinondoni markets .....	43
4.2.3.3 Shelf-life of organic vegetables .....	43
4.2.3.4 Availability of organic vegetables .....	44
4.2.4 Methods used by consumers to avoid consumption of unhealthy foods.....	44
4.2.4.1 Reading food product labels.....	45
4.2.4.2 Product information .....	45
4.2.4.3 Looking at physical appearances .....	46
4.2.4.4 Tasting product quality .....	46
4.2.4.5 Socioeconomic status of consumer .....	47
4.2.4.6 The need of Participatory Guarantee System (PGS) .....	47
<b>CHAPTER FIVE .....</b>	<b>49</b>
<b>5.0 CONCLUSION AND RECOMMENDATIONS .....</b>	<b>49</b>
5.1 Conclusion .....	49
5.2 Recommendations .....	49
<b>REFERENCES.....</b>	<b>51</b>
<b>APPENDICES.....</b>	<b>67</b>

**LIST OF TABLES**

Table 1:	Socio-demographic characteristics of the studied population .....	23
Table 2:	Consumers perception and knowledge of organic vegetables over conventional vegetables .....	24
Table 3:	Perception on organic food and age category of respondents .....	25
Table 4:	Occupation, knowledge and willingness to buy organic vegetables over convectional foods .....	27
Table 5:	Socio-economic group, perception and knowledge.....	29
Table 6:	Multiple regression of the factors affecting the purchase of organic vegetables.....	30
Table 7:	Factors affecting the purchasing of organic vegetables .....	30
Table 8:	Multiple regression analysis of the methods used by consumers to protect themselves from consumption of unhealthy foods .....	31
Table 9:	Methods used by consumers to avoid consumption of unhealthy foods...	32

**LIST OF FIGURES**

Figure 1:	Top ten producers of organic products (tons) in the world by 2013.....	3
Figure 2:	Organic producers by region year 2013.....	4
Figure 3:	Education level and perception of organic vegetable food.....	25
Figure 4:	Availability of organic vegetables at local market.....	26
Figure 5:	Sex, knowledge and perception of organic vegetables over conventional vegetables .....	28
Figure 6:	Income per month and willingness to buy organic vegetables at a higher price .....	29
Figure 7:	Socio economic status and protection means from consumption of unhealthy food.....	33
Figure 8:	The percent of respondents who were in-need of PGS.....	34

**LIST OF APPENDICES**

Appendix 1:	Questionnaire .....	67
Appendix 2:	Consent Form.....	72

**LIST OF ABBREVIATIONS AND ACRONOMYS**

CI	Confidence Interval
DDT	Dichlorodiphenyltrichloroethane
EPOPA	Export Promotion of Organic Products from Africa
EUFIC	European Food Information Council
FAO	Food Association Organization
FiBL	Research Institute of Organic Agriculture
GMO	Genetically Modified Organisms
ha	Hectare
IFOAM	International Federation of Organic Agriculture Movement
NGO	Non-Governmental Organization
OA	Organic Agriculture
PGS	Participatory Guarantee System
RDA	Recommended Daily Allowance
SAT	Sustainable Agriculture Tanzania
SBS	National Bureau of Statistics
SEED	Sustainable Environment for Economic
SPSS	Statistical Package and Service Solution
TOAM	Tanzania Organic Agriculture Movement
TOFO	Tanzania Organic Foundation
TZS	Tanzania Shillings
UN	United Nations
WHO	World Health Organization
$X^2$	Chi square

## CHAPTER ONE

### 1.0 INTRODUCTION

Over the past two decades, there has been an increase in consumers' awareness and concern for safe, nutritious and high quality food. This is because food intake affects the wellbeing of every individual in health promotion and prevention of diseases (Robinson *et al.*, 2009). However, the food that is available today in different parts of the world is not safe; its consumption does not enhance health, and it does not guarantee nutrition security (Rodríguez *et al.*, 2011). Overuse of pesticides and fertilizers by farmers has resulted to land degradation that affects food production (Ruhl, 2013). Pesticides have been widely used in protecting crops against pest infestation; however, the amount of pesticide residues should be minimized to safe levels in order to ensure the supply of safe produce (Tulchinsky and Varavikova, 2014). There is a need to change some of the practices in the food production and distribution systems in order to ensure the production and supply of safe food (WHO, 2015). Therefore, to ensure the production and consumption of safe and nutritious foods, many producers and consumers have opted to use organic products.

Organic agriculture is a system for crops, livestock and fish farming that emphasizes on environmental protection and use of natural farming techniques (FAO, 2012). It is concerned with the food chain from farm to fork, and excludes the use of artificial products, such as genetically modified organisms (GMOs) and certain external agricultural inputs such as pesticides, veterinary drugs, additives and fertilizers (FAO, 2012). One comparative study has shown that most of the organic products have lower nitrate content, less pesticide residues, higher levels of vitamin C, phenolic compounds, omega-3 fatty acids and conjugated linoleic in milk produced by organically raised animals (Huber *et al.*, 2011).



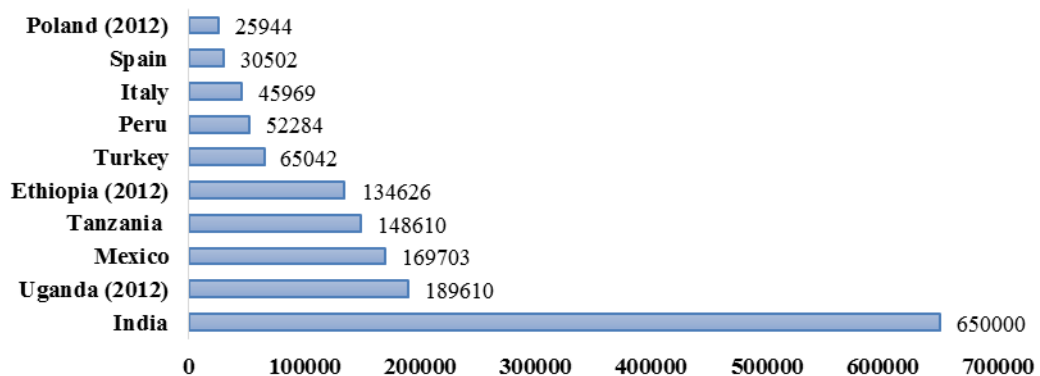
### **1.1 Development of Organic Farming in Tanzania**

Tanzanian farmers, both before and after independence, practiced low-input agriculture, known as *traditional farming*, using animal manure from ruminants and chickens (NOAF, 2008). In the year 2001, the government introduced interventions that aimed at improving food security, rural household income and social- economic development (NOAF, 2008). The intervention included the introduction of agricultural inputs such as intensive use of industrial fertilizers, pesticides and hybrid seeds (Larson *et al.*, 2016). In order to speed up early adopters of one of these agricultural inputs, the government introduced significant agricultural input subsidies. As a result of this, there was an improvement in agricultural production. For instance the yield of maize, which is the staple foods in the country, increased from 10 bags to 25 bags per acre. Also, the prices of agricultural inputs have increased with time. A report from Pesticide and Poverty report Tanzania (2006), showed an increase in the importation of pesticides from 500 tons to 2500 tons from the year 2000 to 2003, unfortunately the subsidies to farmers were reduced due to mismanagement and corruption, and this led to decreased production (Kato, 2013). With a decreased use of pesticides and fertilizers in the farms because of the high price, there has been an increase in the pest infestation in the fields (Ngowi *et al.*, 2008 and Nonga *et al.*, 2011). Moshi and Matoju (2016), assert that traditionally, there were several natural pests and disease control strategies, which acted as plant strengtheners such as comfrey, leucaena leucocephala, hot peppers ordinary wood ash, bar soap, onions and garlic. Also pest killers included pyrethrum, neem tree and pawpaw leaves and others, however, currently the use of traditional repellants has been replaced by modern chemicals (Paul *et al.*, 2009).

### **1.2 World Organic Production and Economical Value**

Organic farming has become one of the fastest growing sectors in agriculture, from 2005-2011, the total area that was used for farming increased from 3.6% to 5.5%, almost 31

million hectares (Willer *et al.*, 2007). Currently, 43 million hectares are used for organic farming (FiBL and IFOAM, 2015). Globally, there have been significant market increments of organic products. The market shares have increased three folds (from 14 billion euros in 2000 to 45 billion euros in 2010) (Willer *et al.*, 2007).



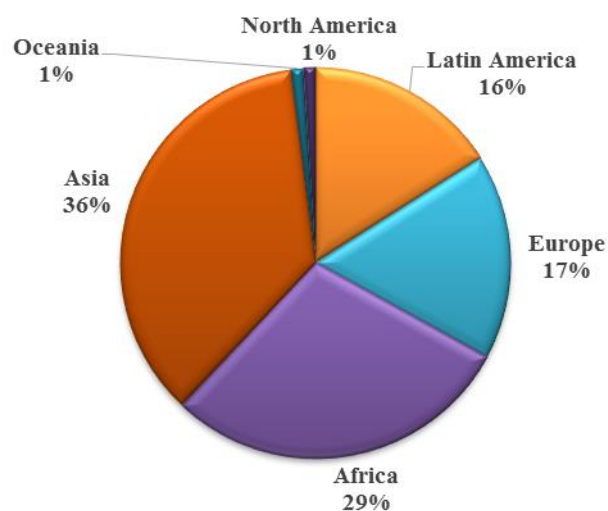
**Figure 1: Top ten producers of organic products (tons) in the world by 2013**

Source: Modified from FiBL-IFOAM (2013)

Worldwide, countries which are the leading producers of organic vegetables include India (650 000 tons), Uganda (189 610 tons) and Mexico (169 703 tons) by 2014 (Fig. 1). The leading continents for organic producers include Asia, Africa and Europe (Fig. 2). Tanzania is Africa's second producer of organic food after Uganda (Fig. 1). Worldwide the country was ranked the fourth in production and exportation of organic food (148610 metric tons), and this contributed to 9 898 960 euros (Rosinger, 2013). There has been an increase in the total area that is used for organic farming (from 72 188 ha in the year 2008 to 186 537 ha in 2012) (Arbenz *et al.*, 2016).

The growing consumer demand for organic food emerged mainly out of health and environmental concerns, which were intensified by food scandals and scares (Shepherd, 2005). However, since the start of the financial crisis in 2008, the growth has declined.

This may be explained by the higher prices for organic vegetables, which make them unaffordable to some consumers (Willer *et al.*, 2012).



**Figure 2: Organic producers by region year 2013**

**Source: Modified from FiBL-I OAM (2013)**

### 1.3 Problem Statement and Study Justification

Food safety is defined as handling, preparation, and storage of food in ways that prevent foodborne illness (Ovca *et al.*, 2014). It includes an important procedure to avoid potentially severe health hazards to human (FAO, 2004). Unsafe foods are likely to cause diseases that affect people in various ways, such as illness or production of toxins (FAO, 2004). It is not recommended to apply pesticides few days before harvesting to avoid health risks such as cancer and other diseases (Wanwimolruk, *et al.*, 2015). With increased exposure to pesticide residues, the demand and supply of organic products have increased worldwide (Schobesberger *et al.*, 2008).

Some of the negative effects of pesticides to nutrition and health which have been reported in different studies include neurotoxicity, which is accompanied by symptoms like headaches, tremor, malaise, lack of energy, muscle weakness, depression, anxiety, poor

memory, loss of co-ordination, dermatitis, convulsions, nausea, vomiting, indigestion and diarrhea (Kim *et al.*, 2016). Contamination of breast milk with pesticides increases the level of chlorine in milk by two to eight times more than non-contaminated milk with pesticides (Hussein *et al.*, 2012 and Martins *et al.*, 2013). The other effect includes development of paraplegia as a result of exposure to pesticides sprays without protective clothing (Hassine *et al.*, 2012). Basically, effects of exposure to pesticides, even at a minimum dose may result into the development of neuropsychological effects like chronic fatigue, peripheral neuropathy, neurobehavioral and cognitive abnormalities, and autonomic nervous system disturbances (Moy and Todd, 2014). With all these effects therefore, many consumers now perceive or are knowledgeable that consumption of organic vegetables is healthier than consuming their counterparts foods and are thus in a great demand to consume these foods (Lubote *et al.*, 2014). However, such a demand is significantly affected by lack of clear differences among conventional and organic vegetables (Lubote *et al.*, 2014). Therefore, the aim of this study was to assess consumers' perception/knowledge on organic vegetables, factors that affect the choice on consumption of organic vegetables and determining the methods used by consumers to avoid consumption of unsafe foods.

### **1.3 Research Questions**

- i. What were the current perceptions of consumers on organic vegetables?
- ii. What were the factors that affect consumers' choice in consumption of organic vegetables?
- iii. What were the methods used by consumers to avoid consuming the perceived unsafe foods?

### **1.3.1 Objectives**

#### **1.3.2 Overall objective**

The overall objective of the study was to assess the knowledge and perceptions of consumers on safety of organic vegetables in Tanzania.

#### **1.3.3 Specific objectives**

The specific objectives of the study were to:

- i. Assess awareness and perception of consumers on safety of organic vegetables in Morogoro Municipality and in Kinondoni Municipality in Dar es salaam.
- ii. Determine the factors that affect consumers' choice in consumption of organic vegetables.
- iii. Identify the methods used by consumers to avoid consumption of unhealthy foods.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

The main barrier for purchasing of organic vegetables is consumers' information available and the understanding of organic food products (Sangkumchaliang and Huang, 2012). Few, who are well informed about the importance of organic products, do not get the desired range of organic products on the local market (Sangkumchaliang and Huang, 2012). Currently, about 90% of the total demand for organic produce comes from the expatriate community and only 10% of organic customers consist of local people, mainly the health-concerned, elite and high caliber Tanzanians, thus having a good level of income (Valerian *et al.*, 2011). Many organic buyers believe that organic produce tastes better than conventionally grown produce, even if sensory evaluations have yielded inconsistent results (Zhao *et al.*, 2007).

Apart from organic food consumption to improve wellbeing, people are also insisted to adopt a healthier lifestyle like exercising adequately, limit alcohol intake, avoiding drug abuse and emotional wellbeing (Patton *et al.*, 2016). However, diet plays a key role, for example, increased intake of fruits, vegetables and less fat lowers the risk of cancer and heart diseases (Cavallo *et al.*, 2016). The protective and health promoting compounds in fruit and vegetables are being increasingly recognized by science, and it is widely agreed that an increased consumption of fruit and vegetables is the simplest way to improve one's nutrient intake and protect one's health (Vincente *et al.*, 2014).

In addition, organic food products market in Tanzania is not well developed because of the low level of awareness about organic products among the population, while access to the international market has been slowed down by the high costs of certification of the

products (Valerian *et al.*, 2011). Therefore, a variety of institutions and individual farmers scattered all over the country are engaged in uncertified organic production (Ton, 2013).

### **2.1 Nutritional and Health Importance of Organic Vegetables**

The nutrition and health benefits of organic food is based more on perception that organic vegetables are more nutritious and healthier than conventional vegetables (Zhao *et al.*, 2007). This has led to an increase of 30% of organic food industry in East Africa (Valerian *et al.*, 2011). The producers of organic vegetables have a strong belief that their products are superior to other types (Zhao *et al.*, 2007).

The other nutritional and health benefit of organic producers is higher antioxidant capacities, which prevent premature ageing; boost immune system; reduce risk of heart disease and prevent cancer (Brandt *et al.*, 2011; Hubera *et al.*, 2011 and Hughner *et al.*, 2007). However, there is no conclusive evidence suggesting the significant nutritional differences between organic and conventionally produced food (EUFIC, 2015).

### **2.2 Standards for the Production, Storage and Transport of Organic Produces**

Agricultural products that have been grown and processed according to uniform standards must be certified, verified by independent state or private organization (OFRF, 2015). Such certification includes annual submission of an organic system plan and inspection of farm fields and processing facilities (OFRF, 2015). Processing inspections include review of the facility's cleaning and pest control methods, ingredient transportation and storage, and recordkeeping and audit control. Organic vegetables are minimally processed to maintain the integrity of the food without artificial ingredients or preservatives (OFRF, 2015).

There are no universal standards for the production and handling of organically grown crops. Initially, organic standards were developed by private associations, entitling members to use the respective associations' organic brands and labels when marketing their products. The IFOAM is promoting organic agriculture internationally; it has established guidelines that have been widely adopted for organic production and processing (Vieira, and Hoppe, 2015). These guidelines are commonly considered as "minimum standards", leaving room for more detailed requirements, depending on regional or local situations. As organic agriculture has become more widespread, many developed countries have defined their own organic standards. The Committee on Food Labeling of the FAO/WHO Codex Alimentarius Commission adopted "Guidelines for the Production, Processing, Labeling and Marketing of Organically Produced Foods" in 1999. Generally, organic standards are usually similar as they derive from IFOAM's guidelines for organic production (FAO, 2001).

### **2.3 Acquisition of Certificate of Organic Products in Developing Countries**

Developing countries have increasingly become involved in organic agriculture even in the absence of large domestic demands. Producers or exporters of organic produce in developing countries who seek to sell their products in developed countries that have adopted organic standards and regulations will have to meet the rules established by the host country (FAO, 2001). This is done by certification bodies, which are under partnership agreement between different certification bodies. Unfortunately, in many developing countries, there are few countries with certified bodies (NOAF, 2008).

### **2.4 The Influence of Internal Market of Organic Food in Tanzania**

Production and marketing of organic products in Tanzania are still at the early stage (Stone, 2008). Efforts from the government of Tanzania to launch a campaign in the 1990s



aimed at promoting organic agriculture and related services (Valerian *et al.*, 2011). Generally, organic sector in Tanzania is predominantly export oriented, supported by development funding and aimed at improving incomes (Stone, 2008).

There are different factors which hinder organic product in the country (Valerian *et al.*, 2011). These factors include the higher prices of organic products caused by production cost as compared to conventional ones, lack of 'guaranteed sign' or 'organic labeling. Nevertheless, EPOPA (2004) agreed that the local market has not been well developed because of the low level of awareness about organic products among the population in Tanzania. In fact, access to the international market has been slowed down by the high costs of certification of the products (EPOPA, 2004). It is clear that a variety of institutions and individual farmers scattered all over the country are engaged in uncertified organic production due to the high price of inputs of agrochemical, and thus practicing organic farming without understanding (Sogn and Mella, 2007). According to EPOPA (2004) there are two methods, which are required to influence internal market. First is promotional effort to raise awareness among the local people so as to increase understanding in the nutritional and health importance of using organic products. The second is to make the products easily accessible to local people.

## **2.5 Certified Organic Farmers in Tanzania**

Efforts to assist the farmers on the decline of production and increase of price of organic vegetables have been made by different institutions, including NGOs. There has been launched sustainable, organic farming stakeholders and some cases of ecological farming initiatives. Some of the cases were based on practices and principles, which are based on organic farming (Stone *et al.*, 2011). The initiatives and movements of organic agriculture have contributed a lot today in knowing how to do certified Organic food production in

Tanzania. Stone *et al.* (2008) assert that traditional commodity crops which have been given emphasis includes coffee, tea, cocoa, cashew nuts and cotton, and some of non-traditional crops such as vanilla, sesame, herbs and spices which are often processed. Horticulturists are also adopting organic practices in order to produce tropical fruit and vegetables, both fresh and dried, for the domestic and international markets. Different products have been certified by as organic by external certifiers such as IMO, Ecocert, KRAV, Soil association and Bio-inspector (NOAF, 2008).

## **2.6 Consumer Attitude and Behavior**

Consumer behavior is a complex pattern and is sophisticated for market research (Peter and Olson, 2008). It consists of ideas, feelings, experiences, with the addition of environmental factors such as ads, prices and comments (Peter and Olson, 2008). This is so dynamic because of the change of ideas, perceptions and activities of individual consumers or as a group in whole. Therefore, it should be understood that the current perception over specific product might not be necessary perceived the same in future due to changes in knowledge, experiences and other environmental factors.

## **2.7 Consumer Awareness of Food Safety**

Consumers' understanding, knowledge, old age and high levels of education on food safety may be considered useful in reducing food borne illnesses (Nesbitta *et al.*, 2014 and Bektas *et al.*, 2011). Thus, increasing consumers' knowledge and awareness on food safety through informative campaign will be beneficial. Moreover, levels of education and welfare can be improved through mass media such as, television, radio and newspaper (Ergönü, 2013). For example, in Thailand as elsewhere (Sangkumchaliang and Huang, 2012), lack of consumer knowledge about the specificities of organic agriculture, and the criteria covered by the organic label, can be key issues hampering the development of the

demand for organic vegetables .Therefore, consumers who have never heard of ‘organic’ or who are not aware of which labels truly indicate organic products are not likely to purchase them.

## **2.8 Methods Consumers Use to Avoid Consuming Food which they Perceive**

### **Unhealthy**

The trends in final food demand show that the concept of food has undergone a radical transformation in the recent years to the point of assigning to food an important role in the maintenance of health, on psycho-physical well-being and prevention of certain diseases, in addition to its nutritional and sensory properties. . Today foods are not only intended to satisfy hunger and to provide necessary nutrients for humans, but also to prevent nutrition-related diseases and improve physical and mental well-being of the consumers (Azzurra and Paola, 2009).

Consumers always use food labeling to identify the different information about the food to state the nutrition information, diet and Health (Serena, 2015). However, in developing countries, the use of food labeling is less common, although some of the producers try to label their products. Consumers have less trust on labeled foods. Other consumers in developing countries believe that labeling increases price of the product (Bosman *et al.*, 2013), while others lack the time and interest to read food labels (Lagerkvista *et al.*, 2014).

## **2.9 Factors Affecting Consumers’ Choice for Organic Vegetables**

Attitudes about alternative food production practices on the importance of food production practices are important to consumers to identify that food is organic, not processed and locally grown. Pelletier *et al.* (2013) assert that there is little evidence available on the

relationship between preferences for organic, local, sustainable, and non-processed and dietary quality.

To identify effective nutrition intervention strategies, which lead to improvements in human health dietary intake, is a national and international priority and requires a comprehensive understanding of the various influences on food choices. Although a variety of influences on dietary intake have been identified in different studies, investigation, identifying additional predictive factors such as macro system influences like marketing, culture and values, food systems and individual and developmental factors for example developmental, biological, psychological/psychosocial are required (Robinson *et al.*, 2009).

Higher price for organic vegetables is one of the factors that reduce the number of consumers who consume this kind of produce. Islam (2013) reported that organic vegetables were priced about 69% higher than conventional vegetables. This was not necessarily due to the demand for organic vegetables. McLendon (2010) suggested that the production of organic vegetables costs approximately 30% more due to the fact that organic farms are smaller than conventional farms; they yield less and cost more for pest control. Part of the price differential is also due to higher margin. Lukic (2011) concluded that higher prices for organic vegetables are due to higher input cost and higher margin.

### **2.9.1 Causes of poor performance of food safety and organic agriculture**

There is a poor understanding of food safety and health effect of organic vegetables. Limited research has been done to show the different nutritional content of organic food and conventional vegetables produced. A consumer does not really differentiate their nutrition and health difference (Azadi and Ho, 2010). Nevertheless, measures to raise

consumer awareness for organic vegetables in Tanzania and food safety are low. A lot of efforts are required to boost organic vegetables in Tanzania. Therefore production and processing, market development, research and education, policy and legislation, standards and certification and institutional development are required (Stone *et al.*, 2008).

### **2.9.2 Strategies for strengthening food safety and organic agriculture in Tanzania**

In order to strengthen food safety and organic agriculture in Tanzania, different strategies are needed to be taken into an account. The strategies should mainly concentrate on the process of food value chain such as in food production, processing and market areas, and food policy matters such as education, institutional development, legislation, standards and certification (Stone *et al.*, 2008).

### **2.10 Participatory Guarantee System (PGS)**

According to IFOAM (2015), "Participatory Guarantee Systems (PGS)" as locally focused quality assurance systems. They certify producers based on the active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange. Within the PGS farmers who are actively engaging with organic production help them to certify their produce by certification bodies, as its certifications are associated with higher fees (Dimitri and Dettmann, 2012). Establishing the PGS with organic growers is much important for the success of small-scale farmers, due to better support systems and establishing networks among them (Hughner *et al.*, 2007). The history of PGS is much longer, although it was not called that way; it was used to verify the quality of organic products. The oldest one was that of France which started its activities in 1972 (Kirchner, 2014).

## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1 Description of the Study Area

Morogoro Region is located about 190 km west of Dar es Salaam. It is situated on the slopes of Mountain Uluguru and covers an area of 260 km<sup>2</sup> (UN-HABITAT, 2009). It lies at the crossings of longitudes 37° 40' 0" East of the Greenwich Meridian and latitude 6° 49' 0" South of the equator. Morogoro Municipality has a population of 315 866 on the ratio of 52.15 percent women (164 166) and 47.85 percent men (151 170), and the growth rate is 4.7 percent per annum (NBS, 2012).

Administratively, the district is divided into twenty nine (29) wards namely; Bigwa, Kichangani, Kihonda, Kilakala, Mzinga, Mlimani, Kingolwira, Mafiga, Mazimbu, Mbuyuni, Boma, MjiKuu, MjiMpya, Mwembesongo, Sabasaba and Sultan Area. Others are Uwanja cha Ndege, UwanjawaTaifa, Chamwino, KihondaMagorofani, Lukobe, Mafisa, Tungi, Mkundi, Mindu, Magadu, Kauzeni, Kingo, and Luhungo (NBS, 2012). About 10 percent of the current population includes civil servants and those employed by institutions and industries, while 50 percent of the population depends on the agricultural sector as its major economic activity (UN-HABITAT, 2009).

The main agricultural cash crop grown in the municipality is sisal while food crops include maize, rice, vegetables and fruits. The main income-generating activities include livestock keeping, mining, charcoal making and business. Municipality's average per capita income is estimated to be 130 000 Tanzanian shillings (UN-HABITAT, 2009). The main ethnic groups are Luguru, Sagara, Kaguru, Ndamba and Pogoro.

The average daily temperature is  $30^{\circ}\text{C} \pm 5^{\circ}\text{C}$ . Normally the highest temperature occurs in November, December and January during which the mean maximum temperatures read  $33^{\circ}\text{C}$  and the minimum temperatures are in June, July and August when the temperatures drop down to  $16^{\circ}\text{C} \pm 5^{\circ}\text{C}$ . The mean relative humidity is about 66 percent and drops down to 37 percent during dry season. The average total annual rainfall ranges from 821 mm to 1505 mm. March to May is the time for long rains whereas by short rains occur between October and December of each year (NBS, 2012).

Kinondoni Municipality is situated in Dar-es-Salaam, and its geographical coordinates are  $6^{\circ} 47' 0''$  South,  $39^{\circ} 16' 0''$ . East is the northernmost of the three municipalities in Dar es Salaam Tanzania the others being Temeke (to the far Southeast) and Ilala (downtown Dar es Salaam). To the east is the Indian Ocean, to the north and west, the Pwani Region of Tanzania. The area of Kinondoni is 531 km<sup>2</sup>. The latest population census of 2012 showed that, Kinondoni had a total population of 1 775 049 to whereas 914 247 were females and 860 802 were males (NBS, 2012). There were 446 504 households in Kinondoni with the average of four people per household. Administratively, Kinondoni municipality is broken into four divisions with 27 different wards and 113 sub-wards. According to NBS (2012), Kinondoni municipality had the following wards; Bunju, Goba, Kawe, Kibamba, Kigogo, Kijitonyama, Kimara, Kinondoni, HananasifKunduchi, Mabibo, Magomeni, Makuburi, Makumbusho, Makurumula, Manzese, Mbezi, Mburahati, Mbweni, Mikocheni, Msasani, Mwananyamala, Mzimuni, Ndugumbi, Sinza, Tandale and Ubungo.

### **3.2 Study Design**

This study used a cross-sectional design at which data were collected once in time. According to Kothari (2004), cross-sectional design is considered to be favorable – as it is inexpensive, flexible, minimizes bias, and maximizes reliability and analysis.

### **3.3 Study Population**

The study population comprised of farmers and buyers who were involved in the shopping of food products from the market. All adult farmers (people aged above 18 years old) who were willing to be involved in this study were involved, and they were given with a consent form to sign for their affirmation. Those who were not willing to participate in this study could not be involved. The other involved people in this study were food buyers who were neither involved in farming activities. More than 50% of the involved population in this study were farmers who were directly involved in farming activities. The least population was self-employed in non-farm activities; these were neither employed in farming activities nor other formal sectors. About half of the involved people in this study had primary education level. Further, more than 70% of the involved population had an average income of less than 500 000 TZS per month.

### **3.4 Sampling Techniques**

The constructed checklist was used for selecting the wards purposively, according to their socioeconomic activities. More than half of respondents in Morogoro Municipality were selected purposely – as were directly involved with organic farming. Such selection was purposely conducted, in order for them to view their success and challenges emanating from growing of organic vegetable in Morogoro. While in Kinondoni were selected by consideration of the huge market of organic vegetables.

The covered wards in Morogoro Municipality were Bigwa, Kichangani, Mzinga, Mlimani, Kingolwira and Mwembesongo. Others in this municipality were Mafisa, Tungi, Mkundi, Mindu, Magadu, Kauzeni, Kingo and Luhungo. The covered wards in Kinondoni Municipality were Bunju, Goba, Kawe, Kibamba, Kigogo, Kijitonyama, Kimara, Kinondoni, HananasifKunduchi, Mabibo, Magomeni, Makuburi, Makumbusho,



Makurumula, Manzese, Mbezi, Mburahati, Mbweni, Mikochei, Msasani, Mwananyamala, Mzimuni, Ndugumbi, Sinza, Tandale and Ubungo. Most of the involved wards in Morogoro municipality were the ones that had organic farmers groups being established by SAT as a pilot area for Participatory Guarantee System (PGS).

### 3.5 Sample Size

Estimation of the sample size was adopted as described by Bartlett *et al.* (2001) and Kothari, (2009) from the following formulae:

$$N = \frac{(Z^2 * P * (1-P))}{D^2}$$

Whereas;

N = estimated sample size,

Z = Confidence interval (1.96),

D = Precision level (acceptable error = 0.05) and

P = Estimated prevalence of people involved in production and consumption of organic food in Morogoro urban and Kinondoni Municipality, which were not known.

Therefore, this study estimated the prevalence at 50%.

Thus,  $N = \frac{(1.96^2 * 0.5 (1-0.5))}{(0.05)^2} = 384$  respondents.

Because of the limited resources, only 200 respondents were involved, however, analysis was done to 192 respondents who completed the study. Of the analyzed sample, half of them were Kinondoni respondents and the others were from Morogoro respondents.

### 3.6 Questionnaire Pre-testing and Administration

The structured questionnaire was constructed to assess consumer perceptions of organic food safety, to assess consumer awareness of nutritional and health effects resulted from

dietary consumption of convectional crops and to determine the factors that affect consumers on purchasing of organic vegetables. Before data collection, the questionnaire was pre-tested to farmers at Mindu Ward through face-to-face interview. The Necessary changes were incorporated before its final administration that included construction of an open-ended questions to respondents and simplifying questions that seemed to be difficult to be answered by respondents. Two enumerators were trained on how to collect data by using a pre-tested questionnaire.

### **3.7 Statistical Analysis**

The data were cleaned, coded, summarized and organized to facilitate data analysis. Data analysis was done using the Statistical Package and Service Solution (SPSS) for Windows version 16.0 (SPSS, Inc, Chicago, IL, USA). Before further data analysis, liability of the scale was tested with Cronbach alpha that was obtained to be 0.789. Descriptive statistics such as frequencies, percentages and Chi square ( $X^2$ ) were computed to determine relationship among variables using separation of means. Willingness to buy organic vegetables and approaches used by consumers to avoid consumption of unhealthy foods were independent variables. Outcome variables included education levels, income and occupation levels of respondents. Consumer awareness and perception was analyzed through descriptive statistics. Multiple regressions analysis was used to determine the factors affecting consumer's choice in consumption of organic vegetables.

### **3.8 Ethical Consideration**

Permission was sought from Sokoine University of Agriculture and from the Directors of both municipalities to conduct the study in the selected wards. Ward Executive Officers and Streets/Villages Chairpersons were also consulted to facilitate the study. The objectives of this study were explained to each participant before his or her enrollment. Those who were willing to participate signed a form to affirm their consent.

Confidentiality of participants was ensured by assigning an identification code to each subject. No harm to the participant was rendered. Subjects were free to drop out from this study at any stage without fear of retribution.

## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1 Results**

This chapter presents the findings and observations of the study of consumers' attitude and perceptions of safety of organic vegetables in Kinondoni and Morogoro municipalities. 200 participants were involved in this study, however, due to respondent drop out, some respondents could not complete answering the questionnaire. Finally, the analysis was conducted with 192 respondents with half of them from each study segment.

##### **4.1.1 Socioeconomic and demographic characteristics of the farmers and consumers**

###### **4.1.1.1 Sex of farmers and consumers**

The socioeconomic and demographic characteristics of the respondents are indicated in Table 1. The results showed that, more than half (57.8%) of the interviewed respondents from both sites were females, while males were only 42.2%.

###### **4.1.1.2 Education level**

About 7.3% of the respondents had no formal education while the least had undergone formal education. The highest attained education level was primary with 50% of respondents. The results showed that only 15.6% of the formally educated people achieved college education.

###### **4.1.1.3 Age of the respondents**

About 72.4% of the respondents were under 45. Most of the respondents fall in the age group 20 and 34 years. The results also indicated that, in both locations the number of studied individuals at the age between 20– 34 was actually higher compared to other age groups (Table 1). Morogoro Municipality had many respondents compared to its

counterpart's location. However, at the age group of 35 – 44 and 45- 54 the number of people in Kinondoni was high compared to Morogoro Municipality.

#### **4.1.1.4 Income levels of consumers and farmers**

The results showed that, 26% of the respondents earned an average income of less than 100 000 TZS per months. The study revealed that only 2.1% of the respondents had an average income of more than one million TZS per month. The results showed that, none of the interviewed individuals in Morogoro Municipality had an average of more than a million per month (Table 1). Most of them (37.5%) had an average income (in Morogoro Municipality) of TZS 100 000 to 400 000 per month. About a quarter of these people in both locations had an average income of less than TZS 100 000 TZS per month. Further, it was observed that the majority of those who had an average income of less than TZS 100 000 per month were in the Morogoro Municipality (Table 1).

#### **4.1.1.5 Occupational of respondents**

More than half (59.4%) of the studied population in Morogoro Municipality were farmers. The rest in these areas were self-employed in a non - farming sector like petty business or worked in the formal sector (including government and private sectors). The results also showed that, about 9.4% and 24% of the interviewed people in Morogoro Municipality and Kinondoni Municipality, correspondingly, had no specific work to do. The prevalence of un-employment in the studied location was 24% with Kinondoni Municipality being higher (14.6%) compared to its counterpart location. There was no one among the interviewed individuals in Kinondoni Municipality who mainly engaged in farming activity.

Farmers and other people who were self-employed accounted to about 59% and 74%, in Morogoro and Kinondoni municipalities respectively. The results also indicated that, people who worked in the formal sector in Kinondoni Municipality were three times more than those in Morogoro Municipality. Similarly, results also showed that the percent of people who were self-employed in Kinondoni Municipality were also three times more than those who were working in the same sector in Morogoro Municipality.

**Table 1: Socio-demographic characteristics of the studied population**

Variable	Categories	Location					
		Morogoro n= 96		Kinondoni n = 96		Total N = 192	
			%		%		%
Sex	Male	35	36.5	46	47.9	81	42.2
	Female	61	63.5	50	52.1	111	57.8
Education	No Formal Education	6	6.3	8	8.3	14	7.3
	Primary Education	65	67.7	31	32.3	96	50.0
	Secondary Education	17	17.7	35	36.5	52	27.1
	College Education and above	8	8.3	22	22.9	30	15.6
	Age (years)	20 – 34	45	46.9	38	39.6	83
	35 – 44	25	26.0	31	32.3	56	29.2
	45 – 54	15	15.6	21	21.9	36	18.8
	55 – 64	11	11.5	6	6.3	17	8.9
Income (Tshs.)	≤100 000	46	47.9	4	4.2	50	26.0
	100 001 – 449 999	30	31.3	42	43.8	72	37.5
	450 000 – 749 999	18	18.8	30	31.3	48	25.0
	750 000 – 1 000 000	2	2.1	16	16.7	18	9.4
	>1 000 000	0	0.0	4	4.2	4	2.1
Occupation	Farmer	57	59.4	0	0.0	57	59.4
	Self Employed	19	19.8	52	54.2	71	74.0
	Formal (private/government)	11	11.5	30	31.3	41	42.7
	Non-employed	9	9.4	14	14.6	23	24.0

#### 4.1.2 Awareness and perception of consumers on safety of organic vegetables in

##### Morogoro municipality and Kinondoni Dar es Salaam

Table 2 presents the perception and knowledge of the consumers and farmers over organic vegetables. The results showed that about 81% of the interviewed people in Kinondoni and Morogoro municipalities had a view that organic vegetables taste better than conventional vegetables. Regarding the size differences between organic and conventional vegetables, the results showed that less than half (45.3%) of the people studied in all

locations reported that organic vegetables were smaller in size than conventional foods. About 37% of the interviewed people perceived that organic vegetables were more attractive than conventional vegetables. The largest number of people (95.8%) perceived that organic vegetables are healthier than conventional vegetables.

**Table 2: Consumers perception and knowledge of organic vegetables over conventional vegetables**

Attribute	Test statistics	Location		X <sup>2</sup>	P
		Morogoro n(%)	Dar es Salaam n(%)		
Taste	Taste better	88(91.6)	67(69.8)	14.674	0.000
Size	Are small in size	34(35.4)	67(69.8)	7.588	0.000
Shiny	Are more attractive	28(29.2)	42(43.8)	4.407	0.036
Healthy	Eating them is more healthier	93(96.9)	91(94.8)	0.522	0.470
Chemicals	Have less chemical residues	47(48.9)	29(30.2)	7.056	0.008

The results showed that, 91.7% and 87.5% of the interviewed people in Morogoro and Kinondoni municipalities, respectively, could agree that there are less chemical residues in most of the organic vegetables compared to conventional vegetables. Furthermore, this study found that only 32.3% of the studied population trusted on people who claim to have been selling organic vegetables. Many (38.5%) people in Kinondoni Municipality trusted more on people who claimed to be selling organic vegetables in this area than the other counterpart do in the Morogoro area (Table 3).

#### 4.1.2.1 Age and perception among respondents

On the issue of age and perception of respondents on the taste of organic vegetables, the results showed that, 81.9%; 76.8% and 83.3% of people with an age between 20- 34; 35 – 44 and 45 – 54; separately reported that, organic vegetables have better taste than conventional vegetables. Similarly, the result also showed that even older people (aged

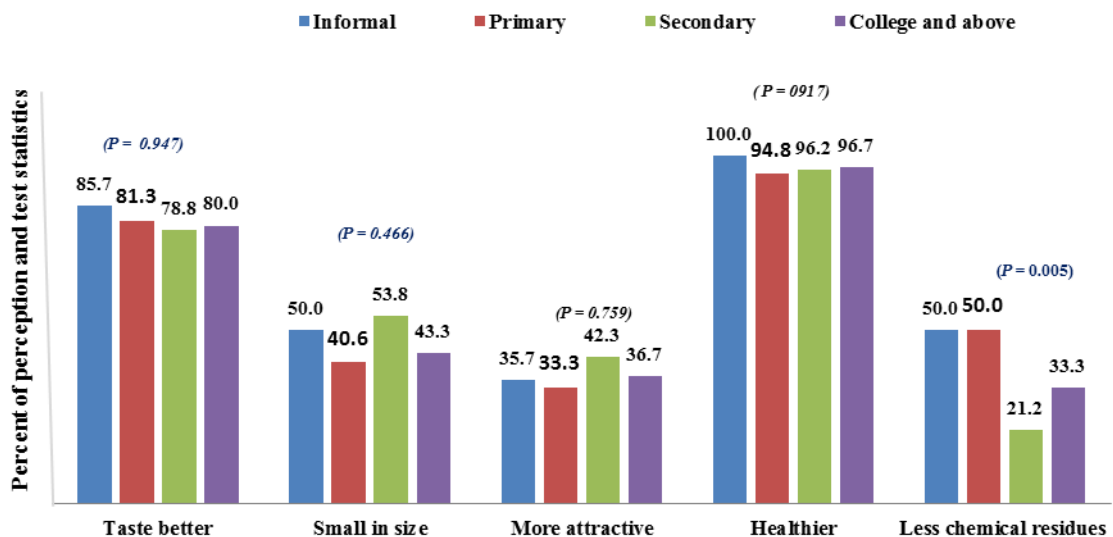
between 55 – 65 years) most of them had the same perception as that of the younger people aging less than 55 years (Table 3).

**Table 3: Perception on organic food and age category of respondents**

Variable	Perception	Age category								Stastical correlation			
		20 – 34 (n =83)		35 - 44 (n=56)		45 - 54 (n = 36)		55 - 64 (n = 17)		Total	X <sup>2</sup>	df	P
		n	%	n	%	n	%	n	%	n			
Taste	Taste better	68	81.9	43	76.8	30	83.3	14	82.4	155	1.567	3	0.67
Size	Small in size	36	43.4	24	42.9	17	47.2	10	58.8	87	1.576	3	0.67
Shiny	More attractive	28	33.7	22	39.3	14	38.9	6	35.3	70	0.554	3	0.91
Healthy	Healthier	79	95.2	53	94.6	36	100.0	16	94.1	184	1.992	3	0.58
Trusting	Less chemical residues	71	85.5	53	94.6	33	91.67	15	88.2	172	3.189	3	0.36

**4.1.2.2 Perception and education level**

This study revealed that (100%, 94.8%, 96.2%, 96.7%) informally, primary, secondary, college and above perceived organic food to be healthier compared to the other counterparts foods. (Fig. 3).

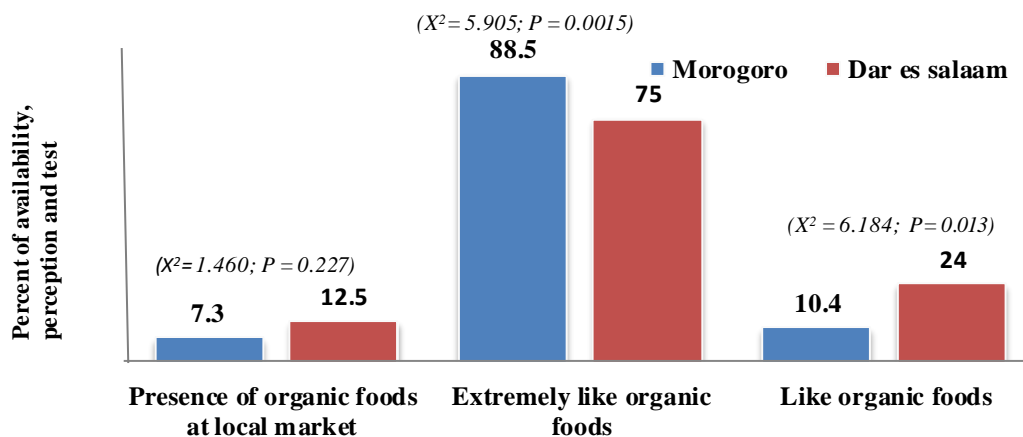


**Figure 3: Education level and perception of organic vegetable food**



#### 4.1.2.3 Availability of organic vegetables at local market and perception among consumers

The results showed that, only 7.3% and 12.5% of food consumers in Morogoro and Dar es Salaam, respectively, had an access to organic food in the local market. About 88.5% and 75.0% of the studied people in Morogoro and Dar es Salaam, in that order, extremely liked the use of organic vegetables over the other foods. However, it was indicated that significantly, only 10.4% of participants in Morogoro liked organic foods and in Dar es salaam also, it was 24.0% only (Fig. 4).



**Figure 4: Availability of organic vegetables at local market**

#### 4.1.2.4 Occupation, perception and knowledge on organic over conventional vegetables

It was found that, many (93.0%) farmers perceived organic vegetables to have better taste than privately employed (82.9%) or non-employee (65.2%). It was further found that, 89.5% farmers and 91.5% self-employed personnel were willing to purchase organic vegetables. Moreover, higher readiness was observed among private employee (97.6%) followed by self-employed (91.5%) and farmers (89.5%) (Table 4).

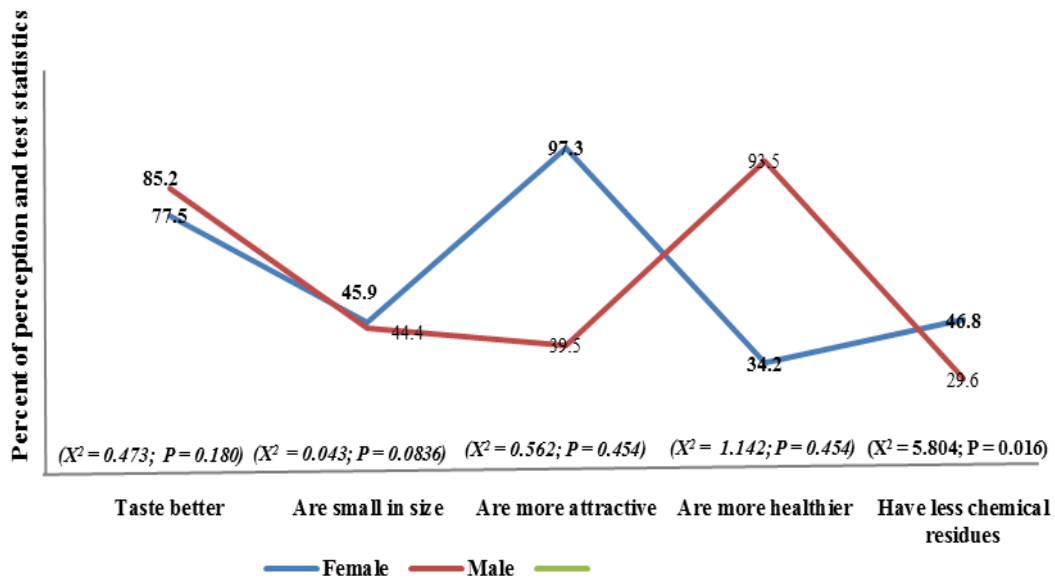
**Table 4: Occupation, knowledge and willingness to buy organic vegetables over conventional foods**

Perception and knowledge	Occupation				X <sup>2</sup>	P
	Famers	Self employed	Privately employed	Non-employed		
Taste better	93.0	74.6	82.9	65.2	10.873	0.012
Small in size	36.8	52.1	43.9	47.8	3.067	0.381
Are more attractive	24.6	47.9	36.6	30.4	7.845	0.049
Eating them is more healthier	96.5	93.0	100.0	95.7	3.317	0.345
Have less chemical residues	98.2	83.1	95.1	78.3	12.290	0.006
Good quality	91.2	71.8	7.3	65.2	9.573	0.023
Willing to buy at a higher price	89.5	91.5	97.6	78.3	6.620	0.085

#### 4.1.2.5 Sex, knowledge and perception of organic vegetables over conventional vegetables

The results presented in Fig. 5 show that, the percent of males who perceived better taste of organic vegetables over conventional vegetables was higher (85.2%) compared to that of their counterpart sex (77.5%).

Regarding the size differences between organic and conventional raised foods, the results also showed further that, there was a slight difference between males and females. However, both sexes perceived that organic foods were much smaller compared to conventional foods. Furthermore, the results showed that, though the differences did not vary significantly, there was a higher percent (97.3%) of women compared to that of men (39.5%) implying that organic foods were much more attractive compared to the corresponding conventional foods (Fig. 5). Similarly, knowledge on chemical composition between organic and conversational foods among men and women varied significantly ( $P < 0.05$ ) with the highest percent of females – as related to that of men believing that organic foods had less chemical residues than the other counterparts foods (Fig. 5).



**Figure 5: Sex, knowledge and perception of organic vegetables over conventional vegetables**

#### 4.1.2.6 Perception, knowledge about organic food from different socio-economic groups

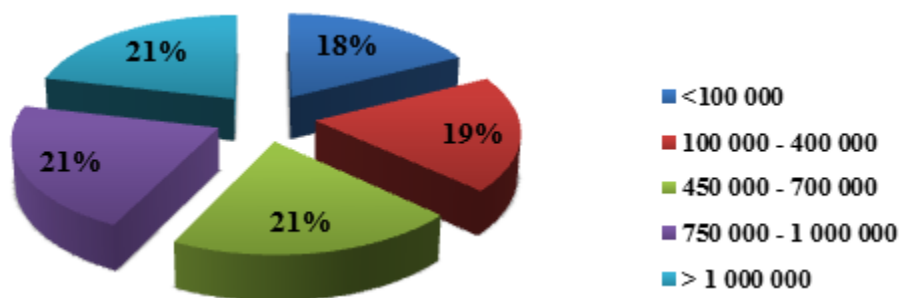
The results showed that, 45.8% of the respondents who had an average income of TZS 100 000 to 400 000 per month perceived organic vegetables to have less chemical residues, and about 39% of those who had an average income of TZS 750 000 to 1 000 000 per month had also the same views (Table 5).

**Table 5: Socio-economic group, perception and knowledge**

Attribute	Income category					X <sup>2</sup>	P
	<100 000	100 000 - 400 000	450 000 - 700 000	750 000 - 1 000 000	> 1 000 000		
Taste better	84	79.2	85.4	66.7	75.0	3.5	0.477
Small in size	38	45.8	52.1	44.4	50.0	2.015	0.733
Are more attractive	32	34.7	43.8	33.3	50.0	2.017	0.733
Eating them is more healthier	96	95.8	93.8	100.0	100.0	1.4882	0.830
Have less chemical residues	58	45.8	14.6	38.9	0.0	23.436	0.000
Good quality	30	16.7	4.2	11.1	0.0	13.298	0.010
Willing to buy at high price	82	90.3	95.8	100.0	100.0	8.147	0.085

#### 4.1.2.7 Socioeconomic status and willingness to purchase organic vegetables

The results of the present study showed that consumers who had higher income (more than 1 000 000 TZS) per month were more willing to buy organic vegetables than those who had lower income (less than 500 000 TZS) per month (Fig. 6).



**Figure 6: Income per month and willingness to buy organic vegetables at a higher price**

### 4.1.3 Factors that affect consumers' choice in consumption of organic vegetables

The results presented in (Table 6), it was found that the lower shelf life of organic vegetable was the main factor that affected by 10.6% the purchase of these foods compared to the lack of uniqueness (4.3%), higher price (2.1%) and lack of availability of organic vegetables at the market (3.2%).

**Table 6: Multiple regression of the factors affecting the purchase of organic vegetables**

Factor	Standardized Coefficient $\beta$	Standard error	<i>P</i>
Uniqueness	0.071	0.043	0.332
Price	0.021	0.048	0.781
Availability	0.032	0.057	0.781
Shelf life	0.108	0.046	0.661

#### 4.1.3.1 Uniqueness of organic vegetables

About 41% indicated that, there was no clear distinction between organic and conventional vegetables sold on the market (Table 7). This was higher in Kinondoni Municipality whereby more than half (53.1%) of the respondents in the area were not able to distinguish between conventional and organic vegetable products. Only 28.1% of the respondents in Morogoro Municipality reported inability to distinguishing the two categories (Table 7).

**Table 7: Factors affecting the purchasing of organic vegetables**

Factor	Response	Location				Total		$X^2$	<i>df</i>	<i>P</i>
		Morogoro n=96		Kinondoni n=96		N=192				
			%		%		%			
Uniqueness	Not unique	27	28.1	51	53.1	78	40.6	12.47	1	0.00**
Cost	More expensive	68	70.8	69	71.9	137	71.4	0.025	1	0.87
Shelf life	Does stay longer	61	63.5	24	25.0	85	44.3	28.90	1	0.00*
Availability	Insuffiecent at the market	80	83.3	80	83.3	160	83.3	0.05	1	0.00*

\*\* The mean difference is significant at  $P < 0.001$

\* The mean difference is significant at  $P < 0.01$

#### 4.1.3.2 The cost of purchasing organic vegetables in Morogoro and Kinondoni markets

About 71% of the respondents reported that the price of organic vegetables was higher than that of non-organic vegetables. More than 70% of the respondents in both locations claimed that they could afford to buy organic vegetable at a higher price (Table 7).

#### 4.1.3.3 Shelf-life and availability of organic vegetables

About 43.3% of the respondents in both locations reported that organic vegetables had a less shelf life than conventional vegetables. This study revealed that 83.3% in both localities, Morogoro and Kinondoni agreed that there is insufficient of organic food in the market (Table 7).

#### 4.1.4 Methods used by consumers to avoid consumption of unhealthy food

The results of multiple regressions showed that, looking product physical appearance explained by 49.3%, the least explained by 43.4%, 29.6% and 14.6%, for asking sellers on product information, reading product labels for packing products, and tasting product, respectively (Table 8).

**Table 8: Multiple regression analysis of the methods used by consumers to protect themselves from consumption of unhealthy foods**

Method	Standardized Coefficient $\beta$	Standard error	<i>P</i>
Reading product labeled	0.296	0.400	0.059
Asking a seller for product information	0.434	0.039	0.000
Looking physical appearance	0.493	0.039	0.000
Tasting product quality	0.146	0.056	0.012

#### 4.1.4.1 Reading food product labels

The methods that are used by consumers in avoiding from consumption of unhealthy foods are indicated in (Table 9). It was observed that, less than half (45.3%) of food, consumers

in the studied population could read the label of the packed food product. Less than a quarter (24%) of respondents in Morogoro Municipality read product labels before purchasing labeled food product.

**Table 9: Methods used by consumers to avoid consumption of unhealthy foods**

Method	Location				Total		X <sup>2</sup>	P
	Morogoro		Kinondoni		N=192	%		
	n=96	%	n=96	%				
Reading product label	23	24	64	66.7	87	45.3	7.59	0.06
Asking the seller for product information	22	22.9	52	54.2	74	38.5	19.76	0.00**
Looking at physical appearances	60	62.5	40	41.7	100	52.1	8.35	0.00*
Tasting product quality	23	24	3	3.1	26	13.5	17.79	0.00*
Buying product without any assessment	15	15.6	9	9.4	24	12.5	1.71	0.00*

\*\* The mean difference is significant at  $P < 0.0001$

\*The mean difference is significant at  $p < 0.001$

#### 4.1.4.2 Product information

The finding from this study showed that only 38.5% of the interviewed consumers in both locations were using this method of assessing product quality to protect themselves from consumption of unhealthy foods. The percent of consumers (Table 9) who could ask the sellers about product information in Kinondoni Municipality was greater (54.2%) compared to those in the Morogoro Municipality (22.9%).

#### 4.1.4.3 Looking at physical appearances

About 52% of the respondents in Morogoro and Kinondoni municipalities avoided the consumption of unhealthy foods through physical observation and experience (Table 9). It was observed that 62.5% and 41.7% of food consumers in Morogoro and Kinondoni, respectively, used physical method of assessing food quality.

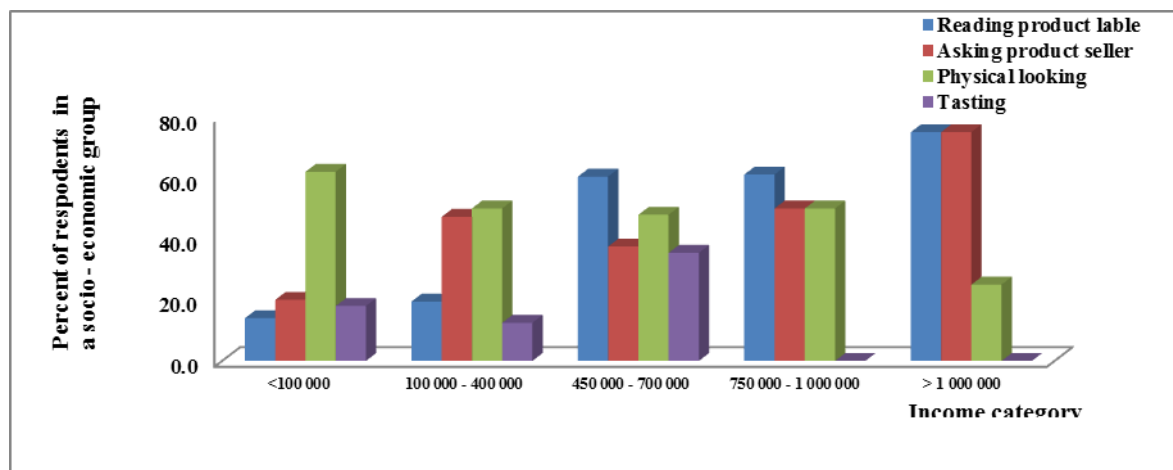
#### 4.1.4.4 Tasting product quality

This study revealed that, less than a quarter of consumers used taste in assessing food quality to protect them from consuming unsafe foods. It was observed that, tasting was

employed by 25% of respondents in Morogoro and only 3.1% of respondents in the Kinondoni Municipality (Table 9).

#### 4.1.4.5 Socioeconomic status of consumers

The study revealed that more than 70% of those who had higher socioeconomic status were reading product labels and asking the sellers on the product information on packed food product. They used these methods as protection means for their health wellbeing. The methods were however not as popular as to those who had lower socioeconomic status, those who were earning TZS <100 000/= per month (Fig. 7).

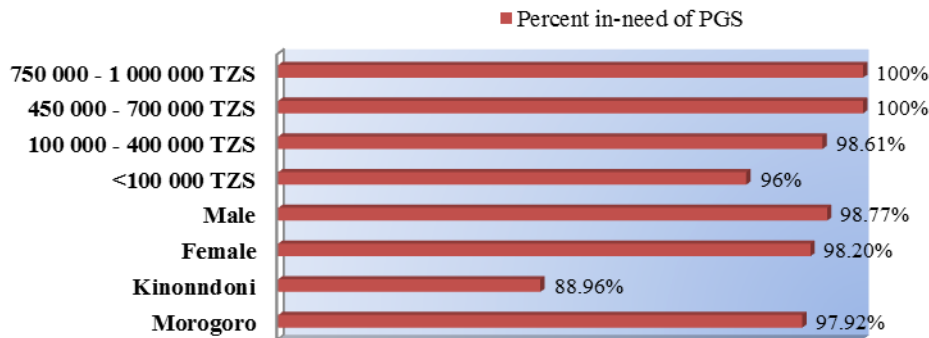


**Figure 7: Socio economic status and protection means from consumption of unhealthy food**

#### 4.1.5 The need of Participatory Guarantee System (PGS)

The recent finding of this study showed that, about 98% (n= 189) of the interviewed respondents preferred this system. Of these, 50.26% were in Morogoro area and the least were in Dar es Salaam (Fig. 8). It was found that, the number of those who preferred this system was, however, higher in Morogoro (97.92%; n = 94) than these in Dar es Salaam (88.96%; n = 95) area.





**Figure 8: The percent of respondents who were in-need of PGS**

The results showed further that more than 98% of both females and males were also in need of this system (Fig. 8). It is also shown that, a large percent of those who had higher economic status were also in-need of this system as those who had lower economic status (Fig. 8).

## 4.2 Discussion

### 4.2.1 Socioeconomic and demographic characteristics of the farmers and consumers

#### 4.2.1.1 Sex of farmers and consumers

In the current study, (Table 1) the proportional of females engaged in this study were actually higher than that of males in each of the locations. However, the proportional of males who were involved in Kinoundoni Municipality was higher than that of Morogoro Municipality. Conversely, female respondents in Morogoro were higher than that of the same sex in Kinoundoni area. This has an implication on organic vegetable purchases in this location. For example, Annunziata and Vecchio (2016) in their study of Southern Italy reported that, women were more concerned with purchase of organic foods than men.

#### 4.2.1.2 Age of the respondents

In both locations the number of the studied individuals at the age between 20– 34 was actually higher compared to other age groups (Table 1). The younger consumers are more

likely to purchase organic products due to their preference for chemical free products and interest in environmental quality (Michaelidou and Hassan, 2010). For example, younger Canadians tended to have a higher preference for chemical free products and therefore showed a higher preference for organic products, whereas older Canadians were less concerned about the complete elimination of chemicals (Mackinnon, 2013). In general, younger consumers tend to have a lower purchasing power than older consumers. Annunziata and Vecchio (2016) hypothesized that older consumers (i.e., More than 55 years) tend to make preventative health decisions, because of perceived health vulnerability as equated to young individuals and the awareness that they are generally at higher health risk than younger individuals (Vecchio *et al.*, 2016). On the other hand, Samson (2012) reported that the level of knowledge and use of food labeling information in purchasing organic vegetables among consumers increased with age, level of education and family income.

#### **4.2.1.3 Education level**

Education status of an individual has a greater implication of knowledge and wellbeing as well. Most of the respondents who had a higher education level (at least college education) were in Kinondoni Municipality (Table 1). It was further found that, the number of secondary educated participants in Kinondoni was twice to those of Morogoro Municipality. Generally, participants in Kinondoni were much more educated than their counterparts in Morogoro area.

#### **4.2.1.4 Occupational of consumers and farmers**

Most of the studied populations in Morogoro Municipality were farmers (Table 1). This is because they were targeted for interviews. The rest in this area were self-employed in a non - farming sector like petty business or worked in the formal sector (including government and private sectors). Despite of the higher number of people being self-

employed and worked in the formal sector in Kinondoni Municipality compared to their fellow in Morogoro area, the prevalence of unemployment in Kinondoni was higher as well. Such prevalence was actually higher compared to that reported by the census done in 2012 by the National Bureau of Statistics (NBS, 2014). It ascertains the finding of others that farming activity remains a single working sector, which employs most people in the country (NBS, 2014; EPOPA, 2004). Becker and Mutlu (2007) reported that people working full time are more likely to purchase organic food compared to part time or none. This was associated with the increasing income of the full time workers compared to the rest.

#### **4.2.2 Awareness and perception of consumers on safety of organic vegetables in**

##### **Morogoro municipality and Kinondoni Dar es Salaam**

Most of the people considered organic vegetable to have good taste than conventional vegetables (Table 2). The results of this study found that many people in Kinondoni Municipality accepted that organic vegetables tasted well than their counterparts in Morogoro area. Regarding taste differences, other author argues that, taste in humans is a personal issue and that, there are greater differences in taste perception among people of different ages when uncontrolled study is done (Robino *et al.*, 2016). However, this study could not establish such a difference. The other study on the same area found many organic buyers believing that, organic produce tastes better than conventionally grown produce, even if sensory evaluations yield inconsistent results (Zhao *et al.*, 2007).

Some consumers are concerned on attractiveness variation between organic and conventional produces. Only one third of the subject perceived organic vegetables to be more attractive than conventional vegetables, thus majority of them were of the view that conventional vegetables were far more attractive than organic vegetables. In their views, unlike consumers, farmers explained that the attractiveness of conventional vegetables was

based much more on vegetables than other organic vegetables. Organically grown vegetables when compared to conventional vegetables, the conventional vegetables were seen to be less attractive and non-shining.

Nearly all of the people interviewed in these locations perceived that organic vegetables were healthier (Table 3) than conventional vegetables with some believe that, consuming them could result in a well-nourished body than eating conventional vegetables. The ongoing research studies show that there are some variations regarding differences in quality of nutritional contents among organic and conventional producers. Findings by Huber *et al.* (2011) indicate that, there is lower protein content in organic wheat, higher amount of vitamin C and lower nitrate values in organic potatoes related to use of manure rather than mineral fertilization.

Another study compared the nutrient content of organic and conventional grown crops using statistical methods to identify significant differences and trends. Ruhl (2013) found that, organic crops contained significantly more vitamin C, iron, magnesium, and phosphorus and significantly less nitrates than conventional crops. The researcher found further that, there were no significant trends; this shows that there was less protein in organic crops, but of a better quality and a higher content of nutritionally significant minerals with lower amounts of some heavy metals compared to conventional ones. Huber *et al.* (2011) concluded that, it seems that there is genuine difference in the nutrient content of organic and conventional crops. With these disparities consumption of foods – rich nutrients may influence healthy well-being of an individual eating them. Therefore, this might be the reason they had this perceived healthy benefit of these foods in this location.

Existence of chemical residue in most of conventional grown or raised animals was also the other concern that was reported by respondents. Both of the farmers and product

buyers agreed that organic vegetables have less chemicals compared to food products that are chemically managed. Many women in Morogoro agreed that organic vegetables have fewer chemicals than men.

#### **4.2.2.1 Age and perception among respondents**

The study showed a greater variation in perception among people of different age categories with older people perceiving organic vegetables to have better taste than conventional vegetables. Many organic buyers believed that organic produce tastes better than conventionally grown produce, even if sensory evaluations have yielded inconsistent results (Zhao *et al.*, 2007). However, the results showed that variation in taste among people of different age categories was not significant ( $P>0.05$ ). Thus, perceptions of taste among the young and older people were not significantly different (Table 4).

Under the current study, the results showed that both younger and older consumers believed that organic foods are healthier and have less chemical residues compared to conventional foods (Table 4). The younger consumers were more likely to purchase organic products attributed this to their preference for chemical free products and interest in environmental quality (Lee and Hwang, 2016). For example, younger Canadians tended to have a higher preference for chemical free products and therefore showed a higher preference for organic products, whereas older Canadians were less concerned about the complete elimination of chemicals. In general, younger consumers tend to have a lower purchasing power than older consumers do. Thus, among young consumers, willingness to pay may not necessarily translate into actual demand for a product. Annunziata and Vecchio (2016), hypothesized that older consumers (i.e., More than 55 years) tend to make preventative health decisions, partly because of the perceived health vulnerability and an awareness that they are generally at higher health risk than younger individuals.

#### **4.2.2.2 Perception and education level**

Education is critically a single factor for personal influence on knowledge and awareness. Most of the informally educated people perceived organic food to be healthier compared to the other counterparts individuals in both locations. Regular consumers of organic products in most countries are found to be educated than occasional and non-buyers. Regular organic consumers have more information about products (Pearson *et al.*, 2010). In addition, there was a positive relation between product knowledge and buying frequency. Moreover, highly educated consumers were found to have high better knowledge (Sangkumchaliang and Huang, 2012). The results showed that perception of taste, size differences and healthy benefits among these foods did not vary significantly among people with different education level. However, the study had found that the perception that organic vegetables contain less chemical residues was not significantly different ( $P < 0.05$ ), among people with different education level (Fig. 3).

#### **4.2.2.3 Availability of organic vegetables at local market and perception among consumers**

It is so surprising that, even though many of the people in Morogoro area were engaging with farming activity, only few of them accessed organic vegetables in their local market. Dickieson and Arkus (2009); Sangkumchaliang and Huang, (2012) reported that product availability was key inhibitors to consumers' demand for organic vegetables in Ireland as two-thirds of non-buyers of organic food would buy organic if it was easily available. However, the differences in the current study among the two locations did not vary considerably (Fig. 4).

This was not so as there were low number of people who accessed organic vegetables at the local market as more than 90% of the available organic vegetables were imported from

outside Tanzania as was reported by Valerian *et al.* (2011). In this case, then, it became not obvious to have incredible organic vegetables at the local market other than in supermarkets. Since there are many consumers in Dar es Salaam as compared to Morogoro, therefore, this should be the reason of their greater availability in this area as compared to the counterpart area. Moreover, the proportional of the population which likes to eat organic foods in Kinondoni was twice higher than that in Morogoro.

#### **4.2.2.4 Occupation, perception and knowledge on organic over conventional vegetables**

Perception of taste, chemical residues, attractiveness and the quality of organic vegetables over conventional vegetables varied significantly ( $P < 0.05$ ) among people of different occupations (Table 4). Though the difference among them was not so significant at ( $P < 0.05$ ), this has an implication of promising market of organic product for all occupancy types. Mutlu, and Becker (2007) reported that consuming organic vegetables were higher among full time working people and was associated with income levels. This implied that people who have secured employment and income are more likely to consume organic products. Therefore, because most people in Kinondoni area had more secured income compared with those of Morogoro, so many consumed organic products.

#### **4.2.2.5 Sex, knowledge and perception of organic vegetables over conventional vegetables**

Though the current study did not show any significant variation ( $P > 0.05$ ) in taste perception of organic vegetables over their counterparts' vegetables, most men in this study perceived better taste of organic vegetables over conventional (Fig. 5). In contrast, women have a positive attitude towards organic vegetables than men (Hui *et al.*, 2013) Moreover, females are likely than males to pay a premium for organic production and age

to be inversely correlated with willingness to pay for organic product (Hui *et al.*, 2013). In the same line, the studies conducted by Doorn and Verhoef (2011) supported that women attribute a higher quality towards organic product compare to men, females pay more attention towards organic product. Also on the other hand, in a study done by Haghjou *et al.* (2013) it is reported that women are more disposed about organic food than men, and women think more about organic food that has better taste and quality. Similarly, Hui *et al.* (2013) argued that women were more likely to purchase organic food more regularly than men, because of being more responsible in the household than men, and consequently were more informed about nutrition and food safety. Therefore, females feel more responsible for the health of the family than males in the same way Arganini *et al.* (2012) state..

#### **4.2.2.6 Perception, knowledge about organic vegetables from different socioeconomic groups**

The perception that organic vegetables have less chemical residues and have good quality, varied significantly among people of different income groups. The health aspect is closely associated with the residues from synthetic chemicals used in agriculture; indeed, organic products generally have a lower level of pesticide residues (Dickieson and Arkus, 2009). The perception of taste and size differences in these foods did not vary significantly among people of different economic status (Table 5). In a study done by Sangkumchaliang and Huang (2012) it was reported that lack of knowledge or awareness to consumers is one of the most important reasons for not purchasing organic products.

#### **4.2.2.7 Socioeconomic status and willingness to purchase organic vegetables**

There was no significant difference in willingness in the purchase of organic produces among consumers of different socioeconomic status at  $P < 0.05$  confidence interval (Fig. 6)



Yi (2009), reported that income level is not a significant variable in explaining differences in the purchasing behavior of buyers and non-buyers of organic products. Income level had no significant influence on willingness to pay for organic products. Consumers' are always concerned with all about health and food safety (Dickieson and Arkus, 2009).

### **4.2.3 Factors that affect consumers' choice in consumption of organic vegetables**

#### **4.2.3.1 Uniqueness of organic vegetables**

It was observed that consumers were not able to make a clear distinction among organic and conventional vegetables. The number of those who could not be able to distinguish these in Kinondoni was higher compared to that in the Morogoro Municipality (Table 7). The failure to distinguish between organic and conventional vegetables is caused by lack of awareness of consumers about them. Mutlu and Becker (2007), reported that organic products are credence goods, consumers (unlike producers who are aware that their products are organic) may not know whether a product is produced using organic or conventional methods, not even after repeated purchase and consumption, unless they are told so (Matt *et al.*, 2011). Thus, awareness and knowledge about organically produced foods are critical in the consumer purchase decisions. If an individual cannot clearly differentiate between two alternative products, a price premium on the organic product can confuse and/or affect the individual's purchasing decision, in favor of the cheaper product. In developing countries, it's also attributed by lack of certification of producers and their products. Unlike in developed countries producers of organic vegetables are certified, smaller producers or large producers, both are certified (Misner and Florian, 2013). This certification of organic food adds value to agricultural production.

#### **4.2.3.2 The cost of purchasing organic vegetables in Morogoro and Kinondoni markets**

The cost of buying organic vegetable was reported to be much more expensive compared to their counterpart's vegetables in these locations (Table 7). Urena *et al.* (2008) observed that organic consumers have been normally willing to pay approximately 10% more over the conventional vegetables. Islam (2013) reported that many consumers still prefer organic vegetables despite the premium price they have to pay for organic vegetables.

The general perception is that organic vegetables are superior over conventional vegetables, and the common attributes motivating organic consumers to pay higher prices are: organic vegetables are healthier than conventional vegetables, organic vegetables are tastier than conventional vegetables, organic vegetables are better quality than conventional vegetables, and organic vegetables have more human touch than conventional vegetables (Islam, 2013). In addition, education level of the consumers plays a significant positive role. Educated people buy more organic vegetables than non-educated ones (Islam, 2013).

#### **4.2.3.3 Shelf-life of organic vegetables**

This study has also revealed that many respondents thought that organic vegetables had a less shelf life than conventional vegetables (Table 7). One of the reasons accounting for the shorter shelf life could be due to the vulnerability of organic produce to bacteria build-up as opposed to conventional fruits and vegetables treated with the chemicals for more resilience, during growth and thereafter (Erman, 2015). However, according to the field observations, both organic vegetables and conventional vegetables had the same shelf life (Erman, 2015).

#### **4.2.3.4 Availability of organic vegetables**

The availability of organic vegetables in the local market is still unquestionable in both areas – as consumers complained they are not easily found in the local markets (Table 7). This creates opportunities of organic market. Majorities were complaining that they did not know where to get organic vegetables. Dickieson and Arkus (2009) reported that product availability was key inhibitors to consumers' demand for organic vegetables in Ireland as two-thirds of non-buyers of organic food would buy organic if it was easily available. Long distance walking, looking for organic food brings barriers to consumers of organic vegetables, always a consumer goes for shopping at a nearby home (Mutlu and Becker, 2007).

#### **4.2.4 Methods used by consumers to avoid consumption of unhealthy foods**

Consumers use different methods in avoiding consumption of foods that could otherwise harm their wellbeing (Naughton *et al.*, 2015). These methods are categorized in two ways: traditional methods such as physical observation of color, shape, environment at which food/food product is placed, the taste of the food, and textural feelings and modern technology methods such as product labeling and other laboratory analytical methods (Benbrook and Davis, 2011).

Despite the existence of various methods in assessing product quality to protect consumers from consumption of harmful foods, some consumers did not use any of these methods. Therefore, it was observed that, the number of those who do not check for the product quality in Morogoro was higher as compared to their counterparts in Kinondoni Municipality.

#### **4.2.4.1 Reading food product labels**

It was observed that there were a higher number of people who could use label identification in Kinondoni Municipality compared to those in Morogoro (Table 9). This implied that consumers have high awareness of food labeling and thus, it assisted consumers to make informed choices during purchase of food. This finding came into an agreement with that of Lagerkvista *et al.* (2014) who reported more than forty percent of the studied consumers could not read on the packed food product. The reason given to this was the lack of time to read the food product.

Nevertheless, in spite of this difference, results showed that, there was no significant difference ( $P>0.05$ ) in the use of this method among people in Kinondoni and Morogoro municipalities (Table 9). WHO (2004) and Samson (2012) reported that, only a few of the food consumers tend to use this method as to protect their health wellbeing. Samson, (2012) reported that, reading food product label for packed food product is not taken into much consideration, not only by those who cannot be able to read the written product information on the food label, but also even those who could be able to read the product label. Roos *et al.* (2010) reported that reading food labeling occasionally, particularly women, dietary restrictions people and those with at least a kind of food and nutrition knowledge of the link between diet and disease check food labeling information.

#### **4.2.4.2 Product information**

Product information is not only linked to product quality, but also its originality (FAO, 2010). Some buyers would wish to ask the product seller on product descriptions that were linked to the sold product (Table 9). Consumers generally perceive an organic label as assurance that the product was organic. More accurately, organic food labels help transform the credence characteristics of such products into search attributes, thereby

allowing the consumer to better evaluate the quality before deciding to buy the product (Hamm and Janssen, 2012). The results showed that, there was a significant difference ( $P < 0.05$ ) in asking food sellers about product information among people of the two locations (Table 9). In addition to that, Samson (2012) reported that the level of knowledge and use of food labeling information in purchasing foods among consumers increased with age, level of education and family income. A study in Northern Thailand also found that willingness to pay for 'safe' vegetables increases with age and income (Magistris and Gracia, 2016).

#### **4.2.4.3 Looking at physical appearances**

Looking physical appearance of the food product in these locations was a common method as compared to tasting product quality with higher number of those using this kind of method in Kinondoni compared to those in Morogoro (Table 9). Mutlu and Becker (2007) observed that quality assessment of food product through physical observation created barriers to organic food consumption. The organic food sometimes could be unattractive in comparison with conventional product and consequently fetch a lower market price (Mutlu and Becker, 2007).

#### **4.2.4.4 Tasting product quality**

Eating food was a general motive for everybody to satisfy the needs. Most consumers thought that organic products taste more natural, intense and rich in flavor (Mutlu, 2007). Food tasting was one of the methods used in the assessment of aromatic characteristics of specific food quality (Magee, 2009). The method may be affected by age and health of an individual. As one ages, the sense of taste is also affected, thus raising the threshold level of an individual in sensory evaluation (Kemmet and Brotherson, 2015). In addition, some individuals have higher ability in differentiating food products, even in the presence of

small changes of organoleptic quality trait concentration (Matt *et al.*, 2011). Many organic buyers believe that organic produce tastes better than conventionally grown produce, even if sensory evaluations yield inconsistent results (Zhao *et al.*, 2007). In the current study, using this method among respondents in these areas was significantly different ( $P < 0.05$ ) (Table 9). This implied that they use other methods apart from taste.

#### **4.2.4.5 Socioeconomic status of consumer**

Reading product label and asking the sellers on the product information on packed food product were common methods used by the majority of higher socioeconomic status costumers in protecting themselves from eating unhealthy foods (Fig. 7). Many individuals with higher educational achievements tend to also have higher incomes and thus increasing the likelihood of purchasing organic products. In contrast, Yi (2009), reported that income is not a significant variable in explaining differences in the purchasing behavior of buyers and non-buyers of organic products, and thus income had no significant influence on willingness to pay for organic.

#### **4.2.4.6 The need of Participatory Guarantee System (PGS)**

Not only farmers, but also vegetable consumers of these areas preferred PGS (Fig. 8). Though there was no significance difference between the two locations ( $X^2 = 3.39$ ;  $df = 1$ ;  $P = 0.561$ ), the number of people welcoming this system in Morogoro was higher compared to those in Kinondoni Dar es salaam. The results of the present findings showed that, there was no significance differences in-need of PGS between males and females, and among people of different socioeconomic status ( $P > 0.05$ ) (Fig 8). One of the reasons to why most of the people were in-need of the PGS in Morogoro than in Dar es salaam City is due to higher number of people (farmers) who were actively engaged in PGS in this area and its rural characteristics than Dar es salaam, which in most cases is business oriented

city. With this observation, it might also be due to a large number of farmers who were actively engaged in organic farming in this area, but lacking special market for their producers and thus selling them at lower prices in respect to production cost they incur in the production process. Therefore, most of the farmers might be motivated with this system if it is established with their locality.

PGS may be an alternative method for the most farmers who were actively engaged with organic producers in Morogoro than being certified by certification bodies, as its certification is associated with higher fees of which most of lower socioeconomic farmers cannot be able to afford (Dimitri and Dettmann, 2012). Establishing PGS with organic growers in the study area is as much important for the success of small-scale farmers, due to better support systems and networks among them. The implementation of PGS in other areas as observed in other studies was successful among small-scale farmers and large-scale farmers. Hence organic farmers must unite so as to share their challenges and success and how to overcome them (Hughner *et al.*, 2007; Dimitri and Dettmann, 2012).

## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

The findings of this research have shown that many consumers were not trusting people who claimed to sell organic food products on the market other than established organizations and supermarkets. Majority (81%) of people in these locations however perceived that, organic vegetables taste better, and that organic food is healthier. Only few (37%) of them were determined that organic vegetables were more attractive than conventional vegetables. With these perceptions, therefore many of consumers were willing to buy organic vegetables. However, there were only few organic vegetables in the markets and were expensive to buy compared to conventional vegetables. Most (97%) of the farmers for organic vegetables affirmed to welcome participatory guarantee methods for their food produces as for liable markets. Looking physical appearances of food product was a common method used by most consumers to protect themselves from eating of unhealthy foods. Some were reading product labels for packing food products, asking sellers on food product information and food tasting. With the exception of food labeling, the use of these methods varied significantly ( $P<0.05$ ) among people in Morogoro and Kinondoni municipalities.

#### 5.2 Recommendations

- i. It is recommended that other studies should be done to investigate other methods that will be used by consumers to avoid consumption of unhealthy foods.
- ii. It is recommended that scientists should investigate on why most of the consumers do not trust in people who claim to sell organic foods at the local market.



- iii. There is a need of having a clear distinction between conventional and organic grown vegetables amongst the other food producers. This can be done either using specific established systems or linking with truthfully organic food producers and food traders. This will answer many of the current doubts posed by consumers to food sellers claiming to have organic vegetables.
- iv. Furthermore, for most farmers of organic vegetables in Morogoro are considerably welcoming the participatory guarantee system to assure them with their produce market availability. It is recommended that investors should cooperate with them for business-oriented aspects.

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## **APPENDICES**

### **Appendix 1: Questionnaire**

#### **STUDY TITLE: KNOWLEDGE AND PERCEPTIONS OF CONSUMERS ON SAFETY OF ORGANIC FOOD IN TANZANIA A CASE STUDY OF MOROGORO MUNICIPALITY AND DAR ES SALAAM CITY**

#### **OBJECTIVES**

The overall objective of the study was to investigate the awareness and perception of food safety by consumers in Tanzania due to increased risks of conventional vegetables produced for human health.

#### **1.3.3 Specific objectives**

The specific objectives of the study were to:

1. To assess the awareness and perception of consumers on the safety of organic vegetables in Morogoro Municipality and in Dar es Salaam city.
2. To determine the factors that affect consumers' choice in consumption of organic vegetables.
3. To identify the approaches used by consumers to avoid consumption of unhealthy foods.

**DATA COLLECTION TOOL: QUESTIONNAIRE****SECTION ONE: SOCIO-ECONOMIC BACKGROUND OF RESPONDENT**

S/N		(Cycle or write where appropriately)
1	Respondent ID (write in numbers)	<input type="text"/>
2	Location	<b>a) Morogoro</b> <b>b) Kinondoni</b>
3	Ward name (name the ward)	<input type="text"/>
4	Sex of the interviewee	<b>a) Male</b> <b>b) Female</b>
5	Age of interviewee (in years)	<input type="text"/>
6	Highest education attained by an interviewee	<b>a) No formal education</b> <b>b) Primary education</b> <b>c) Secondary education</b> <b>d) College education and above</b>
7	What is your estimated income per month (estimate in TZS)	<input type="text"/>
8	What is your occupation?	<b>a) Farmer</b> <b>b) Self employed</b> <b>c) Formal (private/government)</b> <b>d) Non-employed</b>

**SECTION TWO: CONSUMER'S AWARENESS AND PERCEPTION ON SAFETY OF ORGANIC VEGETABLES.**

<p>Before continuing with further interrogation with a respondent, let the interviewer explain the meaning of organic vegetables that they are foods (plant/animal originated foods) which are managed without application of industrial chemicals in their value chains, and provide the respondent with an example(s) of such food product(s).</p>		
9	Do you agree that organic vegetables taste better than conventional vegetables?	<p>a) Yes</p> <p>b) No</p> <p>c) Don't Know</p>
10	Do you perceive that organic vegetables have smaller size than conventional vegetables?	<p>a) Yes</p> <p>b) No</p> <p>c) Don't know</p>
11	Do you agree that organic vegetables are not attractive/shinier than conventional vegetables?	<p>a) Yes</p> <p>b) No</p> <p>c) Don't know</p>
12	Do you agree that that eating organic vegetables is healthier than eating convectional foods?	<p>a) Yes</p> <p>b) No</p> <p>c) Don't know</p>
13	Do you believe in market, sellers who say that they have organic vegetables?	<p>a) Yes</p> <p>b) No</p>
14	In whom do you trust when it comes to organic vegetables?	<p>a) Supermarket</p> <p>b) Registered Organization</p> <p>c) Producers</p> <p>d) -----</p> <p>e) -----</p>
15	a) If organic food were to be sold at higher prices than conventional vegetables, would you be willing to purchase them?	<p>a) Yes</p> <p>b) No</p>
	b) If <b>YES</b> in question 15 a) above, explore and write the reason(s)	<p>a) .-----</p> <p>b) -----</p> <p>c) .-----</p> <p>d) -----</p>
	c) If <b>NO</b> in question 15 a) above, explore and write the reason (s) behind.	<p>a)-----</p> <p>b)-----</p> <p>c)-----</p>
16	Do you think organic vegetables have less chemical residues than conventional vegetables?	<p>a) Yes</p> <p>b) No</p> <p>c) Don't know</p>

17	Are there certified organic vegetables on the local market?	a) Yes b) No c) Don't know
18	How would you rate organic vegetables over conventional ones?	1. Like extremely 2. Like 3. Dislike 4. Dislike extremely
19	Give the reasons behind the answer provided in question 18 above.	a) ----- b) ----- c) -----
20	Due to inadequate markets in African countries, do you agree that organic vegetables should be produced in Africa and just be eaten in western countries?	a) Yes b) No
21	If production of organic vegetables is to be interconnected with the Participatory Guarantee System to ensure organic producers with liable markets, will you be ready to welcome the system?	a) Yes b) No

### **SECTION THREE: FACTORS AFFECTING THE PURCHASING OF ORGANIC VEGETABLES**

22	Can you easily differentiate organically grown vegetables from conventional vegetables?	a) Yes b) No
23	Are organically grown vegetables have higher prices than conventional vegetables?	a) Yes b) No c) Don't know
24	Do you think organic vegetables (e.g. Tomatoes) never last longer compared to conventionally grown vegetables?	a) Yes b) No c) Don't know
25	Are there enough organic vegetables on the market? (If NO, go to question 28, if YES, continue to question 27)	a) Yes b) No
26	Can you tell me which organic vegetables are abundantly available on the market (enumerate the mentioned food products)	a) ----- b) ----- c) -----
27	If they were readily available on the market, would you be willing to buy them?	a) Yes b) No

**SECTION FOUR: WAYS/METHODS USED BY CONSUMERS IN AVOIDING CONSUMPTION OF UNHEALTHY FOODS**

28	To protect consumer's health from consumption of detrimental foods to his/her health, ask him or her whether he/she performs the following ( <i>write and or circle all those applicable</i> )	<p><b>a)</b> Reading the product label for packing food commodities</p> <p><b>b)</b> Asking the seller about the product information</p> <p><b>c)</b> Looking for the physical appearance of the product</p> <p><b>d)</b> Taste to assess the quality of the product</p> <p><b>e)</b> Nothing she/he is checking about the product information</p> <p><b>f)</b> -----</p> <p><b>g)</b> ..</p> <p><b>h)</b> -----</p>
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**This is the end of our interview, thank you very much for your participation and attention.**

**Would you be willing further to participate in other investigations?**

**a) Yes**

**b) No.**

## Appendix 2: Consent Form



### FOMU YA KUKUBALI KUHOJIWA.

Ndugu mshiriki, unaombwa kushiriki katika utafiti wa mwanafunzi kutoka chuo kikuu cha kilimo cha Sokoine kushirikiana na taasisi ya Kilimo hai (SAT) kama sehemu ya elimu yake.

Utafiti huu ni juu ya **“Uelewa na mtazamo wa walaji juu ya usalama wa mbogamboga zitokanazo na kilimo hai nchini Tanzania”**: Utafiti huu unafanyika katika Wilaya ya Morogoro mjini Mkoa Morogoro, na Wilaya Kinondoni Mkoa wa Dar es salaam

Kuna dodoso la maswali ambayo unaombwa kuulizwa. Dodoso hilo lina vipengela vifuatavyo:

- Hali ya jamii na kiuchumi
- Uelewa na mtazamo wa walaji juu ya usalama wa mboga mboga zitokanazo na kilimo hai
- Mambo yanayopelekea ununuaji wa mazao ya mboga mboga hai
- Njia zinazotumika kuepuka ulaji wa vyakula visivyo vizuri kiafya.

### Faida kwa mshiriki

- Baada ya mahojiano juu ya ulaji wa mboga mboga za majani hai, watafiti watatoa ushauri juu ya ulaji bora kiafya pale utakapohitajika.

### Hasara.

- Dodoso linatarajia kuchukua takribani dakika 30 za mahojiano. Hii itachukua muda wako wewe kama mshiriki ambao ungeutumia kufanya mambo mengine ya maendeleo.

Kwa maelezo hapo juu unaombwa kuwa mshiriki katika utafiti huu. Una haki ya kukubali au kukataa kushiriki iwapo hujaridhia. Unahakikishiwa usiri wa taarifa zako zote iwapo utashiriki katika utafiti huu.

Mimi -----nakubali kushiriki katika utafiti huu nikiwa na akili timamu na kwa idhini yangu mwenyewe bila shuruti ya mtu yeyote.

Sahihi .....

Tarehe.....