CASSAVA AND SWEET POTATO VALUE CHAINS IN MVOMERO AND KONGWA DISTRICTS IN TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURAL ECONOMICS OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

2013

ABSTRACT

This study was conducted to analyze cassava and sweet potato value chains so as to identify potential areas for intervention in order to improve small-scale farmers' access to markets in Mvomero and Kongwa Districts. Sub-sector mapping was used to map cassava and sweet potato value chains. Results indicate that several constraints exist in the two sub-sectors which among other things include low production, poor access to inputs, lack of market information, poor support services, poor linkages, lack of value addition and poor infrastructure. Profit and marketing margins along the cassava and sweet potato value chains were computed. Results indicate variations in gross margins with the highest gross margin of 34 355 Tshs/90kg obtained by local processors while the farmers' gross margin was 24 709.31 Tshs/90kg. For the case of sweet potatoes, the highest gross margin of 29 884.41 Tshs/90kg was obtained by farmers while local processors' obtained the lowest gross margin of 3050 Tshs/90kg. Regression analysis model was used to analyse the determinants of cassava and sweet potato farmers' profitability. The findings show that farm size, experience of household head and farm location were the main determinants of farmers' profitability. Convention method, Shepherd's method and Acharya's modified marketing efficiency methods were applied to determine the marketing efficiency at different channels of cassava and sweet potato marketing system. Results indicate that market efficiency in all the two sub-sectors decreases as the marketing costs and/or margins of intermediaries in the marketing channels increases and vice versa. In conclusion, the two sub-sectors in general face a number of challenges that hinder the development of a sustainable and profitable value chain. Therefore, it is recommended that the challenges need to be addressed by involving government, researchers and private parties in establishing a sustainable and profitable cassava and sweet potato value chains.

DECLARATION

I, Mkani Waziri, 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.

_____ _____

Mkani Waziri Date

(M.Sc. Candidate)

The above declaration is confirmed

_____ _____

Dr. Jeremia R. Makindara Date

(Supervisor)

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ACKNOWLEDGEMENTS

My genuine appreciation goes to my supervisor Dr. Jeremia R. Makindara for his constant advice, guidance, constructive and critical comments and for his polite behavior from the very beginning of this work, until the final date of submission. I feel privileged to have the opportunity to work under him. I also extend my deepest thanks to IDRC, through the CGP project for funding this research.

My thanks are also extended to the extension officers of Masinyeti Village Mr. Kasilati Mwambungu and Mr. Chacha Edward and Miss Lilian Mgoba of Kunke Village for the support they gave me during data collection. Without them, the survey exercise would have been difficult.

In addition, I extend my thanks to all my family members for their support, especially my parents Waziri Mkani and Esperance Manase who sacrificed their little resources they had to educate me. May God bless them all.

I also take this opportunity to extend my deepest thanks to all people, institutions and all my friends who facilitated and showed cooperation when I was collecting data and writing this work.

Above all, I extend my special thanks to the Almighty God, for giving me the energy and good health during the entire period of my studies. All glory and honor are in His holy name. However, any shortcoming in this study is my entire responsibility.

DEDICATION

I dedicate this work to my family for their sacrifice and encouragement during my academic study and all aspects of the research.

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LIST OF ABBREVIATIONS AND SYMBOLS

BCR or B/C	Benefit Cost Ratio
CGIAR	Consultative Group on International Agricultural Research
CGP	Crops and Goat Project
CIDA	Canadian International Development Agency
CP	Consumer Price
CRDI	Center de Researches pour Le Development International
DALDO	District Agricultural and Livestock Development officer
DED	District Executive Director
DRC	Democratic Republic of Congo
ECA	Eastern and Central Africa
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
FCI	Farm Concern International
FGD	Focus Group Discussion
FP	Farmer Price
FSA	Financial Service Authority
GM	Gross Margin
GMA	Gross Margin Analysis
GMM_{CV}	Gross Marketing Margin of Cooking Vendors
GMM_{L}	Gross Marketing Margin of Local Processors
GMM_{P}	Gross Marketing Margin of Producers
GMM_{R}	Gross Marketing Margin of Retailers
GVC	Global Value Chains

IDRC	International Development Research Centre
IITA	International Institute of Tropical Agriculture
ILO	International Labour Organisation
ILRI	International Livestock Research Institute
IPC	International Potato Centre
IRR	Internal Rate of Return
ITC	International Trade Centre
KIT	Royal Tropical Institute
MC	Marketing Cost
MC_{CV}	Marketing Cost of Cooking Vendors
MC_{L}	Marketing Cost of Local Processors
MC_{R}	Marketing Cost of Retailers
MFIs	Microfinance Institutions
MM	Marketing Margin
MME	Modified Measures of Marketing Efficiency
MSEs	Micro and Small Enterprises
MT	Metric Tons
n	Number
NMM	Net Marketing Margin
NMM_{CV}	Net Marketing Margin of Cooking Vendors
NMM_{L}	Net Marketing Margin of Local Processors
NMM_{R}	Net Marketing Margin of Retailers
OFSP	Orange Flesh Sweet Potatoes
PZCT	Profit Zone Consultants Trainers
R&D	Research and Development

ROI	Return on Investment
SACCOS	Saving and Credit Cooperative Societies
SARRNET	Southern Africa Root Crops Research Network
SMEs	Small and Medium Enterprises
SNAL	Sokoine National Agricultural Library
SNV	Netherlands Development Organisation
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
TGMM	Total Gross Marketing Margin
TMC	Total Marketing Cost
TR	Total Revenue
Tshs	Tanzanian Shillings
TVC	Total Variable Cost
U of A	University of Alberta
UNCTAD	United Nations Conference on Trade and Development
URT	United Republic of Tanzania
USAID	United States Agency for International Development
VICOBA	Village Community Bank
VIF	Variance Inflation Factor
VOCA	Volunteers in Overseas Cooperatives Assistance
%	Percentage
<	Less than
>	Greater than

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information on Cassava and Sweet Potato Sub - sectors

1.1.1 Cassava sub sector

Cassava (*Manihot esculenta* Crantz) is one of the most important crops widely cultivated by farmers in the tropics including Tanzania. Cassava crop has several advantages over other staple foods particularly cereals because it is tolerant to drought, low demands on soil nutrients, low input requirements, flexibility in planting and harvesting (Marandu *et al.*, 2007). Cassava is also convenient in ground storability as it reduces soil and wind erosion (SARRNET, 1999). In many cassava growing areas, cassava is considered as one of the key staple foods, and both rich and poor households engage in marketing activities by selling part of their harvested cassava (Enete, 2009). Furthermore, cassava is increasingly becoming a cash crop whereby smallholders sell it to rural and urban consumers (Nweke *et al*., 2002). The total global cassava production in 2009 was about 241 million tons (Bull *et al.*, 2011) with Africa being the leading producer (UNCTAD, 2012).

In Eastern and Central Africa (ECA) region cassava is one of the most important root and tuber crops grown for food (Kimathi *et al*., 2007). It is considered a staple root crop for more than 800 million people living in developing tropical countries (Burns *et al*., 2010). Cassava is used as a raw material in the manufacture of processed foods, animal feeds and industrial products (Larsen *et al.*, 2009). There are indications that the novel cassava product will continually be adopted as an ingredient in the manufacture of convenient fast foods for urban consumers and in the industry in some African countries (Mtambo, 2007).

Tanzania is the sixth largest producer of cassava in Africa after Nigeria, the Democratic Republic of Congo (DRC), Ghana, Angola and Mozambique, producing almost 7 million tons of fresh cassava roots annually, which is 5.5% and 14% of the world's and Africa's cassava production, respectively (FAOSTAT, 2007). It is mainly grown in Mtwara, Coast, Mwanza, Kigoma, Tanga, Morogoro, Mara, Ruvuma, Shinyanga, Lindi regions and about 655 700 ha of land are under cassava (Lazaro *et al.*, 2007).

Furthermore, cassava is a staple food crop in most of the semi-arid and the frequently drought suffering areas (Lazaro *et al.*, 2007). Moreover, the crop is still perceived as a food security crop rather than a raw material for other industries. Cassava contributes to an average of 15% in the national food production basket and is second to maize (Mtambo, 2007). The importance of cassava, like in other cassava growing countries, includes ensuring household food security and source of income.

1.1.2 Sweet potato sub sector

Sweet potato (*Ipomoea batatas L.*) is an important traditional crop that is grown customarily by small-scale farmers mainly for household consumption. It ranks as the seventh most important food crop in the world after wheat, rice, maize, potato, barley, and cassava with a global annual production of over 133 million tons (CGIAR, 2006). It is an important root crop that provides food to a large segment of the world population, especially in the tropics and subtropics where bulk of these crops are cultivated and consumed. Asia is the largest sweet potato producing region with 125 million tons of annual production (Abegunde and Arogundade, 2012). China accounts for about 90% of worldwide sweet potato production with an annual production of 117 million tons (Magaji *et al.*, 2007).

According to International Potato Center (IPC) (2011), 7 million tons are produced in Africa annually, mostly for human consumption. However, African yields are quite low about a one third of Asian yields indicating huge potential for future growth (Mmasa *et al*., 2011). In East Africa, sweet potato is the main food crop in many rural areas (Gichuki and Hijmans, 2005). It forms 50% of rural household incomes in the region. The most common varieties grown are: white, red, purple and the yellow-fleshed sweet potato (FCI, 2008). Preparation of sweet potato food is commonly done by boiling, baking, frying or roasting the unprocessed tubers; however vines are fed to livestock particularly in areas like central Kenya where small-scale dairying in zero grazing management systems is well developed (Mmasa *et al*., 2011). According to Ndunguru (2003) sweet potato is an under-exploited food crop in East Africa. The limited range of ways and availability of adapting processing technologies in which sweet potato is utilized in the region seriously undermine its potential benefits to farmers, consumers and other chain actors.

Tanzania is the third largest producer of sweet potato in Africa after Nigeria and Uganda, producing almost 1.3 million tons (FAO, 2004). Moreover, sweet potatoes play an important role in food security, especially during periods of food scarcity particularly in those regions prone to drought and with poor soils like Shinyanga and Kagera regions (FAO, 2004). In these regions farmers process and store dried potatoes for up to six months as a food security strategy (URT, 2009). The low yields in the country are caused by many factors including susceptibility to pests and diseases, declining soil fertility, moisture stress, low level of crop husbandry and management and poor accessibility to markets (Ndunguru, 2003).

Moreover, sweet potato is mainly grown under small scale farming systems in Morogoro, Mbeya, Kigoma, Shinyanga, Mwanza, Rukwa and Kagera Regions. According to URT (2009), it was estimated that 470 600 ha was put under sweet potato cultivation in 2002/2003.

1.2 Problem Statement and Justification

Cassava and sweet potato provide employment and are important in sustaining food security and livelihood for the majority of small scale farmers in rural area. In Tanzania, they are grown as subsistence crops for both food security and for cash (URT, 2005). They are mostly frequently boiled, fermented, dried and milled into flour. Besides simple starches, cassava and sweet potato are rich in complex carbohydrates, dietary fiber, beta carotene (a vitamin A equivalent nutrient) and Vitamin C (Mmasa *et al*., 2011; Meludu, 2010; Adenuga, 2010).

Despite the fact that cassava and sweet potato presents an opportunity for small scale farmers in Tanzania, the potential to create a significant livelihood from selling cassava and sweet potato products often remains out of reach (Mmasa *et al*., 2011; Crissman *et al*., 2010). Besides, access to a reliable market and with limited transformation, the expected benefits from these crops and their products will not be visible. However, to the best of the author's knowledge, little has been done to develop cassava and sweet potato marketing system in Tanzania regardless of the apparent importance to the rural poor, the economy and food production in general. The marketing systems for cassava and sweet potato in Tanzania in general and the study area in particular are still traditional and mainly conducted informally at local markets or by the roadside. In most cases, producers have no access to any up-to-date market information that would enable them to negotiate

with consumers (buyers). So far, not much study has been conducted on analysis of cassava and sweet potato value chains that encompass the whole actors in the chain.

Thus, this study was conducted with the aim of making a comprehensive analysis of cassava and sweet potato value chains so as identify potential areas for intervention which will improve small-scale farmers' access to markets in the study area. Besides filling the existing research gap, the findings of this study will not only help the local value chain players and supporters to improve performance of small-scale farmers in the study area, but also development partners and planners to better target investments in cassava and sweet potato sub-sectors.

1.3 Significance of the Study

The study will give detailed information on how cassava and sweet potato value chains are currently functioning in Mvomero and Kongwa Districts. It will point out factors that constrain cassava and sweet potato production and marketing system. The study may also generate information that help how to formulate cassava and sweet potato marketing development programs and guidelines for interventions that would improve efficiency of the cassava and sweet potato marketing system. The findings of this study will benefit cassava and sweet potato farmers, processors and traders, policy makers, governmental and non-governmental organizations that have a stake in cassava and sweet potato marketing system and plan for interventions in the future. Finally, researchers who are planning to make further investigation in cassava and sweet potatoes may equally benefit from the results.

1.4 The Objectives of the Study

1.4.1 The overall objective

The overall objective of this study was to analyse cassava and sweet potato value chains so as to identify potential areas for intervention in order to improve small-scale farmers' access to markets in the study area.

1.4.2 Specific objectives

The specific objectives of the study were:

i. To map cassava and sweet potato value chains in Mvomero and Kongwa Districts.
ii. To examine how the value chain is organized, coordinated and governed among the key actors along the value chain.
iii. To determine profit and marketing margins obtained by actors at various nodes of cassava and sweet potato value chains.
iv. To analyse the determinants of cassava and sweet potato farmers' profitability in Mvomero and Kongwa Districts.
v. To analyse the marketing efficiency in various cassava and sweet potato marketing channels.
vi. To identify challenges faced by actors in cassava and sweet potato value chains.

1.5 Hypotheses

The study was guided by the following research hypotheses

i. Farmers receive the lowest market margins and gross margins compared to traders and processors.
ii. Farmers' socio-economic factors do not influence cassava and sweet potato profitability.

1.6 Research Questions

This study was guided by the following research questions:

i. What are the major characteristics of cassava and sweet potato value chains in Mvomero and Kongwa Districts?
ii. How well is the cassava and sweet potato value chains organized, coordinated and governed?
iii. How efficient is the value chain in terms of profit and marketing margins received by different actors along the chain?
iv. What are the main determinants of cassava and sweet potato farmers' profitability in Mvomero and Kongwa Districts?
v. What is the marketing efficiency under various cassava and sweet potato marketing channels?
vi. What are the major challenges facing the actors and what strategies can be adopted to improve linkages and efficiency in performing different operations in the cassava and sweet potato value chains?

1.7 Organization of the Study

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

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions of Terms and Concepts

2.1.1 Value chain concept

The concept of 'value chain' was initially popularised by Michael Porter in the 1980s as a tool for enhancing competitiveness of enterprises to attain a competitive edge. The concept has since been expanded to cater for larger units such as industry sub-sectors. Kaplinsky and Morris (2000) defined value chain as, "the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers and final disposal after use." Other researchers have defined value chain differently. For example, Brown (2009) defined value chain as, "the set of interconnected, value-creating activities undertaken by an enterprise or group of enterprises to develop, produce, deliver and service a product or service." Webber and Labaste (2010), on the other hand suggest that value chains include all of the vertically linked, interdependent processes that generate value for the consumer, as well as horizontal linkages to other value chains that provide intermediate goods and services.

In addition, KIT *et al.* (2006) defined value chain as a specific supply chain where actors actively seek to support each other so that they can increase their efficiency and competitiveness. They invest time, effort and money and build relationships with other actors to reach a common goal of satisfying consumers' needs. A value chain consists of input suppliers, producers, processors, traders, wholesalers, exporters, retailers and consumers of the product or service (Hellin and Meijer, 2006). Value chain also includes Research and Development. The farmer/producer combines the resources from research

and development; and input suppliers with land, labor and capital to produce commodities (ACDI/VOCA, 2006).

Based on Will (2008) value chain is characterized by a sequence of functions and linkages and coordination between the various actors and supporters. Value chain exists where operators share a common vision and goals for managing the chain processes, thus allowing for mutual decision-making on how to link production with markets while sharing risks and benefits. The better all value chain partners cooperate, the greater will be the value generated for the individual operator at every stage of the chain.

According to USAID (2009) taking a value chain approach requires understanding a market system in its totality. This includes all chain actors, supporters and the business environment in which the industry operates. The study also found out that within many staple food value chains in Africa, relationships between actors at different levels of the value chain are weak, disconnected or even adversarial. Information flows are often asymmetrical. In addition, there is a widespread lack of objective standards and grades. Consequently, transaction costs and risks and costs are high, and lack of transparency means that value chain actors enter into negotiations with mistrust (USAID, 2009).

2.1.2 Value chain analysis

According to Profit Zone Consultants Trainers (PZCT) (2010) value chain analysis involves critical examination of a value chain to determine the value added, the stage it is added and at what cost with the aim of improving the chain to create more value hence more benefits to the value chain participants. The goal of value chain analysis is to improve efficiency and profitability in the chain by tackling challenges and taking advantage of opportunities. Ultimately, value is added or created through innovation and

intervention in production, processing and marketing. Practitioners contend that detailed analysis helps to challenge the assumptions that often underpin development interventions (PZCT, 2010). Jensen (2009) argues that the analysis should be market driven to ensure the proper amount of investment is done.

Furthermore, value chain analysis looks at all activities related to the production, transformation, processing and trading activities until the final consumption of a product, and the external factors which influence the market chain of a product (Kusters *et al.*, 2006; Belcher, 2005). Focusing on the whole range of activities and relations associated with production, exchange, transportation and distribution of a particular commodity (Kaplinsky and Morris, 2001) argue that the value chain approach is simultaneously a descriptive tool and an analytic instrument.

Thus, the arguments presented by Webber and Labaste (2010) show that there are many ways to analyse or evaluate a value chain. Analysis can stem from research of secondary information such as government or industry data, to interviews with industry participants as well as participatory market assessments and observations.

2.1.3 Value chain governance

Governance refers to the inter-firm relationships and institutional mechanisms through which non-market coordination of activities in the chain is achieved (Bair, 2008). In Global Value Chains (GVC) analysis, governance is the process of organizing activities with the purpose of achieving a certain functional division of labor along a value chain resulting in the specific allocation of resources and distribution of gains (Ponte, 2007; Kaplinsky, 2000). It involves the definition of the terms of chain

membership, incorporation/exclusion of other actors accordingly and re-allocation of value-adding activities.

According to Marshal *et al*. (2006) the governance of value chains refers to how control is exercised within the chain, reflecting the relationships between different actors. It plays an important role in determining the sustainability of the overall chain and the accountability of benefit distribution, and can also influence how production capacities are upgraded. According to Kaplinsky and Morris (2001) value chain governance includes four stages: setting rules; supporting other actors in the chain in order to be able to adhere to the rules; monitoring adherence to the rules; and imposing sanctions where rules are violated. Purnomo *et al.* (2009) mentioned that good value chain governance ensures that interactions between firms along the value chain are efficient and effective. International Labour Organisation (ILO) (2006) cited by Purnomo *et al*. (2009) mentioned four types of value chain governance: market-based, balanced networks, directed networks and hierarchy. The four types of governance and their indicators as mentioned by Purnomo are:

Market-based: indicated by many customers and many suppliers; repeated transactions possible, but information flows limited; and no technical assistance. Enterprises deal with each other in arms length transactions.

Balanced network: indicated by supplier having various customers; intense information flow in both directions; and both sides have the capabilities and commitment to solve problems through negotiation. Enterprises co-operate and have complementary competences but no control over each other.

Directed network: indicated by main customer takes at least 50% of output; customer defines the product and provides technical assistance; and imbalance of information. The

lead firm sets the parameters under which others in the chain operate and the relationship is quasi-hierarchical.

Hierarchy: indicated by vertical integration; supplying establishment owned by the customer; and the parent company controls its subsidiaries and very limited autonomy to take decisions at the local level.

Thus, governance within global value chains has been identified as an important determinant of how value is controlled and distributed along a value chain and how it ultimately affects livelihoods (Belcher and Schreckenberg, 2007; Schreckenberg *et al*., 2006). Particular determinants include how access to a market is governed to determine how, where and when actors participate in a value chain, how and where funnels for technical assistance enter the chain and who and which stages of value chains are promoted for policy initiatives (Purnomo *et al.,* 2009; Keane, 2008).

2.1.4 Value chain coordination and organization

According to ITC (2011), the value chain organization describes the institutional set up of the marketing agents in the value chain. Moreover, it examines the relationship between actors along the value chain and how the trade is conducted. The value chain organization describes the marketing channels together with the flows of the goods and services in the chain. The way a value chain is organized also influences its competitiveness. The value chain organization depends on the nature and types of institutions existing in a particular value chain (Makindara, 2012). The institutions can either be political, legal or social (Sykuta and Harvey, 2004). Tomas *et al*. (2008) describe value chain coordination as it deals with organization coordination between functions and activities in the supply chain (e.g. customer orientation, competitor orientation, logistic management, operational management and supply management).

Makindara (2012) also argued that coordination is considered to be one of the crucial components in an organization's effort to achieve efficient and effective value chain management practices. Likewise, little is known in terms of cassava and sweet potatoes value chains organization and coordination in Tanzania. Thus, critical examination of the current cassava and sweet potato value chains was done in this study so as to assess the efficiency and effectiveness of the chains.

2.1.5 Value chain mapping

According to ILO (2009), mapping a chain means creating a visual representation of the connections between businesses in value chains as well as other market players. In its simplest form it is merely a flow diagram (i.e. illustrating the core transactions of value chains). It has very practical implications for a value chain initiative which are:

(i) It helps to illustrate and understand the process by which a product goes through several stages until it reaches the final customer (i.e. the core transactions). Knowing about the different levels in a value chain is also a precondition for identifying bottlenecks that are preventing the achievement of certain targets.

(ii) It serves as a way of identifying and categorizing key market players. Such value chain maps (or inventories) have been used in projects to invite market players to various workshops and events, arrange interview appointments with them or form steering groups comprising key market players.

(iii) Apart from businesses involved in core transactions, value chain maps can also illustrate which other supporting organizations (government, NGOs, associations, etc.) are available, and which value chain levels they concentrate their services on.

(iv) If a value chain initiative intends to explore market opportunities, value chain maps can show up differently market channels through which products and services reach the final customer. These maps can also provide additional

information on the relevance of individual market channels and the nature of relationships (e.g. number of competitors, size of market, number of workers, value chain governance, etc.)

(v) A value chain map can help companies investing in emerging markets to orient their activities, i.e. to identify important stakeholders, possible marketing or supply channels, competitors, weak links in the chain.

2.1.6 The concept of gender

Gender is defined by the Food and Agriculture Organization (FAO) as the relations between men and women, both perceptual and material. Gender is not determined biologically, as a result of sexual characteristics of either women or men, but is constructed socially. It is a central organizing principle of societies, and often governs the processes of production and reproduction, consumption and distribution (FAO, 1997). According to FAO definition, gender issues focus on women and on the relationship between men and women, their roles, access to and control over resources, division of labour, interests and needs. Gender relations affect household security, family well-being, planning, production and many other aspects of life (Bravo-Baumann, 2000).

Both women and men are actively involved in cassava and sweet potato subsectors. USAID (2009) claimed that men and women's roles and responsibilities differ throughout the value chain.

2.1.7 Market and marketing

The term market has got a variety of meanings. Traditionally, market can be defined as a specific geographical area where buyers and sellers meet for exchange of goods and services (Zeberga, 2010). The most common way of obtaining goods and services that are

not produced in a particular area is to buy such goods and services from another area that specializes in producing it. To make such purchases, buyers seek out sellers in the markets. According to Hyman (1989) markets are ways in which buyers and sellers can conduct transactions resulting in mutual net gains that otherwise would not be possible. It also means the people living there who have the means and the desire to buy a product. Thus, there can be a “local" market, a "domestic" market, and a “world" market. The limits of this kind of market are set not by a physical boundary fence but by the ease of communication, transportation, political and monitory barriers to the free movement of goods and money (Zeberga, 2010).

The choice as to which market definition to use depends on the problem to be analysed (Zeberga, 2010). A market is an institutional and organizational arrangement to facilitate exchange of one thing for another (Zeberga, 2010). The most observable features of a market are its pricing and exchange processes. A market is thought of as a meeting of buyers and sellers: a place where sellers and buyers meet and exchange takes place, an area where price determining forces (supply and demand) operates, an area where there is a demand for good (Andargachew, 1990). A market is a mechanism or an institution through which buyers and sellers exchange information and transact. No need to meet physically for a market to operate, especially in today’s information and communication technologies (Zeberga, 2010).

Another basic concept that is closely related to market is marketing. The term marketing has been a very debatable concept and defined in so many different ways by different scholars (Zeberga, 2010). This is because marketing, or more specifically agricultural marketing, projects different impression to different groups of people in a society, like farmers, traders and consumers (Kohls and Uhl, 1985). According to Jahan (2011),

marketing has been defined as the performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until they are in the hands of consumers.

Mendoza (1995) also defined marketing as a system because marketing usually comprises several interrelated structures along the production, distribution and consumption units underpinning the economic process. According to Ringold and Weitz (2007), marketing encompasses all of the business activities performed in directing the flow of goods and services from the producer to the consumer or final user. These activities are usually classified into six stages. These are: production, assembly, processing, wholesaling, retailing and consumption.

Based on Kotler (2003), marketing is a social process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others. For managerial definition, marketing has often been described as ‘the art of selling products’, but people are surprised when they hear that the most important part of marketing is not selling, i.e. selling is only the tip of the marketing iceberg (Sarsar, 2009).

Marketing is also an important aspect of any crop /system. It provides the mechanism whereby farmers/producers exchange their crop products for cash. The cash is used for acquiring goods and services, which they do not produce themselves, in order to satisfy a variety of needs including food, clothing, medication, schooling, and the purchase of production inputs.

2.1.7.1 Market chain and business support services

According to Lundy *et al*. (2004) a market chain is used to describe the numerous links that connect all the actors and transactions involved in the movement of agricultural goods from the farm to the consumer. Supporting these activities are services that enable the chain to operate. Agricultural goods and products flow up the chain and money flows down the chain. The efficiency of the market chain is generally a factor of how well information flows among these actors (Zeberga, 2010). Given the many challenges of the marketplace, it is vital to suggest that a practical starting point in developing a marketing strategy is to assist chain actors to visualize their market chain from beginning to end (Lundy *et al*., 2004). Market chains operate more competitively when they are supported by dedicated business organizations, both formal and informal, which participate in enabling produce to flow from the farm gate to the final consumer (Lundy *et al*., 2004).

2.1.7.2 Marketing channels

According to Giles (1973), the term 'channels of distribution' refer to the system of marketing institutions through which goods or services are transferred from the original producers to the ultimate users or consumers. Most frequently a physical product transfer is involved, but sometimes an intermediate marketing institution may take title to goods without actually handling them. These intermediaries constitute a marketing channel also called a trader channel or distribution channel (Takele, 2010).

Kohls and Uhl (1990), cited by DucHai (2003) defined marketing channels as "alternative routes of product flows from producers to consumers." They focus on the marketing of agricultural products, as does this study. The marketing channel starts at the farm-gate and ends at the consumer's front door. The marketing channel approach focuses on firm's selling strategies to satisfy consumer preferences (Takele, 2010).

Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). The channel system creates time, place, possession and form utilities. However, the benefits of the channel system cannot be enjoyed without an element of cost. This channel may be short or long depending on the kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al.*, 2001).

Therefore, product may take many routes on its journey from a producer to buyers and marketers search for the most efficient route from the many alternatives available. The channel may be direct or indirect (Muthuya, 2008). In the direct channel a producer and ultimate consumer deal directly with each other. In the indirect channel intermediaries are involved between the producers and final consumers and perform numerous channel functions. To choose appropriate channel environmental factors, consumer characteristics, product type and the firm financial, human and technological capabilities determine (FSA, 2011).

2.1.7.3 Marketing system

A marketing system is a collection of channels, intermediaries, and business activities, which facilitate the physical distribution and economic exchange of goods (Kohls and Uhl, 1985). The concept of marketing system includes both the physical distribution of economic input and products and the mechanism for coordinating production and distribution (Andargachew, 1990). Branson and Norvell (1983) defined the marketing system in terms of what is otherwise known as a marketing channel. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and

services from producers to consumers (Zeberga, 2010). The marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers (Islam *et al*., 2001).

Therefore, a marketing system comprises several, usually; stable, interrelated structures that, along with production, distribution, and consumption, underpin the economic process (Mendoza, 1995). It can be regarded as a multi-layered sequence of physical activities and of transfers of property rights from the farm-gate to the consumer including brokerage, storage, processing, transport and trade financing (Harris-White, 1995). The efficiency with which a marketing system in an area or country operates can influence the living standards of people and the overall development of a nation and thus it is vital to make improvement in marketing efficiency to trigger economic development of a country.

2.2 Cassava Marketing and Value Chain

2.2.1 Cassava marketing and value chain in Africa

Mumbeya (2011) studied a value chain and market integration analysis of the cassava market in the Democratic Republic of Congo. Value chain analysis and market integration techniques were used to analyze the collected data. The value chain analysis was performed to identify critical issues and constraints that undermined value chain development, as well as identify business and technological opportunities that can enhance the performance and competitiveness of the sub-sector. The study found that the price of cassava products in the DRC was high due to the high cost of production, processing and marketing of cassava at different levels of the market chain. Moreover, Mumbeya (2011) argued that poor market linkages lead to low utilization of value added technologies and this contributes directly to poor market opportunities. A market

integration analysis was conducted to consider whether food policy focusing on two reference marketplaces would be sufficient to stabilize the cassava supply nationwide.

Mumbeya (2011) found further that the poor value chain status of cassava leads to the stagnation of this crop as a semi-commercial crop and restrains its absorption into the mainstream market chain in local, national and regional markets. Mumbeya (2011) concludes that understanding of the causes of food insecurity and various issues surrounding market integration would further help policy makers to improve efficiency of the cassava marketing system, lower farm to retail price spread and consolidate food security across the country.

Enete (2009) examined the argument that middlemen exploit farmers through monopsony purchases and usury applies to cassava farmers. The study was based on primary data collected within the framework of the collaborative study of cassava in Africa. Findings from the study failed to support the view that middlemen generally engage in monopsony purchases of cassava products, because farmers had on average, higher volume of cassava products for sale in the market than middlemen.

Oluwasola (2009) analyzed the economics of cassava processing by rural farm households to establish the socio-economic and policy strategies required to stimulate rural enterprise in Oyo State, located in the Southwest geopolitical zone of Nigeria. Multistage sampling technique was used to collect data from 150 respondents using a structured questionnaire. Descriptive statistics, budgetary analysis and the Cobb Douglas regression function were used to analyze the collected data. Oluwasola (2009) argued that age, experience and size of enterprise were significant determinants of the profitability of cassava processing enterprises while age, experience, level of education and initial capital

outlay were significant determinants of the size of the enterprise. Oluwasola (2009) claim that policy efforts should be geared towards accessing processors with locally fabricated machines while policy, research and extension regarding food processing at the rural farm-gate should be tailored to meet the needs and constraints of women.

2.2.2 Cassava marketing and value chain in Tanzania

Sewando (2012) studied urban markets-linked cassava value chain in the Morogoro rural District, Tanzania with the aim of examining the cassava value chain in order to determine strategies for enhancing profitable farmers' participation in the cassava value chain in reducing poverty. Profit and marketing margins along the cassava value chain were computed. Linear model was estimated whereby farm size, experience, total family labour, group participation, non-crop livelihood sources and food insecurity were the main determinants of profitability. Sewando (2012) claimed that there was weak vertical and horizontal coordination along the cassava value chain. Furthermore, Sewando (2012) claimed that the profitability of cassava at farm level is negatively affected by lack of the farmers' group. Sewando (2012) concludes that efforts to improve both horizontal and vertical coordination are required.

Mdoe *et al.* (2011) studied farmers' preferential choice decision of alternative cassava value chain strands and as well as factors behind such decisions in the Morogoro rural District, Tanzania. Factor analysis was first used to reduce and identify the factors (variables) for further analysis whereby the factors with highest eigen values were applied to develop factor scores to measure the attitudinal variables. Mdoe *et al.* (2011) argued that farmers have positive risk attitude towards participation in the alternative cassava value chain strands for commercialization. Also a count data model known as a Poisson model was applied to determine the factors which influenced this attitude. Mdoe *et al.*

(2011) claimed that farm size, experience, female-headed households and landholding had influenced the farmers' preferential choice decision. Mdoe *et al.* (2011) suggests strengthening coordination, provision of improved cassava varieties and introduction of cassava processing technologies for enhancing farmers' participation in profitable cassava value chain strands.

2.3 Sweet Potato Marketing and Value Chain

2.3.1 Sweet potato marketing and value chain in Africa

Anyaegbunam *et al.* (2009) conducted an evaluation of the income generation level and constraints of sweet potato Landrace production in the Ikom agricultural zone of Cross River State, Nigeria. The data collected were analyzed with descriptive statistics, profitability and Cobb Douglas production function Model. On the aspect of profit maximization by Otere-two farmers, Anyaegbunam *et al.* (2009) claimed that a profit of N2.71 was realized for each N1.00 invested in the production of the crop. Moreover, Anyaegbunam *et al.* (2009) argued that costs of planting material and other inputs were positive and significantly related with gross return from Otere-two variety production. While human labour was found to have a negative but significant relationship with a gross return from Otere-two variety production. Factors like cost of fertilizer and transport cost were positive and negative but have no significant relationship with a gross return from Otere-two variety production (Anyaegbunam *et al.,* 2009). From the regression Anyaegbunam *et al.* (2009) claimed that the production of Otere-two variety of sweet potato by the farmers was decreasing suggesting that the production is within subsistence level.

Ohajianya and Ugochukwu (2011) explored factors (related to fixed and variable transaction costs) that influence decision to participate in sweet potato markets by a random sample small holder farmer in south eastern Nigeria. The data collected were analyzed with the ordered probit analysis procedure. According to Ohajianya and Ugochukwu (2011) participation decisions revealed that marketing experience, farm size, membership of cooperatives/social organizations, extension contact, farming experience and road conditions to the nearest town had a positive relationship with a decision to be autarkic other than the buyer and to be seller other than autarkic, and were significant at the 1% level of probability. Moreover, Ohajianya and Ugochukwu (2011) claimed that the coefficient of age, household size, and output were also positive and significantly related to the decision to be autarkic other than the buyer and to be seller other than autarkic at the 5% level of probability.

The coefficients for access to credit, and access to communication facilities were positive and significantly relate to the decision to remain autarkic other than the buyer and to be seller other than autarkic (Ohajianya and Ugochukwu, 2011). The coefficients for level of education, distance to the nearest town, distance from the farm to the market and cost of transportation were negative and significantly related to the decision to remain autarkic other than a seller and to be buyer other autarkic at the 1% level of probability. The coefficient for sex was positively and significantly related to decision by female farmers to be autarkic other than the buyer and to be seller other than autarkic. These decisions to participate as a buyer, seller or to remain autarkic were as a result of fixed and proportional transaction costs associated with participating in the market (Ohajianya and Ugochukwu, 2011).

Darroch *et al.* (2010) analysed factors that influence adoption and intensity of adoption of orange flesh sweet potato varieties: evidence from an extension intervention in Nyanza and Western province, Kenya. The study also investigated whether participation in a value chain extension intervention program increased these farmers' likelihood of adopting OFSP. The study applied logic and logit transformed regression to examine factors affecting the adoption of Orange Flesh Sweet-Potatoes (OFSP), and intensity of such adoption, by a representative sample of 340 farmers in the Busia and Rachuonyo districts of Kenya in 2009. Darroch *et al.* (2010) claimed that the district where the farmer comes from, knowledge on value addition, nutritional benefits and availability of vines were the key factors for adoption. Moreover, the study argued that participation in a value chain extension program enhanced the probability of adoption whereby factors affecting the intensity of adoption were site, value addition, vines availability, level of commercialization and having a child of up to five years.

Engoru *et al.* (2005) aimed to characterize tuber utilization among sweet potato producers in eastern Uganda. The data collected were analysed using SPSS for frequencies and descriptive statistics. Engoru *et al.* (2005) claimed that all potato farmers consume part of their produce while still fresh (unprocessed). About 46.1 % of the farmers process their fresh sweet potato tubers, into various products. The processing generate two primarily products locally called *inginyo* and *amukeke*. Further processing of these two secondary products produces *amukeke* flour and *inginyo* flour.

2.3.2 Sweet potato marketing and value chain in Tanzania

Mmasa e*t al.* (2011) aimed at mapping sweet potato value chain linkages between actors, processes and activities in Tanzania specifically in Shinyanga rural and Mwanza urban Districts. Sub-sector mapping analysis and content/context analysis were used.

A map obtained was shown that there are three main marketing channels exist in the study area: Producers selling directly to consumers; producers to retailers to consumer; and producers to hawkers/village vendors to consumers. Moreover, Mmasa *et al*. (2011) found out that "*Michembe*" and "*Matobolwa*" were two main local made value added products derived from sweet potato preferred by producers. Mmasa *et al*. (2011) concludes that the sweet potato sub sector in general faces a number of structural and technological problems that need immediate attention to restore agricultural sector development.

According to Gichuki *et al.* (2005) in Tanzania, sweet potato is processed into two main products namely, "*Michembe*", where the roots are withered, i.e. cut into slices and dried, and "*Matobolwa*", where the roots are boiled, sliced and dried; both of these products can last for 5 up to 10 months. Other products that can be prepared from sweet potato in Tanzania include cake, chapattis, doughnut, *kalimati*, meal flour, porridge and crisps.

Mmasa e*t al.* (2012) analysed factors affecting consumption of value added products of sweet potato in Shinyanga rural and Mwanza urban Districts. Analyses of the factors hypothesized to influence the consumption of sweet potato were carried out using multiple regression analysis. The goodness of fit of the model which is high as measured using coefficients of determination (R^2). The higher value of R^2 suggests that variables included in the model explained about 73% of the variations in the dependent variable. The F–Value is significant, indicating that the explanatory variables were statistically significant in explaining variation in the dependent variable. Furthermore, Variance Inflation Factor confirms absence of a serious collinearity problem. Similarly, Durbin Watson test confirms the absence of autocorrelation.

Furthermore, Mmasa e*t al.* (2012) claimed that the sizes of land owned and education level are highly statistically significant at (p <0.01) and statistically significant (p < 0.05) respectively. Hence there is a need for farmers to increase the land area for sweet potato production to medium scale. Regarding to sweet potato prices it was found to vary from one node to another. However, there are a number of challenges facing the development of the sweet potato industry in Tanzania. The chronic shortage of seed is the most important challenge that needs to be dealt with (33.1%). Others were lack of capital (26.8%) unpredicted weather and pests/insect attack were the most critical challenges facing the subsector.

2.4 Theoretical Framework and Empirical Methods

2.4.1 Sub-sector mapping

A Subsector is defined as a vertical grouping of enterprises involved in the production and marketing of one well-defined product or several closely related products (Boomgard *et al.*, 1992). A commodity subsector does not necessarily lie strictly within one particular sector; it can cut across other sectors. For example, cotton is grown in the agriculture sector, shipped in a factory by the transport sector, processed in the manufacturing sector, and so on. The key is the network, which is based around a common raw material or a common output. An essential tool for the analysis of this system is the subsector map.

The map illustrates the flow of products from producer to consumer in quantitative, graphic terms, as well as the interrelationship among participants in the subsector. There are several components that should be illustrated in the map:

Markets: Markets are the final destination of the product. This can be defined either by location such as domestic or international or by the type of consumer.

Functions: Each step that the product goes through during the production and distribution system is referred to as a function.

Participants: Participants are the key actors and their roles within the subsector.

Channels: Channels are made up of participants, differentiated by technologies, functions and linkages. Goods flow to the market through different channels.

According to Lusby (1999), subsector analysis is a process that:

i. Examines the relationships between enterprises that produce, procure, process, and distribute goods within a single product group.
ii. Identifies the constraints and opportunities facing these enterprises along with potential support initiatives to address them.
iii. Identifies sources of leverage where support initiatives can have the greatest impact.

Today, subsector analysis is seen as very similar to value chain analysis (indeed the terms are often used interchangeably). However, advocates of the Global Commodity Chain school of Value Chain Analysis see subsector analysis as being restricted to activities within national boundaries (Wildt *et al.*, 2006). Moreover, subsector analysis remains an important tool in any subsector program (Lusby, 1999). It enables program designers to get a clear grasp of what's going on between the different actors (large and small) in a particular industry. It enables them to determine what the major constraints/ opportunities are for increased growth. And it provides a basis for identifying support initiatives that can impact large numbers of MSEs. Thus, subsector analysis can be used in the context of many kinds of development programs.

2.4.1.1 Empirical studies on sub-sector mapping analysis

USAID (2007) employed the value chain mapping method to map of the value chain for cocoa beans from Indonesia where it was mapping the various functions, key participants performing those functions in the value chain and their dynamic interrelationships.

SNV (2009) carried out value chain analysis study for the current structure of beekeeping sub-sectors in Rwanda. Mapping procedure was used to assess the existing vertical and horizontal linkages within the sub-sector as well as functions and roles of actors from input supply to the final consumers. It ended up with a map showing a clear picture of the link of the actors, activities and existing relationships across the beekeeping actors.

Thus, in this study sub-sector mapping analysis was adopted to identify the key value chain stakeholders in the chains and how was connected to each other.

2.4.2 Profit maximization theory

The profit maximization theory assumes that peasants are profit maximizing economic agent and are thus efficient producers (Alene, 2003). Since the process of decision making of a peasant family involves production and consumption aspects, another theory like the risk-averse peasant theory argues that poor small farmers are necessarily risk-averse and they attempt to increase family security rather than maximize profit (Mendola, 2005). As small-scale farmers often operate in a household economy, consumption and production decisions are assumed to be independent (Rweyemamu, 2001). Doing so enables farmers' focus to be placed directly on market channel of their choices and the resulting impact on farm output/crop profits. According to Blandon *et al.* (2007) a small-scale producer is assumed to choose the level of output for each distribution channel in a manner that maximizes profits.

Karuga (2009) argued that the main motivating factor of traders to guarantee their capital in marketing is the level of profit received from their capital invested. Thus, the most profitable segment along cassava and sweet potato value chains will attract capital relative to the lower profitable segments.

2.4.2.1 Gross Margin of cassava and sweet potato marketing enterprises

There are various measures of profitability of the enterprises which are Gross Margin (GM), Return on Investment (ROI), Benefit-Cost Ratio (BCR or B/C), Internal Rate of Return (IRR), and Marketing Margin (MM) (Turuka, 2000). However, Kotler and Armstrong (2006) argued that to date there is no adequate measurement of profitability available in the marketing sector. A study by Kotler and Armstrong (2006) for marketing exclusives and professional revealed that 68% of marketing executives have difficulties in measuring profitability of investment and 73% of them reported that there is an adequate profitability measurement tool.

Nevertheless, the GM is an important measure of resource efficiency in small and Medium Enterprises (SMEs). GM is a gross return minus the total variable expenses, which can be expressed in normal value, ratios or as a percentage of return (Debertin, 1993). The normal profit is the last payment a trader or the owner of the enterprise would be willing to accept for performing the entrepreneurial functions. Thus, receiving a normal profit is important in order to keep the trader or the owner from withdrawing the capital and managerial effort and putting it into another alternative business (Kotler and Armstrong, 2006).

GM can be expressed as a ratio or in percentage in order to compare the profitability of enterprises at different stages along the cassava and sweet potato (Mendoza, 1995). Therefore, the GM, when expressed as ratio or percentages is given by;

$$\text{Percentage/ratio} = \frac{\text{Total Revenue (TR)} - \text{Total Voriable Cost (TVC)}}{\text{Total Revenue (TR)}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

The expression above cannot be used to show the normal value of the earnings of the enterprises and cannot be used to measure profitability of non production enterprises. However, the expression is useful for comparing profit across different enterprises and different segments along the value chain (Mendoza, 1995).

Therefore, to calculate GM of different enterprises in different segments along cassava and sweet potato value chains require a detail analysis of the account of the enterprises, noting precisely the cost incurred and the value added at each stage along the value chains (Debertin, 1993). Therefore, GM analysis has been used to identify returns (profit) obtained by traders at each stage along cassava and sweet potato value chains.

Eskola (2005) used GM to analyse profit for rice in two different markets which were Ifakara and Dar es Salaam. The findings show that local traders and brokers of rice in Ifakara market obtained a profit of 10-20% per kg; large scale trader obtains a profit of Tshs. 20 000 per trip to buy goods from the region; rice wholesalers at Kariakoo markets obtained a profit of Tshs. 10 000 to 15 000 daily; and rice wholesalers at Tandale market obtained a profit of Tshs. 40 – 48 per kg. Therefore, the limitation of the methodology used by Eskola (2005) is that it does not have a uniform unit of profitability measurement across the different traders. Also, traders are not grouped into homogenous groups

performing similar functions which might be misleading and difficult to interpret when attempting to formulate policy.

Debertin (1993) identified some problems of using GM as a measure of profitability, which are failing to deduct the opportunity costs for the money invested in the enterprise. Furthermore, Ponte (2002) argued that GM has several disadvantages including failure to account for variation of fixed costs, and failure to make allowances of costs for depreciation and obsolescence of fixed assets.

However, Phiri (1991) argued that GM is still the most satisfactory measure of resource efficiency to Small and Medium Enterprises (SMEs). It gives a good indication of the financial health of enterprises; and shows the deep insight into trader' management efficiency of the enterprises (Hammod, 2001). Thus, without adequate GM received by traders, their ability to pay operating costs and hence their business sustainability is jeopardized (Hammod, 2001).

Therefore, an estimation of enterprise profitability along the value chains will harmonize the attitude of consumers, politicians and policy makers toward cassava and sweet potato traders who are thought to be exploiters. The amount of profit received will separate the facts from prejudice and enable one to refute allegations that traders exploit both farmers and consumers. Moreover, computing GM across different enterprises is vital because traders tend to shift tied capital to more highly profitable enterprises or segments in the cassava and sweet potato marketing systems. Thus, the higher the GM earning enterprises warrant the traders' working capital to more profitable enterprises. Hence, working capital is switched off from low GM enterprises to highly GM earning enterprises (Rweyemamu, 2001).

Despite the weaknesses of GM as a measurement of profitability, it remains the most satisfactory measures of resources efficiency. The GM is useful for cassava and sweet potato enterprises operated by small scale farmers and middlemen performing different marketing functions for profit objectives.

2.4.3 Marketing margins

Marketing margin or price spread is a commonly used measure of the performance of a marketing system (Abbott and Makeham, 1990). It can be a useful descriptive statistics if used to show how the consumers' expenditure is divided among market participants at different levels of the marketing systems. Marketing margin is defined as the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price (Cramers and Jensen, 1982). A wide margin means usually high prices to consumers and low prices to producers (Gebregziabher, 2010). The total marketing margin may be subdivided into different components: all the costs of marketing services and the profit margins or net returns. The marketing margin in an imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit (Wolday, 1994).

According to Tomek and Robinson (1990), marketing margins provide neither a measure of farmers' well-being nor of marketing firms' performance. However, they give an indication of the performance of a particular industry or an indication of the market's structure and efficiency. For instance, Gordon and Hazledine (1996) argued that the form of the market power is likely to manifest in larger marketing margins than would otherwise be the case. Therefore, marketing margins are the result of demand and supply factors, marketing costs, and the degree of marketing channel competition (Ojogho *et al*., 2012). Sexton *et al.* (2005) argued that even though variations in the margin over time

might be attributable to marginal marketing costs under perfect competition, additional factors such as seasonality, technological changes, and sales volume may also explain the variations in the margin. Thus, margins reflect aggregate processing and retailing firm behavior which influence the level and variability of farm prices and may influence the farmer's share of the consumer food dollar (Tomek and Robinson, 1990).

2.4.3.1 Empirical studies on marketing margin analysis

A large number of studies have analysed the marketing margins for different types of commodities to examine the performance of agricultural product marketing. For example, Gebregziabher (2010) conducted a study on the market chain analysis of poultry in Alamata and Atsbi-Wonberta Woredas of Tigray Region, Ethiopia. The data were collected from individual interview using pre-tested questionnaire. The primary data collected were analysed by descriptive statistics. The quantitative data were analysed by Heckman two stage econometric models as well as profit and marketing margins. The result obtained in the marketing margin analysis shown that a large proportion of the total marketing margin generated in value chain goes to the retailer.

Kariuki (2011) assessed the price spreads along the different Omena fish marketing channels in selected outlets in Kenya using gross marketing margin analysis. Kariuki (2011) claimed that *Omena* marketing channels are to a large degree effective as it regards to meeting the consumption needs. However, he argued that longer marketing channels resulted not only to high costs and thus high retail prices; but also to lower returns to the fishermen.

Abassian *et al.* (2012) conducted an economic analysis of marketing margin of mazafati date in Sistan and Blouchestan-Iran in order to estimate the economic function of factors

affecting the date marketing margin in the province. The data were collected through field survey and document analysis. A combination of models including the Price Increase Model, Relative Price and Marketing Margin were used during data analysis. Abassian *et al.* (2012) found that farm-gate price and harvest margin of dates were among the highly influential factors on the entire marketing margin. The retail-margin function was influenced by retail price and retailer cost and the wholesale margin function were affected by wholesale price and wholesaler cost.

In general, there are three methods used in estimating marketing margin. (a) Detailed analyses of the accounts of trading firms at each stage of the marketing chain (time lag method); (b) computations of share of the consumer price obtained by producers and traders at each stage of the marketing chain; and (c) concurrent method: comparison of prices at different levels of marketing over the same period of time (Scarborough and Kydd, 1992). This study therefore employed the use of concurrent method due to complexities in data issues in the remaining method.

2.4.4 Regression analysis

Regression analysis is a statistical forecasting model that is concerned with describing and evaluating relationship between given variables i.e. the dependent and independent variables (Manage, 2007). The regression analysis can be used to predict the outcome of a given dependent variable based on the interaction of other related explanatory variables. Regression models depend on several assumptions. Firstly, the predictors must be linearly independent i.e. it must be possible to express any predictor as linear combination to others. Secondly, error terms must be normally distributed and independent and, thirdly, the variance of the error terms must be constant (Manage, 2007).

In this study a linear regression model was used to analyse the determinants of cassava and sweet potato farmers' profitability (Equation 2). This approach was also used by Sewando (2012) to identify the determinant of farmers' profitability, whereby farm size, experience, total family labour, group participation, non-crop livelihood sources and food insecurity were the main determinants of cassava profitability.

$$Y = \alpha + \beta Xi + \mu \quad \ldots\ldots\ldots\ldots(2)$$

Whereby:

Y	=	Dependent variable,
X_i	=	Independent variables,
α	=	Constant term, μ=error term,
β	=	Degree to which independent variables influence dependent variable.

2.4.5 Marketing efficiency

According to Kohls and Uhl (1967) marketing efficiency is the ratio of input and output. An increase in this ratio represents improved efficiency while a decrease donates reduced efficiency. It is considered to be a pre-requisite for prompt delivery of goods. Prompt delivery of food at a reasonable price is possible only if the market works in a competitive way. Competitive mechanism is possible only when the market agents are free to exercise their actions. An efficient marketing system implies that price spread or marketing margin is fairly less (Kanakaraj, 2010). In market integration terminology, prices in spatially separated markets will differ only by transaction costs among markets. Lower price spread also implies that both consumers and producers are gaining from affordable price and reasonable profit. Hence, an efficient marketing system implies the existence of market integration (Kanakaraj, 2010).

Marketing efficiency depends on the market structure, the nature of commodity and the socio-political system (Kanakaraj, 2010). Price stability can also be considered as an indicator of the efficient market system. Hence, it can be argued that there are several factors that determine marketing efficiency including economic efficiency and technical efficiency (Kanakaraj, 2010).

According to Lipsey and Harbury (1992) economic efficiency has two components: (i) Productive efficiency, and (ii) Allocative efficiency. Productive efficiency is a situation when it is not possible to produce more of any one good without producing less of any other good. Allocative efficiency involves choosing between productively efficient bundles. Resources are said to be allocated efficiently when it is not possible to produce a combination of different goods from that currently being produced which will allow any one person to be made better off without making at least one other person worse off (Lipsey and Harbury, 1992). Thus, as the term denotes it concerns matters related to trading or pricing so as to enrich the degree of competition. When there is enrichment in the degree of competition, the possibility of price spread will be lower. Lower price spread ensures remunerative and affordable prices to various economic agents. Hence, effective measures of pricing efficiency ensure an efficient market system (Kanakaraj, 2010).

In addition, as a firm is considered more technically efficient than another if, given the same quantity of measurable inputs; it consistently produces a larger output (Lau and Yotopoulos, 1971).

All these definitions are converging as pointing out that technical efficient system should ensure least cost combination. And an ideal marketing system originates from optimum

marketing efficiency resulting from operational and economic efficiency. Hence, a market through economical and organizational efficiency tries to function effectively. If the organizational and pricing structure smooths the free flow of market information it will lead to an integrated market. Hence, marketing efficiency is concerned with the enhancement of utility with the most efficient utilization of scarce resources available in the marketing system; which is the basic principle of economics.

Acharya (1988) argued that the efficient marketing has several advantages including an increase in the farm production thereby stimulating the emergence of additional surpluses, means for raising the income levels of the farmers and enable the consumers to obtain the greatest possible satisfaction at the least possible cost.

2.4.5.1 Empirical assessment of marketing efficiency

Acharya's Modofied Marketing Efficiency

$$MME = \frac{FP}{MC + MM} \quad \text{.....(3)}$$

Whereby:

MME = Modified measure of marketing efficiency

FP = Price received by farmers

MC = Marketing cost

MM = Marketing margin

According to Shepherd (1965) the ratio of the total value of goods marketed to the marketing cost may be used as a measure of marketing efficiency. The marketing efficiency is measured as

$$\text{Marketing efficiency} = \frac{\text{Consumer price}}{\text{Total Marketing Cost}} - 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

This method eliminates the problem of measurement of value added.

Emam (2010) aimed to measure the marketing efficiency of meat poultry in Khartoum State. Analysis of net marketing margins and marketing efficiency for wholesalers and retailers were carried out using descriptive statistics tool and quantitative analysis techniques. The results reflected to the fact that rent, transportation and taxes costs represented higher percentages in the total marketing costs for each trader. Retailers got higher marketing efficiency than wholesalers.

Emam (2010) found further that meat poultry channels in Khartoum State markets passes from producer to consumer through: wholesaler, wholesaler and processor or wholesaler and retailer. Also, the findings show that about 50% and 35% of wholesalers and retailers, respectively, were facing obstacles in transportation. 90% of wholesalers and 75% of retailers were facing constraints in poor extension services. Emam (2010) concludes that marketing efficiency at wholesaler’s meat poultry in Khartoum State market can be increased through reducing marketing costs, provision of extension and credit services and encourage investment in this efficiency activity.

Anyaegbunam and Nto (2011) aimed to determine the sweet potato marketing channel, gross marketing margin and returns, marketing efficiency and state the policy implications of the study in South east agro ecological zone of Nigeria. Data collected were analysed using marketing margin, Net-return analyses, Efficiency ratio, Chisquare and Duncan multiple range tests. Anyaegbunam and Nto (2011) claimed that sweet potato marketing is not efficient but lucrative. Efficiency results revealed that none of the

states/sectors had an efficiency of 100%. The efficiencies range (20-80%). There were significant differences in marketing efficiencies in the markets across the states studied. Anyaegbunam and Nto (2011) argued that lack of infrastructural facilities is the main problem militating against an efficient marketing system in the zone under study. Anyaegbunam and Nto (2011) suggest that infrastructural facilities should be provided for the marketers to reduce spoilage and distressed sales. This will improve marketing efficiency.

2.5 The Conceptual Framework

This study adopted and modified conceptual framework that was developed by Mmasa *et al.* (2011) which has a local component of the value chain. The local value chain starts with input suppliers to cassava and sweet potato growers to local traders, transporters, retailers, processors and end up with the local consumer of cassava and sweet potato products as shown in Fig. 1. According to Mmasa *et al.* (2011) model, the product does not cross the country borders. This study therefore concentrates on the local component of cassava and sweet potato value chains in Mvomero and Kongwa Districts.

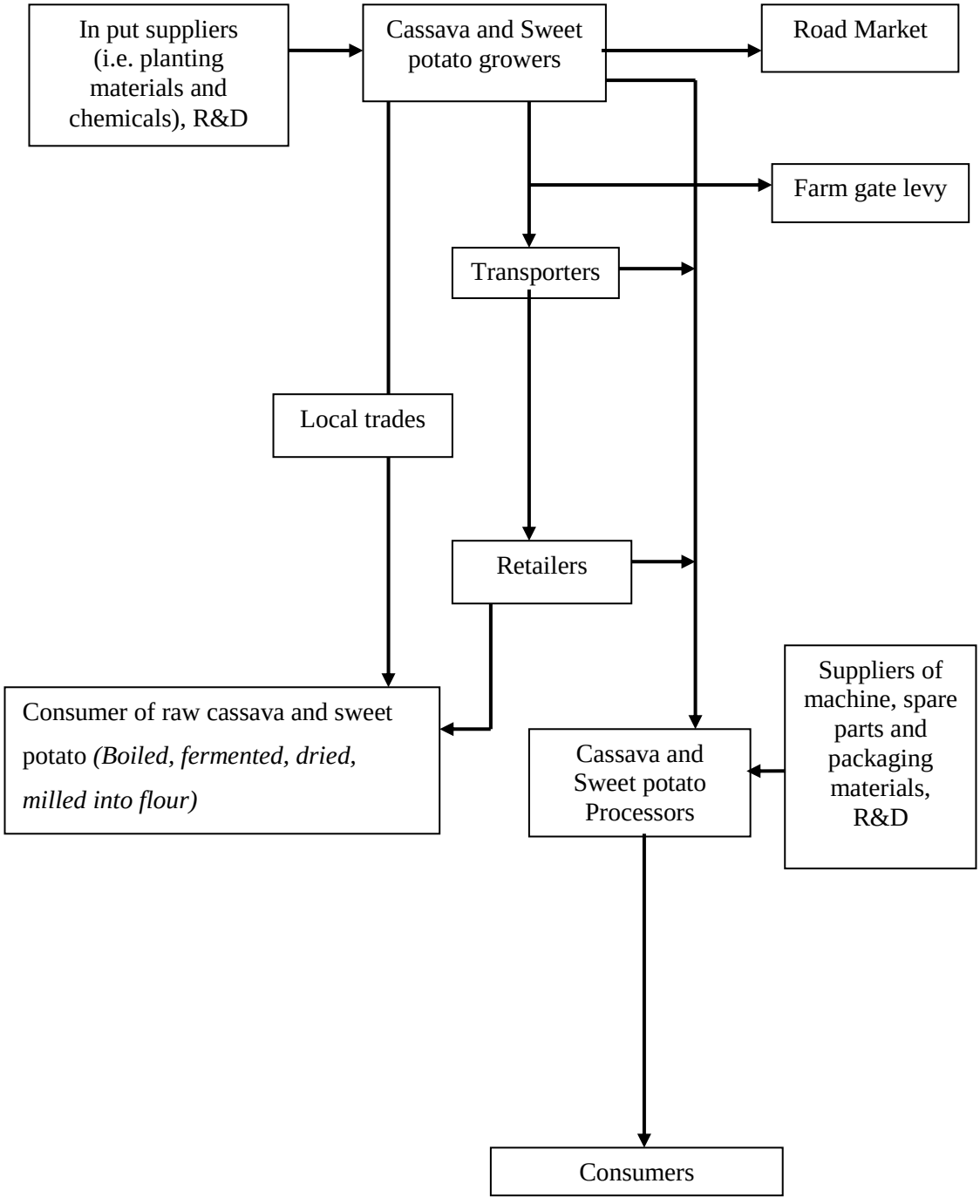


Figure 1: The conceptual framework for analyzing cassava and sweet potato value chains in Mvomero and Kongwa Districts.

Source: Modified from Mmasa *et al.* (2011)

CHAPTER THREE

3.0 METHODOLOGY

3.1The Study Area and Justification for Selection

The study was conducted in Tanzania, specifically in Mvomero and Kongwa Districts which are in Morogoro and Dodoma Regions, respectively. Mvomero and Kongwa are the two districts where new sweet potato varieties of Mataya (orange), Kiegea (orange), Simama and Ukerewe) and cassava (Kiroba and Mumba) were introduced during the crop and goat project (CGP) in 2011. The project is a 4-year program funded by the International Development Research Centre (IDRC), Centre de Recherches pour Le Development International (CRDI) and Canadian International Development Agency (CIDA). The project is implemented by Sokoine University of Agriculture (SUA), Tanzania in partnership with the University of Alberta (U of A) and International Livestock Research Institute (ILRI). The area was chosen because new varieties of sweet potatoes and cassava have been introduced but yet, a market study has not been done. The location of the study area is presented in Fig. 2.

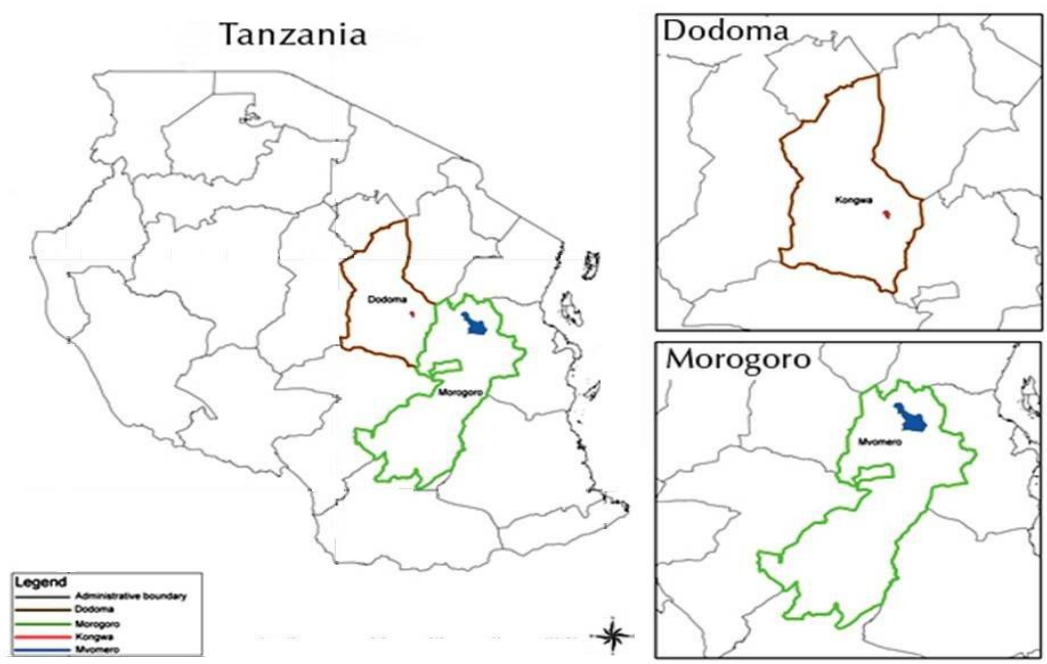


Figure 2: Map of Tanzania showing Kongwa and Mvomero Districts

3.2 Description of the Study Area

3.2.1 Mvomero District socio-economic characteristics

Mvomero is a new District split from the former Morogoro District 2002. It is among the six councils of Morogoro Region of Tanzania. The District borders Handeni District to the North, Bagamoyo to the East, Morogoro Municipal and Morogoro District to the south and Kilosa District to the West (URT, 2007). According to National Population and Housing Census report (2002), the population of Mvomero District is estimated to be 260 525, out of which 131 159 are males and 129 376 are females (Table 1). The main ethnic groups found in the district are Waluguru, Wakaguru, Wazigua and Wanguu. Waluguru group dominates in Mgeta and Mlali wards. Wakaguru, Wazigua and Wanguu dominate Mvomero and Turiani wards. Other people belong to ethnic immigrant groups employed in the civil and private service sectors in the district.

Table 1: Mvomero District administrative units and population distribution

Characteristics	Mvomero
Area (sq. Km)	7 325
Division	4
Wards	23
Villages	115
Hamlets	640
Population (2002 Census)	260 525

Source: DED's Office, Mvomero District, 2012

Geographically, Mvomero District covers a total area of 10 329 square kilometers with arable area covering about 6635 sq. km. The grazing area is 2664 sq. km, forests covers 328 sq. km while the national park cover 702 sq. km. Topographically, Mvomero District is found at latitude 06° 26' South and longitudes 37º 32' East. It experiences two rainy seasons namely: Long rains and short rainy seasons. The amount of rainfall ranges between 600-2000mm. The annual temperatures vary from mean minimum of 18°C to a maximum of 30°C. Highland and mountain zone occupies about 25% of the district area extending on Nguu Mountain Ranges. Mvomero vegetation is woodlands mostly of miombo and it has Savannah River Basin Line which extends alongside the great rivers of Mkata, Wami, Mgeta, Mlali, Divue, Diburuma, Mkindo and Mburumi (URT, 2007).

The main economic activity in Mvomero District is farming (involving the production of both cash and food crops) and livestock keeping. Others are fishing, small businesses and industries such as Mtibwa sugar cane industry. There are about 58 314 farming households in the district. Farmers are about 142 155 out of which 71 922 are males and 70 833 are females. The cash crops are cotton, coffee, sim sim, sunflower, sugarcane, bananas, and vegetables and the major food crops include maize, paddy, millet, cassava, and pulses. There are also a few households who keep livestock (e.g. beef and dairy cattle, indigenous and dairy goats, sheep and chicken) complement crop farming. A few (less than 1%) of the population are civil servants working for the Mvomero

District Council. The location of the study area in Mvomero District is presented in Fig. 4.

3.2.1.1 Sweet potato production trends in Mvomero District: 2007-2011

Total area under sweet potato has not increased much in the past five years though it fluctuated from year to year (Fig. 3). In addition the production trend for sweet potato during the same period has been simply stable with no apparent increasing trend as shown in Fig. 3 below.

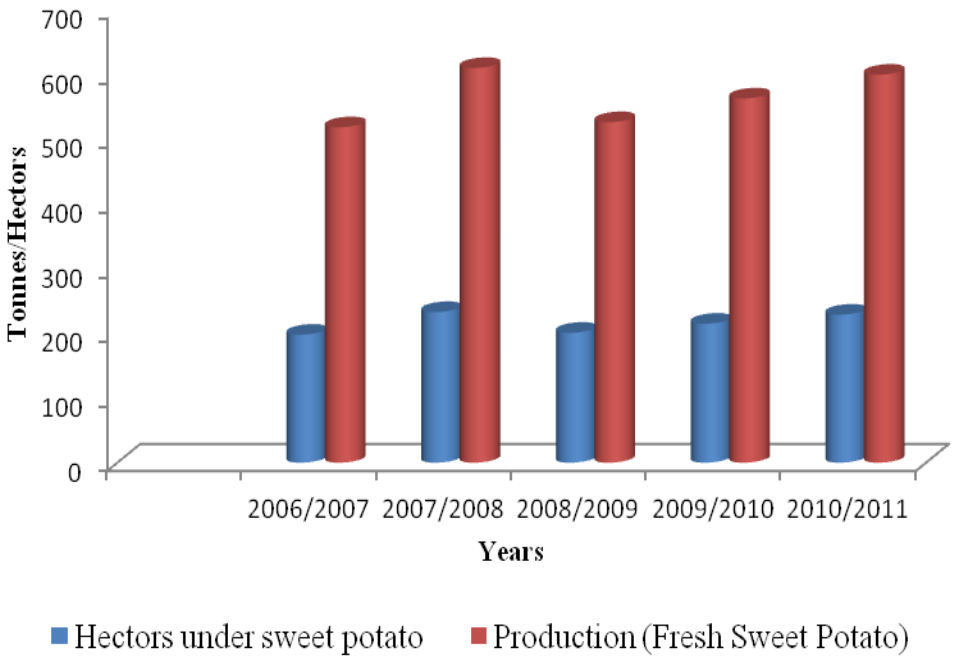


Figure 3: Estimated production of sweet potato (tons) in Mvomero

Source: District Agricultural and Livestock Development Officer (DALDO) office, Mvomero, 2012.

3.2.1.2 Cassava production trends in Mvomero District: 2007-2011

In Mvomero, both land allocated to cassava and the yield have tremendously increased between 2006/2007 and 2008/2009 seasons (Table 2). The increase in cassava yields could be attributed to the recurrent droughts, which have compelled farmers to diversify from maize as a food crop into drought tolerant crops and the growing importance of this crop for cash. In year 2009/2010 and 2010/2011 amount of land allocated to cassava have been increased while the yield have been decreasing (URT, 2012). The decrease in cassava yields in year 2009/2010 and 2010/2011 could be attributed to the excessive drought.

Apart from fresh cassava production, Table 2 shows that there was a direct relationship between the production of fresh cassava and cassava processed products. This could be due to the fact that, as fresh cassava production increases also the production of cassava processed products increase and the vice versa is true.

Table 2: Estimated production of cassava (tons) in Mvomero District

Season	Hectors under cassava	Production (Fresh Cassava)	Production of processed products
2006/2007	7 743	22 929	22.9
2007/2008	8 618	25 854	25.9
2008/2009	10 230	30 690	30.7
2009/2010	13 820	22 803	22.8
2010/2011	13 940	23 120	23.1

Source: District Agricultural and Livestock Development Officer (DALDO) office, Mvomero District, 2012.

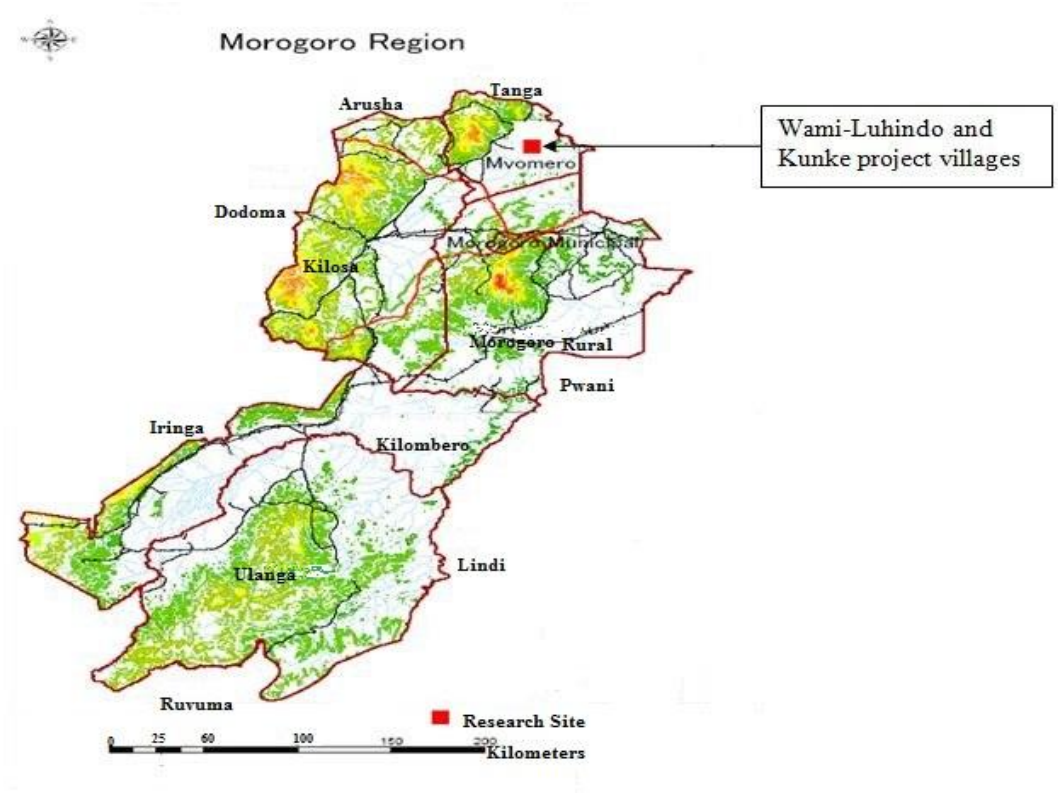


Figure 4: Map of Morogoro Region showing Mvomero District

3.2.2 Kongwa District socio-economic characteristics

Kongwa District is situated in Dodoma Region, in Central Tanzania. The District borders Kilosa District to the East, Chamwino District to the West, Kiteto District to the North and Mpwapwa District to the South (Fig. 6). Based on population and household census of 2002, the population of Kongwa District is estimated to be 295 476 out of which 146 799 are males and 148 677 are females (Table 3).

Table 3: Kongwa District administrative units and population distribution

Characteristics	Mvomero
Area (sq. Km)	4 041
Division	3
Wards	22
Villages	74
Hamlets	312
Population (2002 Census)	295 476

Source: DED's Office, Kongwa District, 2012

Geographically, Kongwa District covers a total area of about 4041 sq. km of which almost 80 % of the area is suitable for agricultural farming. Topographically, Kongwa District lies between latitude 5º 30’ to 6º 0’ South and longitude 36º 15’ to 36° East. The District altitude ranges from 900 to 1000 meters above sea level. Kongwa District can be categorized into two zones visualized as zone one with rainfall between 600 – 800 mm per annum and zone two that receives between 400 and 600 mm of rainfall annually. The rainfall pattern in the zones is bi-modal with short rains commencing November/December to January and the long rains falling from Mid February to May. The annual temperature varies from minimum of 18^{o}C to a maximum of 34^{o}C. The characteristic vegetation of the district is about bush or thicket type (URT, 2007).

The main economic activities in Kongwa District are crop production and livestock farming. The cash crops are sunflower, groundnuts, sesame, castor oil seeds and cashew nuts and the major food crops include sorghum, millet and maize. Other food crops not widespread and less preferred for cultivation are leguminous crops (pigeon peas, common beans and chick peas. Livestock keeping is the second major economic activity in the district. The district has 117 598 cattle, 73 196 goats, 33 896 sheep, 7324 pigs, 2656 donkeys and 387 779 chickens. Labour force engaged in agricultural farming is 89.8% (of which farmers 85.1% and livestock keepers is 4.7%) (URT, 2012).

3.2.2.1 Cassava production trends in Kongwa District: 2007-2011

According to Kongwa, District Agricultural and Livestock Development officer (DALDO office), the estimates show that production of fresh cassava and cassava processed products increased from 4 696 tons and 1 565.3 tons in 2006/2007 to 7840 tons and 2 613.3 tons in 2010/2011 respectively, representing a 59.9% increase (Fig. 5).

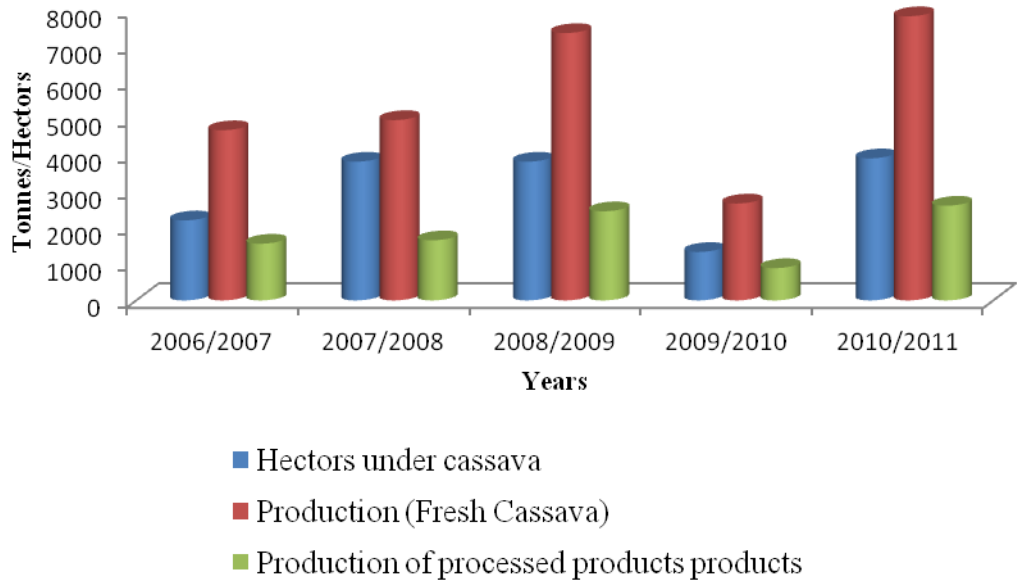


Figure 5: Estimated production of cassava (tons) in Kongwa District

Source: District Agricultural and Livestock Development Officer (DALDO) office, Kongwa District, 2012.

3.2.2.2 Sweet potato production trends in Kongwa District: 2007-2011

Since it is only recently that sweet potato production has gained importance in Kongwa, there has been no systematic collection of time series data that would have assisted this study in assessing the trend of sweet potato production like in Mvomero. However, the data available show a rising trend (Table 4).

Table 4: Estimated production of sweet potatoes (tons) in Kongwa District

Season	Hectors under sweet potato	Production (Fresh Sweet Potato)
2006/2007*		
2007/2008*		
2008/2009	680	204
2009/2010	18	144
2010/2011	768	6 144

*Data were not available

Source: District Agricultural and Livestock Development Officer (DALDO) office, Kongwa District, 2012.

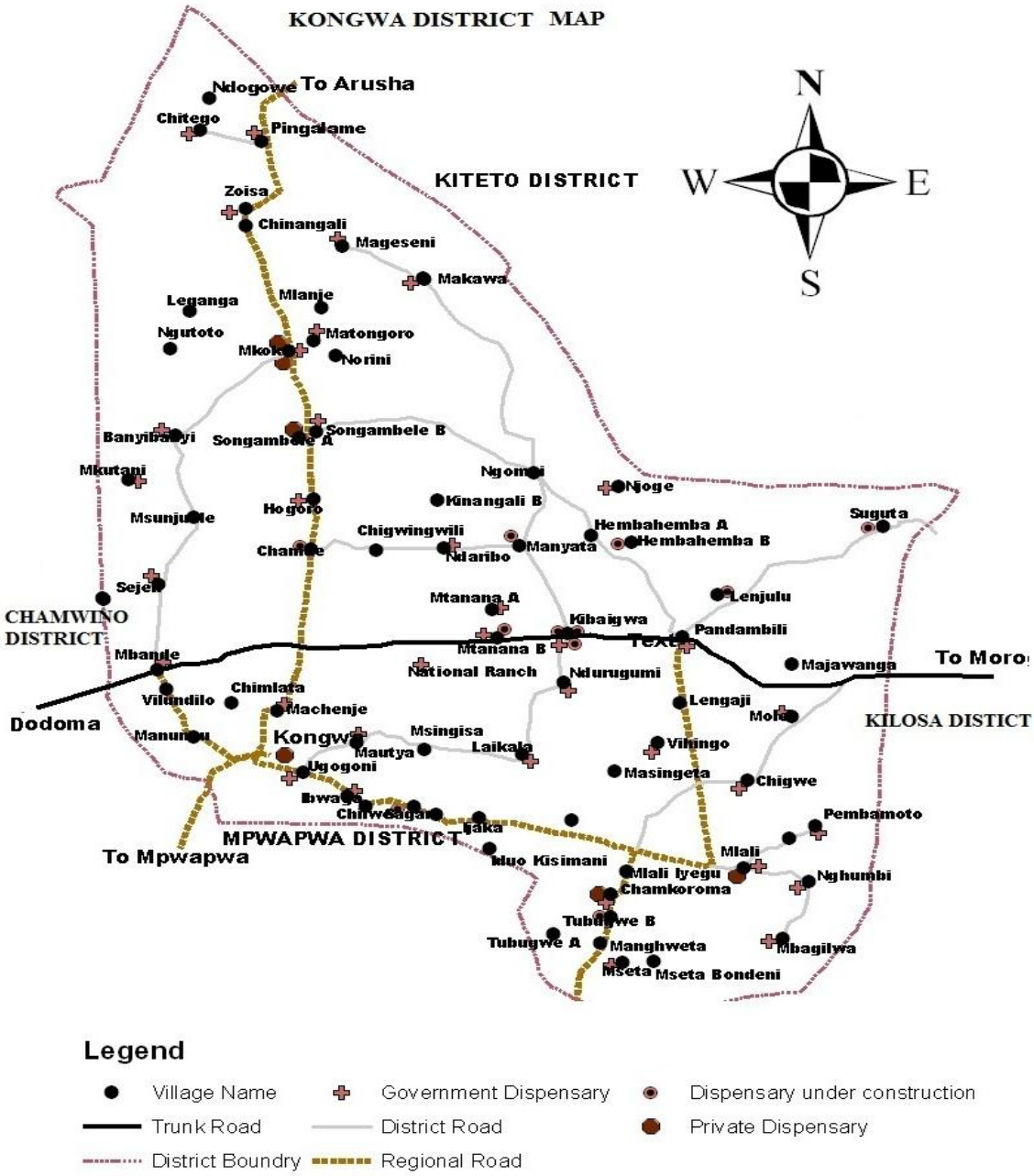


Figure 6: Map of Kongwa District, Tanzania

3.3 Research Design

The research design for this study was a cross sectional. Under this design, data from household's respondents were collected at a single point in time without repetition from the representative population. The design is appropriate in descriptive study and for determination of the relationship between and among variables. It is also economical in terms of time and financial resources (Babbie, 1993).

3.4 Sampling Unit and Sample Size

The sampling unit for this study included producers (farmers), processors, traders/transporters (retailers**)** and consumers of cassava and sweet potatoes from Mvomero and Kongwa Districts. Generally, the study covered 245 respondents. The sample size is reasonably large especially in conformity with Bailey (1994) argument that around 30 cases seems to be the bare minimum for studies in which statistical data analysis is to be done. In addition, the choice of this sample size is realistic due to limited time and funds but fulfills the requirements of the study for meaningful analysis. The summary of the sample size based on the player/actor is presented in Table 5.

Table 5: Sample size summary

Player/Actor	Cassava	Sweet potato	Total	Location
Farmers	63	51	114	Mvomero and Kongwa Districts
Traders/Transporters	25	15	40	Mvomero and Kongwa Districts
Processors	21	4	25	Mvomero and Kongwa Districts
Consumers	36	30	66	Mvomero and Kongwa Districts
Total	145	100	245	

3.5 Sampling Techniques

Both judgmental/purposively, simple random and snowball sampling techniques were adopted in this study.

3.5.1 Selection of sample villages and sub villages

The villages were selected purposefully based on the history of cassava and sweet potato production using improved varieties that were introduced by Crop and Goat Project (CGP) in 2011 as discussed earlier. The summary of the sampled villages and sub villages by region and district is presented in Table 6.

Table 6: Sampled villages and sub villages by region and district

Region	District	Villages	Sub villages
Dodoma	Kongwa	Ihanda	Chang'ombe Kandamiza Ng'halondeki
		Masinyeti	Chumvichumvi Golani
Morogoro	Mvomero	Kunke	Ikulu Mashariki Mnazi Mmoja
		Wami-Luhindo	Luhindo Sokoine-Vijana

3.5.2 Selection of cassava and sweet potato producers

List of cassava and sweet potato producers, were obtained from CGP-Project SUA office and village extension officers from which sample of cassava and sweet potato producers were randomly drawn from it.

3.5.3 Selection of cassava and sweet potato processors

A snowball sampling method was employed in obtaining processors involved in this study. In this case processors were asked to identify their fellow processors who were then selected for the survey in their processing outlets in the project villages of Mvomero and Kongwa Districts. A snowball sampling technique was adopted because members of these populations have not all been previously identified and were more difficult to locate

or contact than known populations (Coleman, 1958; Goodman, 1961; Spreen, 1992). This sampling technique can be defined as “a non-probability sampling technique in which the researcher makes initial contact with a small group of people who are relevant to the research topic and then uses these to establish contacts with others” (Bryman, 2008). Snowball sampling is a method typically used with unknown or rare populations.

3.5.4 Selection of cassava and sweet potato traders/transporters

Traders were selected randomly from the group of cassava and sweet potato traders operating in villages (i.e. Masinyeti, Ihanda, Kunke and Wami-Luhindo) local markets and other three markets ‘Kibaigwa’, ‘Mlali’ and ‘Dakawa’. Transporters who were engaged in cassava transportation were also involved in the survey. The transporters were selected randomly in the project villages of Mvomero and Kongwa as they were seen transporting cassava to Kibaigwa and Mlali markets in Kongwa District and Dakawa market in Mvomero District.

3.5.5 Selection of cassava and sweet potato consumers

Random sampling procedure was employed to obtain consumers, because food products produced within and around Mvomero and Kongwa Districts mainly reach the consumers through direct producer to consumer sales or via retail outlets such as local market place.

3.6 Questionnaire Pre-testing

The survey instruments for farmers, traders, processors and consumer were developed by the researcher. Before the exercise of data collection these questionnaires were pre-tested to see if they answer the stated objectives and their clarity to the respondents. A total of 15 questionnaires were administered during pre-testing of the questionnaire and the exercise was done in Mvomero and Kongwa Districts because they were study areas.

After the pre-testing, modifications were made to the questionnaires and improved versions of the questionnaires were developed.

3.7 Data Collection Methods

Both primary and secondary data collection methods were used to obtain the information required for the study.

3.7.1 Primary Data

Data used in this study were largely primary data collected from the samples of respondents using four kinds of questionnaires, FGD, observation and semi-structured interviews with key informants. The questionnaires were designed for producers (farmers), processors, traders/transporters and consumers of cassava and sweet potatoes (Appendix 1 - 4). The questionnaires were administered by the researcher. A total of four (4) FGD were conducted involving 27 men and 19 women in total. A structured questionnaires and FGD guide were administered to producers/farmers, processors, traders and consumers while semi-structured interviews were conducted with key informants (i.e. village extension officers and Manager, Mlali SACCOS).

3.7.2 Secondary data

These are data obtained from literature sources or data collected by other people for some other purposes. Thus, secondary data provide second hand information and include both raw data and published ones (Saunders *et al.,* 2004). In this study secondary data were obtained from District Agricultural offices, from reading various publications from the Ministry of Agriculture, Food Security and Cooperation; Sokoine National Agricultural Library (SNAL) and Internet.

3.8 Data Processing and Analysis

The data collected from cassava and sweet potato producers, processors, traders and consumers were coded for analysis. The options for the close ended questions were assigned numbers while in open ended questions all possible answers were identified and summarized. The data entry was done by using the Statistical Package for Social Science (SPSS) computer program version 16 and cleaned before transferring to Microsoft Excel for further analyses. The data were cleaned to remove outliers. Both qualitative and quantitative analyses were carried out based on specific objectives of the study as described below.

3.8.1 Qualitative analysis

Qualitative analysis involved the computation of descriptive statistics such as frequencies, means, mode, range and cross tabs. These were used to summarize the characteristics of the cassava and sweet potatoes value chains. Cross tabulation was used to analyse relationships between pairs of variables particularly age, sex, marital status and education level of various actors.

3.8.2 Quantitative analysis

Quantitative analysis involved sub sector mapping analysis, gross margin analysis, marketing margin analysis and marketing efficiency.

3.8.2.1 Sub-sector mapping analysis

Sub-sector mapping analysis was used to map cassava and sweet potato value chain linkages between actors, processes and activities in the value chain**.** The aim was to visualize networks in order to get a better understanding of the connections between actors and processes in a value chain, demonstrate the interdependency between actors and processes in the value chain and create awareness of stakeholders to look beyond

their own involvement in the value chain (Michael *et al.,* 2010). The analysis was extended by mapping the specific positions and roles of men and women in value chains and identifying their specific constraints and opportunities.

3.8.2.2 Gross margin analysis

Mlulla (2003) defined gross margin as the difference between total revenue and total variable costs. It is used as a measure of enterprise profitability and means of selecting farm plans. The size of gross margin depends on the services provided, market structure, market price, perishability of the product as well as the distance between producers and consumers and may be influenced by market information especially for short-run margins. According to Eskola (2005) Gross Margin Analysis (GMA) is one of the widely used analytical techniques for planning and analysis of projects by advisors, consultants, researchers and producers.

Therefore, Gross Margin Analysis (GMA) was used to estimate profit for cassava and sweet potato actors. GM was calculated using the following formula:

GM = TR – TVC…..…….. (5)

Whereby:

GM = Gross Margin

TR = Total Revenue

TVC = Total Variable Cost

3.8.2.3 Marketing margin analysis

A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. It is calculated as the difference between producers and retail prices. According to Mendoza (1995) when there are several participants in the marketing chain, the marketing margin is calculated by finding the price variations at different segments and by comparing them with the final price to the consumer. The consumer price is then the base or the common denominator for all marketing margins. Comparing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer and then expressed as a percentage. Marketing margins for the various cassava and sweet potato traders were estimated using the following formulas.

$$TGMM = \frac{\text{End buyer price} - \text{First seller price}}{\text{End buyer price}} \times 100 \quad \text{.......................................(6)}$$

Whereby: TGMM = Total gross marketing margin

The producer margin also estimated by introducing the idea of ‘farmer’s portion’, or ‘producer’s gross margin’ (GMMp) which is the portion of the price paid by the consumer that goes to the producer. It is calculated by using the following formula:

$$GMMp = 100\% - TGMM \quad \text{..(7)}$$

Or

$$GMMp = \frac{\text{End buyer price} - \text{Marketing gross margin}}{\text{End buyer price}} \times 100 \quad \text{..................................(8)}$$

Whereby: GMMp = The producer participation margin

Also,

$$GMM_R = \frac{\text{Retailling Price - Farmer's Price}}{\text{Consumer Price}} \text{ x } 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

$$GMM_{CV} = \frac{\text{Cooking Vendor Price - Farmer's Price}}{\text{Consumer Price}} \text{ x } 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(10)$$

$$GMM_{L1} = \frac{\text{Local Processor Price - Farmer's Price}}{\text{Consumer Price}} \text{ x } 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(11)$$

$$GMM_{L2} = \frac{\text{Local Processor Price - Retailer Price}}{\text{Consimer Price}} \text{ x } 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(12)$$

Whereby:

GMM_R = The percentage of the total gross marketing margin received by the retailer

GMM_{CV} = The percentage of the total gross marketing margin received by the cooking vendor

GMM_{L1} = The percentage of the total gross marketing margin received by the local processor in cassava marketing channel IV and sweet potato marketing channel III

GMM_{L2} = The percentage of the total gross marketing margin received by the local processor in cassava marketing channel V and sweet potato marketing channel IV

The net marketing margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted. The percentage of net income that can be classified as pure profit (i.e. Return on capital), depends on the extension to such factors as the middlemen's own (working capital) costs.

NMM= TGMM- TMC……...…… ……(13)

Whereby: NMM = Net marketing margin

TMC = Total marketing cost

Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which depresses market participation of smallholders.

Gross Margin is a profit divided by sales revenue or gross profit divided by net sales revenue, expressed as a percentage (Encarta, 2006).

Market cost: This includes handling **(**packing and unpacking cost, loading and unloading cost), transportation cost, production loss, storage cost, processing cost, capital cost, commission and other unofficial payments.

3.8.2.4 Determinants of cassava and sweet potato profitability

A linear regression model was used to analyse the determinants of farmers' profitability whereby farmers' profit margin was taken as a function of other 6 variables such as gender, education level, experience of household head, farm size under cassava/sweet potato cultivation, farm gate price and farm location. The model for profitability was specified as follows:

$$Y = \alpha + \beta_1 GENDER + \beta_2 EDUC + \beta_3 EXPHH + \beta_4 FARMSIZE + \beta_5 FARMLOC + \beta_6 FARMGPRICE + \mu \quad \ldots\ldots(14)$$

Whereby:

Y	=	Profit margin (Tshs/acre)
α	=	The intercept of the regression equation,
$\beta_1 - \beta_6$	=	The parameters to the estimated,
GENDER	=	Gender of household head expressed as dummy, 1= female, 0=otherwise,
EDUC	=	Education level of the household head measured in years spend schooling,
EXPHH	=	Experience of household head in cassava/sweet potato production expressed in years,
FARMSIZE	=	Farm size was expressed as the total amount of land in acres under cassava/sweet potato cultivation for 2011/2012 growing season,
FARMLOC	=	Farm location was expressed as the distance the cassava/sweet potato plot is from the main market,
FARMGPRICE	=	Farm gate price was expressed as the total amount of Tshs/bag farmers were getting by selling cassava/sweet potato at the farm level,
μ	=	Error term

3.8.2.5 Marketing efficiency

The following analytical tools were used to determine the marketing efficiency:

Convention method

$$E = \frac{\text{Value added by marketing system}}{\text{Total marketing cost}} \quad \text{.....(15)}$$

Whereby:

Value added by marketing system = Consumer price – Price received by farmers

Acharya's Modified Marketing Efficiency

$$MME = \frac{FP}{MC + MM} \quad \text{.....(16)}$$

Whereby:

MME = Modified measure of marketing efficiency

FP = Price received by farmers

MC = Marketing cost

MM = Marketing margin

Also, Shepherd's formula technique was used as follows:

$$\text{Marketingefficience} = \frac{\text{Consumer price}}{\text{Total Marketing Cost}} - 1 \quad \text{.....(17)}$$

This could be said to mean the percentage ratio of price increase to costs of marketing. According to Scarborough and Kydd (1992), the value of marketing efficiency ranges from 0% to infinity. If marketing efficiency is 100% (unity), it shows that the market is perfectly efficient because price increment is just high enough to cover the cost of marketing such commodity. Whereas marketing efficiency that is greater than 100%

indicates excess profit. However, if marketing efficiency less than 100% is an indication of inefficiency.

3.9 Limitation of the Study

In some cases, it was difficult to locate some of the respondents (especially traders and processors from Kongwa District); majorities were busy engaged in other economic activities. Language barrier was another problem because some of respondents from Masinyeti and Ihanda villages were unable to understand and speak good Kiswahili. Also, the information sought from some of the respondents was based on past experiences; therefore, it was somehow hard to recall especially considering that majority of those respondents did not keep records. Again, some respondents were a bit reluctant to provide sensitive details such as questions involved their income earned and size of land owned. Due to bad weather including frequent rains particularly in Kunke and Wami-Luhindo villages, the process of data collection became hard and time consuming.

In overcoming these limitations, the researcher had to use research assistants who spoke both Swahili and indigenous language (i.e. Kikaguru) and were from the study area where data were collected although this might have led to inaccuracy of some answers. Moreover, the research team spent some addition time looking for respondents and sometimes call-backs and physical revisits were done. Whenever there was rain interviews had to be cancelled until the rain stopped.

CHAPTER FOUR

4.0 RESULTS AND DISCUSION

4.1 Socio-economic Characteristics of Respondents

The socio-economic characteristics of the key actors identified in cassava and sweet potato value chains have important implication to accessibility, participation and decision of marketing produce within the household. Basically the compositions of a household influence the decision on marketing. This section therefore describes the characteristics of the respondents based on age, sex, marital status and education level in relation to cassava and sweet potato marketing within producers, traders, processors and consumers.

4.1.1 Socio-economic characteristics of producers

Table 7 shows the socio-economic characteristics of cassava and sweet potato producers in Mvomero and Kongwa Districts. The findings show that the majority of respondents' ages were greater than 40 years (Table 7). This implies that majority of respondents (cassava and sweet potato producers) were adult who can handle adult's responsibility including farming for caring their family for livelihood survival. According to Kabuje (2008) age had implication on the roles and responsibilities in the society.

The findings show further that 60% of the females in Mvomero participate in sweet potato production while 45% participate in cassava (Table 7). This is about culture and tradition. In the case of Kongwa, the findings show that 47% of the females participate in cassava production while only 31% participate in sweet potato production. This indicates that most (47%) of the women are growing cassava in Kongwa for commercial purposes.

Table 7: Socio-economic characteristics of producers

Characteristics	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Age (Years)								
<21	0	00.0	0	00.0	1	3.1	2	7.8
21-30	2	6.5	3	12.0	8	25.0	3	11.5
31-40	10	32.3	9	36.0	5	15.6	5	19.2
>40	19	61.2	13	52.0	18	56.3	16	61.5
Total	31	100.0	25	100.0	32	100.0	26	100.0
Sex								
Male	17	54.8	10	40.0	17	53.1	18	69.2
Female	14	45.2	15	60.0	15	46.9	8	30.8
Total	31	100.0	25	100.0	32	100.0	26	100.0
Marital status								
Married	23	74.2	21	84.0	26	81.3	24	92.4
Single	2	6.4	0	00.0	2	6.3	1	3.8
Divorced	4	13	3	12.0	3	9.4	1	3.8
Widow/widower	2	6.4	1	4.0	1	3.0	0	00.0
Total	31	100.0	25	100.0	32	100.0	26	100.0
Education level								
No formal education	10	32.3	3	12.0	11	34.4	12	46.2
Primary education	21	67.7	22	88.0	19	59.4	12	46.2
Secondary education	0	00.0	0	00.0	2	6.2	2	7.6
Total	31	100.0	25	100.0	32	100.0	26	100.0

Moreover, the findings show that 74% of the cassava producers in Mvomero District were married while in Kongwa the number was 81%.Inthe case of sweet potato producers the findings show that 84% of the sweet potato producers in Mvomero District were married while in Kongwa were 92% (Table 7). This implies that marital status induces someone to work hard due to family responsibilities. Apart from marital status, the findings also indicated that majority of cassava and sweet potato producers attained formal education (Table 7). This is similar to findings of agricultural marketing information needs study (URT, 2004), which found that there is a large number of farmers with primary education and below this level of education.

4.1.2 Socio-economic characteristics of traders

The socio-economic characteristics of cassava and sweet potato traders in Mvomero and Kongwa Districts are presented in Table 8. The findings show that the majority of cassava and sweet potato traders in Mvomero District were aged between 31-40 years while in the Kongwa District majority were aged between 21-30 years. Thus, the majority of cassava and sweet potato traders in both districts were aged between 21 and 40 years. This implies that most of cassava and sweet potato traders were within the economically active age. These findings concurred with the study done by Adinya *et al*. (2008) which found that people in age groups of 21 - 60 are more economically active and independent than those in the age group of less than 21 years and above 60 years.

Regarding sex of the respondents, the findings show that females dominated the business in both districts (Table 8). This implies that females were more efficient in retailing than male. These findings concurred with the study done by Akinpelu and Adenegan (2011) which found that female are more efficient in retailing than male.

Regarding marital status it was found that all cassava and sweet potato traders in Mvomero District were married while in Kongwa District about 79% of cassava traders were married and all sweet potato traders were married (Table 8). This implies that majority of cassava and sweet potato traders in both districts were married people indicating a great potential for business development due to family responsibilities. Similar findings was reported by Mmasa *et al*. (2011) who noted that married obliged to take care of their family hence participation in economic activities is inevitable for the wellbeing of the family. In terms of education, majority of cassava and sweet potato traders in both districts have attained primary education (Table 8).

Table 8: Socio-economic characteristics of traders

Characteristics	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Age (Years)								
<21	0	00.0	0	00.0	2	14.3	0	00.0
21-30	4	36.4	4	36.4	9	64.3	4	100.0
31-40	6	54.5	4	36.4	3	21.4	0	00.0
>40	1	9.1	3	27.2	0	00.0	0	00.0
Total	11	100.0	11	100.0	14	100.0	4	100.0
Sex								
Male	5	45.5	4	36.4	2	14.3	0	00.0
Female	6	54.5	7	63.6	12	85.7	4	100.0
Total	11	100.0	11	100.0	14	100.0	4	100.0
Marital status								
Married	11	100.0	11	100.0	11	78.6	4	100.0
Single	0	00.0	0	00.0	2	14.3	0	00.0
Divorced	0	00.0	0	00.0	1	7.1	0	00.0
Total	11	100.0	11	100.0	14	100.0	4	100.0
Education level								
No formal education	2	18.2	2	18.2	4	28.6	0	00.0
Primary education	9	81.8	8	72.7	9	64.3	4	100.0
Secondary education	0	00.0	1	9.1	1	7.1	0	00.0
Total	11	100.0	11	100.0	14	100.0	4	100.0

4.1.3 Socio-economic characteristics of processors

The socio-economic characteristics of cassava and sweet potato processors in Mvomero and Kongwa Districts are presented in Table 9. Findings show that the majority of the cassava and sweet potato processors in both districts were aged between 21 and 30 years (Table 9). This indicates that most of the processors are young adults. A similar finding was obtained by Ayoade and Adeola (2009) who reported that the majority of cassava processors were in their middle age. This age range can be regarded as the young adults and active age when processors can make vital impact in agricultural processing and technological development generally.

Table 9: Socio-economic characteristics of processors

Characteristics	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Age (Years)								
<21	1	10.0	0	00.0	1	9.1	0	00.0
21-30	5	50.0	2	100.0	8	72.7	2	100.0
31-40	2	20.0	0	00.0	1	9.1	0	00.0
>40	2	20,0	0	00.0	1	9.1	0	00.0
Total	10	100.0	2	100.0	11	100.0	2	100.0
Sex								
Male	2	20.0	1	50.0	5	45.5	1	50.0
Female	8	80.0	1	50.0	6	54.5	1	50.0
Total	10	100.0	2	100.0	11	100.0	2	100.0
Marital status								
Married	9	90.0	2	100.0	9	81.8	2	100.0
Single	1	10.0	0	00.0	2	18.2	0	00.0
Total	10	100.0	2	100.0	11	100.0	2	100.0
Education level								
No formal education	1	10.0	0	00.0	1	9.1	1	50.0
Primary education	8	80.0	2	100.0	10	90.9	1	50.0
Secondary education	1	10.0	0	00.0	0	00.0	0	00.0
Total	10	100.0	2	100.0	11	100.0	2	100.0

The findings show further that 80% of cassava processors and 50% of sweet potato processors in Mvomero District were females while 20% of cassava processors and 50% of sweet potato processors were males. In the case of Kongwa District, 55% of cassava processors and 50% of sweet potato processors were females while 45% of cassava processors and 50% of sweet potato processors were males (Table 9).

Moreover, majority of the processors in both districts were married. The reason that can be adduced to this is that a great importance is attached to marriage institution in the society. This finding is in line with earlier findings (Bammeke, 2003; Enitan, 2010) which reported that majority of women involved in processing activities were married. Apart from marital status the findings indicated that most of the processors have attained

primary education and were willing, given the favorable environment, to adopt innovative technology (Table 9).

4.1.4 Socio-economic characteristics of consumers

The findings show that the modal class of the age of the respondents is between 20- 31 years in both districts (Table 10). The implication of this is that the majority of the respondents are in their youthful and active stage of life in terms of energy requirements and cassava and sweet potato products, being the most important energy-giving food to people in the area, have a lot to do in this regard. Regarding to sex the findings show that most of the consumers were female because they are the people who did the majority of shopping in the household (Table 10).

Table 10: Socio-economic characteristics of consumers

Characteristics	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Age (Years)								
<21	1	5.9	0	00.0	1	5.3	1	6.2
21-30	7	41.2	7	50.0	12	63.2	6	37.5
31-40	5	29.4	1	7.1	4	21.0	5	31.3
>40	4	23.5	6	42.9	2	10.5	4	25
Total	17	100.0	14	100.0	19	100.0	16	100.0
Sex								
Male	6	35.3	7	50.0	7	36.8	3	18.8
Female	11	64.7	7	50.0	12	63.2	13	81.2
Total	17	100.0	14	100.0	19	100.0	16	100.0
Marital status								
Married	14	82.4	11	78.6	15	79.0	14	87.5
Single	1	5.9	2	14.3	2	10.5	2	12.5
Divorced	2	11.7	1	7.1	2	10.5	0	00.0
Total	17	100.0	14	100.0	19	100.0	16	100.0
Education level								
No formal education	2	11.7	2	14.3	8	42.1	5	31.2
Primary education	14	82.4	10	71.4	11	57.9	11	68.8
Secondary education	1	5.9	2	14.3	0	00.0	0	00.0
Total	17	100.0	14	100.0	19	100.0	16	100.0

The findings show that majority of cassava consumers 82% in Mvomero District and 80% in Kongwa District were married. In the case of sweet potato consumers, majority of sweet potato consumers 79% in Mvomero District and 87% in Kongwa District were married (Table 10). This implies that marital status may induce someone to consume more due to family responsibilities. In terms of education, the majority of cassava and sweet potato consumers have attained primary education (Table 10). Upon Enitan (2010) reported that education is an important variable that tends to influence the choice of food commodities consumed by individuals and households.

4.2 Mapping of Cassava and Sweet Potato Value Chains

4.2.1 Cassava value chain

Cassava value chain is complex with multiple products and comprises of a number of participant (actors) i.e. input suppliers, small-scale farmers, transporters, local processors and retailers of fresh cassava as well as vendors. This shows high intensity of value addition and complex interactions among actors and chain service providers in Mvomero and Kongwa Districts. Critical pre-production phases of the cassava value chain were identified to land and sourcing of cassava cuttings though the CGP Project, own production and fellow farmers while land was administered by the village committee (Table 17).

A range of production and marketing functions undertaken in the cassava value chain are production, transportation, processing, retailing and consumption (Fig. 7). The actors involved are presented as nodes within the space of the value chain map. Production and business support services are inputs supply, policy security at the market places, financial services and extension services. Arrows of different colours distinguish the flows of value added products and services. The quantitative overlays indicate the concentration of actors and sex of actors across different nodes of the value chain (Fig. 7).

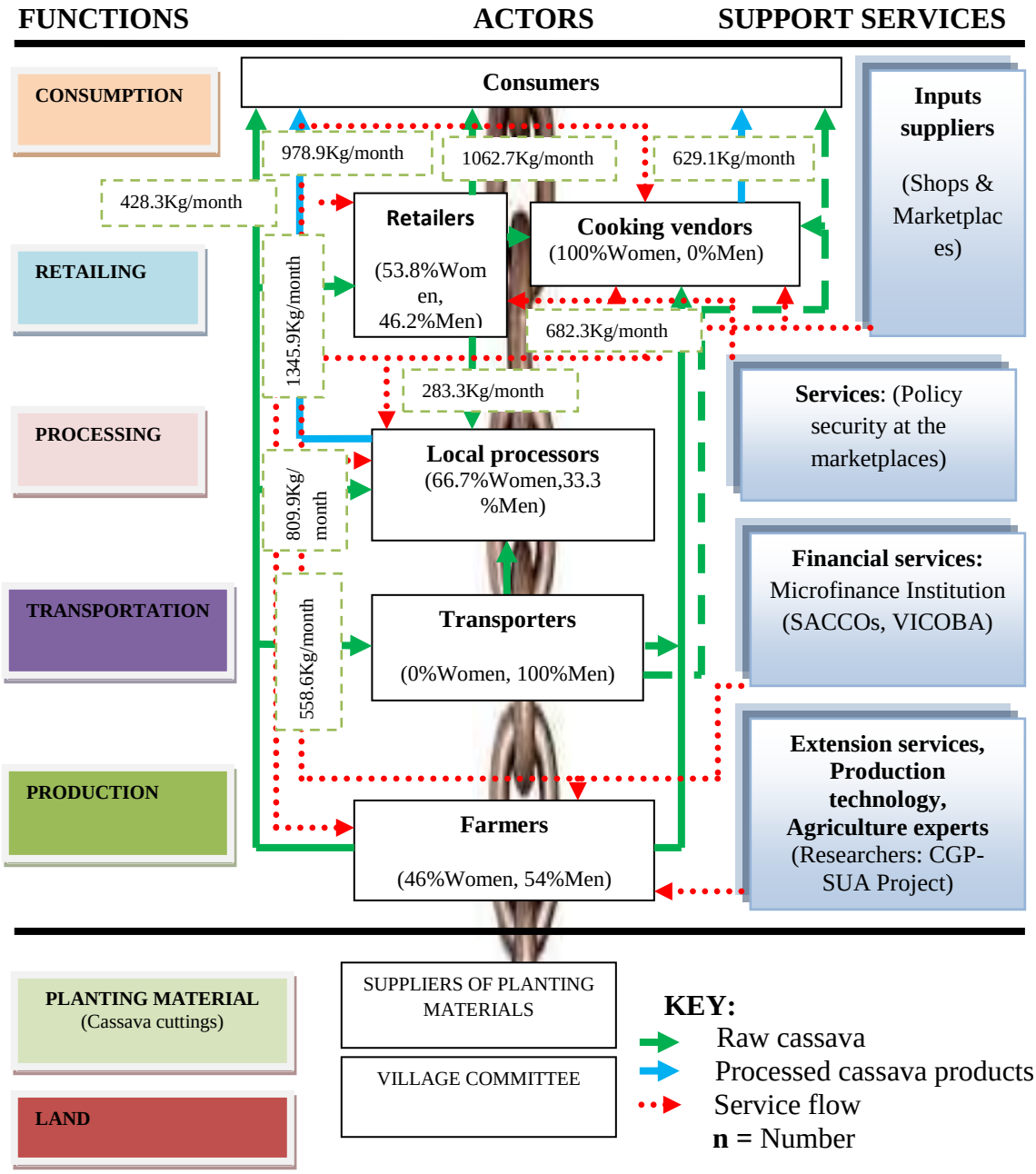


Figure 7: Cassava Value Chain Map in Mvomero and Kongwa Districts

4.2.1.1 Actors in cassava value chain

Different actors exist in cassava value chain in Mvomero and Kongwa Districts. The common one are:

Producers (production)

Cassava production in Mvomero and Kongwa Districts is mainly done by small holder farmers. The average area under production of cassava is about 1.27 acres per household. Depending on the varieties and crop management practices done in Mvomero and Kongwa Districts the yield of cassava per acre vary from 360kg/acre for the less yielding varieties to 10 800kg/acre for the high yielding varieties. A number of varieties of cassava are used in both districts as presented in Table 16, including the local varieties which are not highly yielding and some improved varieties from CGP-SUA Project.

Generally production per acre basis is still very low because most farmers do not use improved varieties and instead still use local varieties which are not high yielding (Table 16). The average production costs are Tshs 115 602 per acre. The costs of production include land rent, land preparation, planting materials (seeds), planting and weeding (Table 11).

Table 11: Cassava production costs per acre

Production costs	n	Min	Max	Mean
Cost of land rent	15	5 000	40 000	19 800
Cost of land preparation	27	5 000	80 000	17 519
Cost of planting materials	13	5 000	20 000	10 542
Cost of planting	24	4 000	70 000	18 667
Cost of weeding	27	10 000	270 000	49 074
Total production cost		29 000	460 000	115 602

In both districts cassava farmers store their produce before sale. Most cassava farmers (52%) in Mvomero and 53% in Kongwa store their produce in the soil (late harvesting), due to high perishability of cassava in post harvest storage. Others, 39% in Mvomero and 16% in Kongwa, store their produce in dry chips form. A few farmers used both storage techniques when storing their produce (Table 12).

Table 12: Cassava farmers storage techniques

Storage techniques	Mvomero		Kongwa	
	Frequency	Percent	Frequency	Percent
In the soil (Late harvesting)	16	51.6	17	53.1
Drying chips form (Makewe/Makopa)	12	38.7	5	15.6
Both: Drying chips form and in the soil	3	9.7	10	31.3
Total	31	100.0	32	100.0

Transporters (collection, bulking and transportation)

Collection, bulking and transport are normally done by transporters who come from Mvomero and Kongwa towns such as Kibaigwa, Mlali, Wami-Dakawa and Turiani. The main function of these transporters is to buy from farmers in bulk, thereafter transport the produce to Kibaigwa, Mlali, Wami-Dakawa and Turiani. There is no formal relationship existing between transporters and farmers. However, some few farmers do have informal agreements with transporters.

Local processors (processing)

Cassava processing in Mvomero and Kongwa Districts is mainly done by farmers and very few traders. Majority of the farmers process cassava at household level for home consumption and not for sale. However, the most common product from cassava is dried chips (Makopa/Makewe) which are then processed into flour. The most common cited processing technology involves peeling the tubers, slicing, soaking in water to remove

cyanide, drying and then pounding into flour. Cassava dried chips store better than flour. Those farmers who did not do any processing reported that they did so due to lack of proper technology and lack of knowledge on processing.

For those few traders, the most common product is frying cassava chips. The most common cited processing technology involves peeling the tubers, washing, soaking in water to remove cyanide and then frying.

Retailers (retailing)

Two types of retailers were identified in Mvomero and Kongwa Districts. These include vendors who cook/boil cassava and sell and those who sell fresh cassava. Most of these retailers are women who sell around their homes and at local markets.

Consumers (consumption)

In Mvomero and Kongwa Districts, cassava is eaten in different forms such as raw cassava, boiled cassava, dried chips (Makewe/Makopa), roasted, futari and flour. Boiled cassava was the most popular form of consumption reported in both districts. This is where fresh cassava is peeled and boiled. Frying cassava chips were another alternative meal prepared for breakfast, which was mentioned in both districts. It was also indicated that many households do mix maize meal with cassava flour to enhance taste and acceptability. It is therefore observed that boiled cassava remains the major form by which people consume cassava. A similar result was obtained by IITA (2003) which reported that boiled cassava remain the major form by which people consume cassava.

Cassava is not normally eaten alone. There are a number of compliments, the commonest being home made fresh chilli paste, tea and beans. A high percentage of respondents in all

the two districts indicated that they consume boiled cassava and this is mainly for breakfast.

In general, most consumers did not have any unique methods they used when preparing cassava for consumption in both districts. Only a few of them used traditional methods of preparation, an indication that there was very little innovation. This shows that there is also a room for improving consumption of cassava through the development of various methods to enhance acceptability removes monotony and broadens the use to which the produce can be prepared.

Service providers

Apart from trading actors there are non-trading service providers that support the value chain development. These involve providers of commercial and public services. These are inputs suppliers, financial services, extension services and policy security at the marketplace. The village land committee foresees the land issues including land use planning and allocation of village land among different users.

The R&D institutions like SUA and agriculture experts (i.e. extension officers) are supporting cassava value chain development particularly in technological fronts through provision of improved cassava varieties and professional advice.

Regarding capital provision, microfinance institutions (MFIs) are supporting cassava value chain. The micro-finance institutions lend to smallholder farmers and other small scale actors such as small traders and small processors. SACCOS and VICOBA are among such MFIs.

Input suppliers

Input suppliers are not vertically integrated with producers, since the majority of farmers normally search seeds for planting from their fellow farmers not from recognized sources/agent. However, suppliers of farm equipments, processing tools and packaging materials do not interact with producers/processors at all.

4.2.2 Sweet potato value chain

The sweet potato value chain in Mvomero and Kongwa Districts is relatively underdeveloped compared to the cassava value chain (Fig. 8).

4.2.2.1 Actors in sweet potato value chain

Different actors exist in the sweet potato value chain in Mvomero and Kongwa Districts. The common ones are:

Production (producers)

Sweet potato is mainly produced by smallholder farmers. The area under production per household in Mvomero and Kongwa Districts is about 0.62 acres. The average production of sweet potato for most of farmers in Mvomero and Kongwa Districts is 1008kg/acre. Generally, production per acre is still very low because most of the farmers use local varieties which are not high yielding. According Stephen (2012) the average yield of fresh sweet potato in Tanzania is 3-4MT/acre that is 30 to 40 bags per acre under good agronomic practices.

Several varieties of sweet potatoes are cultivated in Mvomero and Kongwa Districts (Table 16). These including the local varieties which are not highly yielding and some

improved varieties (i.e. mataya, kiegea, simama and ukerewe) from the CGP-SUA Project.

The findings show that the cost of planting materials accounts for 32% of the total costs of production as shown in Table 13. The costs of production include land rent, land preparation, planting materials, planting and weeding.

Table 13: Sweet potato production costs per acre

Production costs	n	Min	Max	Mean
Cost of land rent	9	7 000	20 000	13 000
Cost of land preparation	17	4 000	114 000	24 147
Cost of planting materials	21	6 000	50 000	29 174
Cost of planting	9	2 000	57 000	14 778
Cost of weeding	6	3 000	28 000	11 167
Total production cost		22 000	269 000	92 266

Storage is one of the key areas in the sweet potato value chain. In Mvomero, farmers claimed that they store sweet potato once harvested. Various methods were employed such as storing sweet potato in the soil (late harvesting) (40%), in chips form (*matobolwa/michembe*) for future consumption (8%) and storage in own house (52%) to prevent thieves and damage by wild animals (Table 14). In the case of Kongwa, sweet potato farmers store their produce before sale. Majority i.e. (65%) store sweet potato in the soil (late harvesting), which allows farmers to utilize sweet potato in their fresh form. 35% stored in own houses. However, farmers in both districts indicated receiving poor prices after storage due to loss of quality caused by lack of proper storage facility.

Table 14: Sweet potato farmers' storage techniques

Storage techniques	Mvomero		Kongwa	
	Frequency	Percent	Frequency	Percent
In the farmers house	13	52.0	9	34.6
In the soil (Late harvesting)	10	40.0	17	65.4
Matobolwa/Michembe	2	8.0	0	00.0
Total	25	100.0	26	100.0

Processing (local processors)

Sweet potato processing in Mvomero and Kongwa Districts is mainly done by very few traders. However, the most common processed product is fried/roasted sweet potato. The most commonly processing technology involves peeling the tubers, washing and then frying/roasting.

Retailing (retailers)

The main consumers of sweet potatoes are in Kibaigwa, Mlali, Wami-Dakawa and Turiani. The main function for these retailers is to buy and sell the produce at retail price to local processors and consumers. However, the price varies from one place to another within Mvomero and Kongwa Districts depending on the distance from the farmers and the income levels of people in the area.

Consumption (consumers)

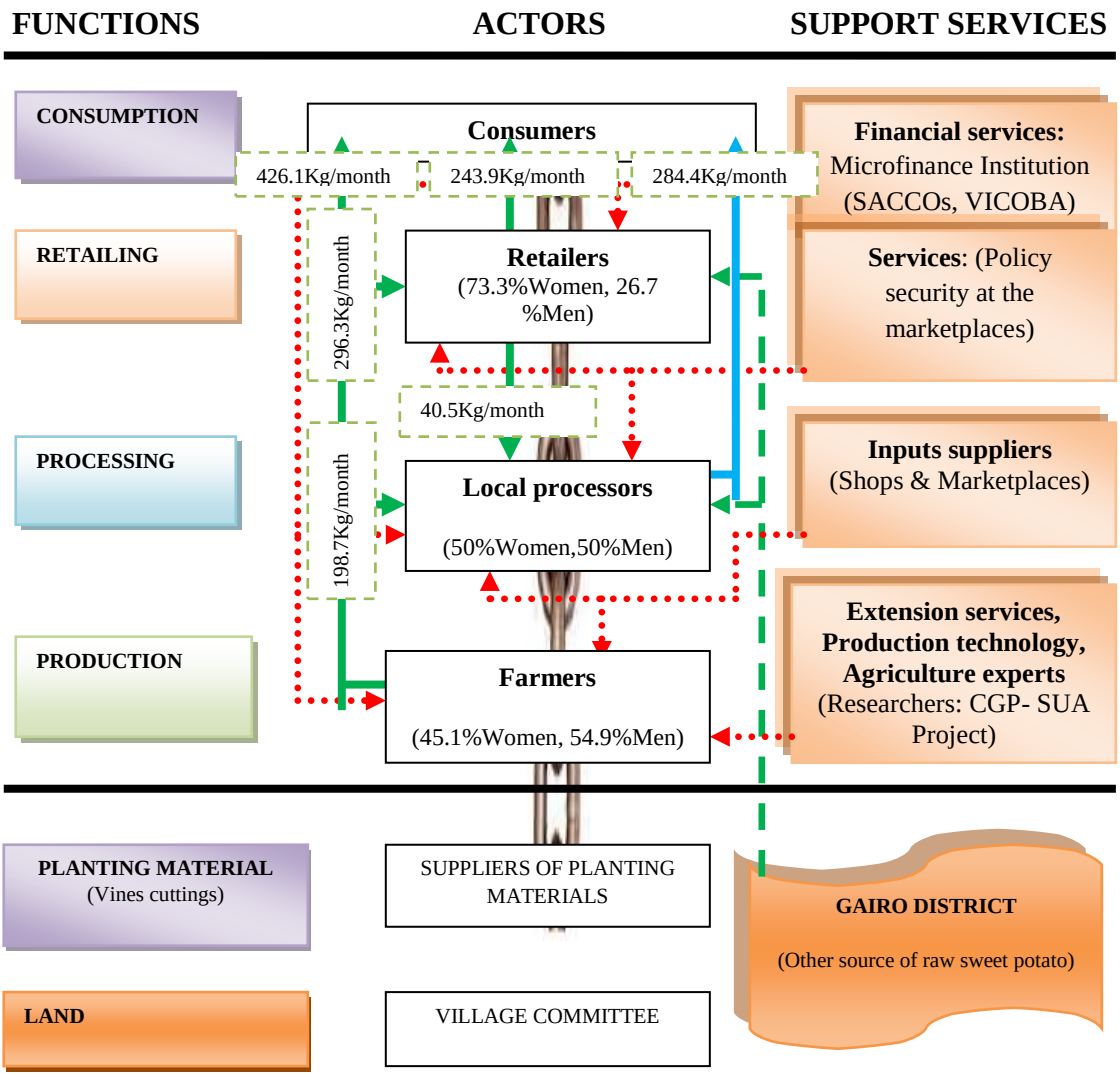
In both districts, sweet potato is eaten in different forms such as boiled sweet potato, "futari", fried/roasted and raw. Boiled sweet potato was the most popular form of product consumed in both districts. This is where the fresh sweet potato is peeled and boiled. Fried/roasted was most common form of sweet potato consumption in Mvomero District than in Kongwa District. Therefore, the findings reveal that boiled sweet potato remain major form by which people consume sweet potato.

Sweet potato is not normally eaten alone. There are number of compliments, the commonest being tea, home made fresh chilli paste and beans. This is clear indication that sweet potato is a substitute of bread and other foodstuffs that go together with tea. Majority of respondents in all the two districts indicated that they consume boiled sweet potato and this is mainly for breakfast and is eaten together with tea.

In general, most consumers did not have any unique methods they knew about or used when preparing sweet potato for consumption in both districts. A high percentage of respondents mentioned the usual traditional methods of preparation, an indication that there was very little innovation. This shows that there is also a room for improving consumption of sweet potato through the development of various method of preparation to enhance acceptability removes monotony and broadens the use to which the product can be prepared.

Support services

Support services in sweet potato value chain include input supply, extension services, financial services and business services. Currently, in most sweet potatoes producing areas in Mvomero and Kongwa Districts, the input (seeds) used is local varieties and in most cases farmers are not linked to any input supplier or business development services.



KEY:

- Raw sweet potato
- Service flow
- Processed sweet potato products
- n = Number
- Flow of raw sweet potato from Gairo

Figure 8: Sweet potato value chain map in Mvomero and Kongwa Districts

4.2.3 Farming equipments/tools

In Mvomero, majority of the respondent used poor farming tools especially hand hoe (100% for both cassava and sweet potato). Similarly majority of farmers in Kongwa used hand hoe (88% for cassava and 100% for sweet potato) and only (12.5%) of cassava producers used both hand hoe and oxen plough for cultivation (Table 15). Uses of traditional technologies in cassava and sweet potato production slow down production and therefore efforts are needed to train farmers on the use of improved agronomical practices to increase their agribusiness profitably.

Table 15: Farming equipment/tools owned by farmers

Farming equipment/tools	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Hand hoe	31	100.0	25	100.0	28	87.5	26	100.0
Hand hoe and oxen plough	0	00.0	0	00.0	4	12.5	0	00.0
Total	31	100.0	25	100.0	32	100.0	26	100.0

4.2.4 Common seeds/planting materials used

There are a lot more varieties of cassava and sweet potato mentioned in Mvomero and Kongwa Districts that are preferred by producers. In Mvomero, the majority of producers (97% cassava producers and 76% sweet potato producers) used local seeds, namely *kaniki, kibangameno, kigoma, agriculture, mzungu, msufi and moshiwataa* for cassava and gairo, *nturawima, karate, allimtumwa, kabajeshi, shangazi, yeboyebo and mapembe* for sweet potato. Similarly, majority of cassava producers 100% and 92% sweet potato producers used local seeds in production, namely *japani, kaniki, kipera, sindano and makawea* for cassava and *morogoro, shangazi, sindano and kiegea* for sweet potato. These local seeds were selected for sowing based on the following reasons: size of the product produced and quantity (potential production) and early maturity.

Table 16: Common planting material used

Planting material	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Local variety	30	96.8	19	76.0	32	100.0	24	92.3
Improved variety	1	3.2	6	24.0	0	00.0	2	7.7
Total	31	100.0	25	100.0	32	100.0	26	100.0

A few farmers (3% cassava producers and 24% sweet potato producers) and (8% sweet potato producers) in Mvomero and Kongwa Districts respectively used improved seeds (Table 16). This implies that efforts are needed to mobilize farmers on the underlying principle of using improved seeds to boost cassava and sweet potato production.

4.2.5 Source of planting material

In Mvomero, farmers indicated that major source of planting material was from fellow farmers obtained freely, (55% cassava producers and 28% sweet potato producers). A few producers got cuttings through CGP Project (3% cassava and 20% sweet potato), buying from fellow farmers (20% cassava and 28% sweet potato), and from own production (own cuttings) (23% cassava and 24% sweet potato) (Table 17).

Similarly in Kongwa, major source of planting material was from fellow farmers obtained freely i.e. 59% for cassava and through buying from fellow farmers (54%) for sweet potato. A few producers got cuttings from CGP Project 8% for sweet potato and from own production (own cuttings) 19% of sweet potato (Table 17). However in Kongwa, a higher percentage of sweet potato farmers compared to cassava farmers claim that planting material is scarce and this reflected in the fact that a higher percentage of sweet potato farmers bought planting material compared to cassava farmers. Although it was noted that few farmers in the surveyed area used to grow reserved seed in their wet lands.

Table 17: Source of planting material

Sources	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
From own production (own cuttings)	7	22.5	6	24.0	6	18.8	0	00.0
Free from fellow farmers	17	54.8	7	28.0	19	59.4	10	38.5
CGP (SUA Project)	1	3.2	5	20.0	0	00.0	2	7.7
Buy from fellow farmers	6	19.5	7	28.0	7	21.8	14	53.8
Total	31	100.0	25	100.0	32	100.0	26	100.0

4.2.6 Source of marketing information

Considering the risk involved in perishable agricultural products such as cassava and sweet potato, the availability of market information is very crucial for traders to maximize profits and ensure availability of reliable good quality sources of products and prices (Anyaegbunam and Nto, 2011). It was surprising however, to note that no government agency reported to provide market information. Sources of information for the farmers/producers in Mvomero were fellow farmers, observations of nearby markets and friends (Table 18).

The same sources were also reported in Kongwa whereby 77% of cassava producers and 89% of sweet potato producers got market information from fellow farmers (Table 18). Therefore it is clear that among the services that need to be improved with the aim of enhancing marketing efficiency of cassava and sweet potato is the provision of market information.

Table 18: Source of marketing information

Sources	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Direct visit to the market	2	9.1	1	7.7	2	6.7	0	00.0
Cross check with fellow farmers	18	81.8	10	76.9	23	76.7	16	88.9
Hear from friends	2	9.1	2	15.4	5	16.6	2	11.1
Total	22	100.0	13	100.0	30	100.0	18	100.0

4.2.7 Cassava and sweet potato marketing decisions

Slightly more cassava than sweet potato farmers sell part of their produce in both Mvomero and Kongwa Districts. The findings show that the decision for sale was made by both men and women (Table 19). In the case of cassava more men (55% and 66%) were independently involved in making marketing decisions than women (36% and 16%) in Mvomero and Kongwa Districts respectively. However, in the case of sweet potato in Mvomero more women i.e. 44% were independently involved in making marketing decisions than men (24%) while in Kongwa more men i.e. 54% were independently involved in making marketing decisions than women (19%).

Traders and households/individuals are the most important outlets for produce sold by farmers. However, a number of farmers who sell their produce to traders are higher for cassava than for sweet potato. In most cases transactions is done in the farm (90% for cassava and 55% for sweet potato) as presented in Fig. 9 and 10. Sometimes, it is the responsibility of the buyer to harvest the produce, so they normally buy stands of either cassava or sweet potato. This is done to ensure that buyers have the provision for on-farm storage where the produce is less perishable relative to post harvest storage.

Table 19: Cassava and sweet potato marketing decisions

Marketing decisions	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Men	17	54.9	6	24.0	21	65.6	14	53.8
Women	11	35.5	11	44.0	5	15.6	5	19.3
Both men and women	3	9.6	8	32.0	6	18.8	7	26.9
Total	31	100.0	25	100.0	32	100.0	26	100.0

4.2.8 Terms of trade by farmers

The study assessed the terms of trade by cassava and sweet potato farmers in Mvomero and Kongwa Districts. The findings reveal that the terms of trade are cash sale and *tele kwa tele* (i.e. barter trade) whereby farmers directly exchange cassava and sweet potato for other crops like maize or millet using the same measurement such as "*Kisado and debe*" (Table 20). In Mvomero, cash is the dominant terms of trade while in Kongwa farmers mentioned the most term of trade as being cash and *tele kwa tele*. The findings show that *tele kwa tele* is the most commonly used by sweet potato farmers in Kongwa District probably due to seasonal availability of the crop.

Table 20: Terms of trade by farmers

Terms	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Cash	22	100.0	13	100.0	29	96.7	10	55.6
Tele kwa tele	0	00.0	0	00.0	0	00.0	5	27.8
Cash and *tele kwa tele*	0	00.0	0	00.0	1	3.3	3	16.6
Total	22	100.0	13	100.0	30	100.0	18	100.0

4.2.9 Varieties of cassava and sweet potato

There are a lot of varieties of cassava and sweet potato mentioned in specific districts that are used by producers as planting materials (Table 16). However, the attributes that consumers prefer in these varieties are almost similar in both districts. For cassava,

consumers claimed that they prefer varieties that have good taste, large size and good shape. For sweet potato good taste, large size and color were given first priority. Table 21 shows how cassava and sweet potato attributes were rated in each district. It was observed that in Mvomero and Kongwa Districts, size and taste were the attributes that most consumers look for in cassava and sweet potato. However, colour was more pronounced in sweet potato than in cassava. The popularity of these varieties varied from district to district within the study area.

Table 21: Attributes in the varieties of cassava and sweet potato

Attributes	Percentage of consumers preferring a particular attribute			
	Mvomero		Kongwa	
	Cassava	Sweet potato	Cassava	Sweet potato
Size	100	100	94.7	100
Colour	0	21.4	15.8	68.8
Taste	100	100	100	93.8
Shape	23.5	14.3	5.3	6.3

4.2.10 Cassava and sweet potato value addition (processing) at the traders' level

4.2.10.1 Cassava value addition (processing) at the traders' level

An assessment was made on the value addition processes done by the cassava traders. It was found that most cassava traders do store, process and transport it to the respective customers (Table 22). In Mvomero, majority of the cassava traders (67%) store while others (22%) transport and a few (11%) do both. For the case of Kongwa, majority of the traders (43%) process, 36% do transport and 21% do both (Table 22).

Table 22: Cassava value addition processes done by traders

Cassava value addition	Mvomero		Kongwa	
	Frequency	Percent	Frequency	Percent
Transport	2	22.2	5	35.7
Storage	6	66.7	0	00.0
Transport and processing	1	11.1	3	21.4
Processing	0	00.0	6	42.9
Total	9	100.0	14	100.0

4.2.10.2 Sweet potato value addition (processing) at the traders' level

An assessment was made on the value addition processes that are storage, transport and processing, that were carried out by sweet potato traders. The findings show that some of sweet potato traders in Mvomero and Kongwa Districts undertake value addition processes at their trading sites (Table 23). In Mvomero, majority of the traders transport (45%) while others store (33%), and transport and store their products (22%). On the other hand, majority of Kongwa traders transport and store (75%) while others transport and process (25%). Thus, more value addition processes are done by Mvomero traders than Kongwa traders.

Table 23: Sweet potato value addition processes done by traders

Sweet potato value addition	Mvomero		Kongwa	
	Frequency	Percent	Frequency	Percent
Transport	4	44.5	0	00.0
Storage	3	33.3	0	00.0
Transport and storage	2	22.2	3	75.0
Transport and processing	0	00.0	1	25.0
Total	9	100.0	4	100.0

4.2.11 Cassava and sweet potato transportation

In both districts, the common means of transporting cassava and sweet potato among traders were on head, by bicycles, public transport and animal carts (Table 24). It should be noted that some producers also act as retailers.

Table 24: Means of transport used by traders

Mode of transport	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
By head	0	00.0	0	00.0	4	28.6	0	00.0
Bicycle	4	100.0	3	50.0	10	71.4	1	25.0
Public transport	0	00.0	3	50.0	0	00.0	0	00.0
Animal carts	0	00.0	0	00.0	0	00.0	3	75.0
Total	4	100.0	6	100.0	14	100.0	4	100.0

4.2.12 Cassava and sweet potato storage techniques

4.2.12.1 Cassava and sweet potato traders storage techniques

In this study, traders were asked whether they do store sweet potato and cassava before selling. The findings show that the majority of sweet potato traders in Mvomero and Kongwa Districts store sweet potato at room temperature (own house or rented house) (Table 25). In Mvomero, majority of the cassava traders (80%) store cassava in the ground while in Kongwa, majority (80%) stored cassava in water (Table 25). Traders reported problems encountered when storing the products which included quality loss.

Table 25: Cassava and sweet potato traders' storage techniques

Storage techniques	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Room temperature	0	00.0	10	100.0	1	10.0	4	100.0
In ground	4	80.0	0	00.0	1	10.0	0	00.0
In water	1	20.0	0	00.0	8	80.0	0	00.0
Total	5	100.0	10	100.0	10	100.0	4	100.0

4.2.12.2 Cassava and sweet potato processors storage techniques

An assessment was made on whether processors do store sweet potato and cassava before processing. The findings show that majority of the sweet potato processors in Mvomero and Kongwa Districts store sweet potato at room temperature (own house) (Table 26). In Mvomero, all cassava processors (100%) store cassava in the ground while in the case of Kongwa, majority i.e. 83% store cassava in water (Table 26).

Table 26: Cassava and sweet potato processors storage techniques

Storage techniques	Mvomero				Kongwa			
	Cassava		Sweet potato		Cassava		Sweet potato	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Room temperature	0	00.0	2	100.0	0	00.0	2	100.0
In ground	9	100.0	0	00.0	1	16.7	0	00.0
In water	0	00.0	0	00.0	5	83.3	0	00.0
Total	9	100.0	2	100.0	6	100.0	2	100.0

4.2.13 Opportunities and constraints in cassava and sweet potato value chains

4.2.13.1 Opportunities and constraints in cassava value chain

(a) End markets

Current situation: The market for cassava is very unstable; prices do change every time depending on the demand and supply.

Constraints for upgrading: The major constraint in the cassava market is the availability of reliable market information.

Opportunities for upgrading: The demand for cassava is still growing. Therefore, farmers should be encouraged to increase the scale of cassava production.

(b) Business enabling environment

Current situation: Cassava is not a priority crop in Mvomero and Kongwa District plans. No plans from the local government on how marketing should be improved as in other cash crops.

Constraints for upgrading: The crop is grown in few areas only. Hence its contribution to the economy is yet to be realized. This is due to lack of sufficient market awareness to farmers to fetch better market price.

Opportunities for upgrading: The land for expansion of cassava production is available in both districts since the crop can grow in most of the areas which experience low rainfall. Therefore, efforts to encourage farmers to undertake cultivation of root crops particularly cassava are required.

(c) Vertical coordination

Current situation: Linkages among the actors is not visible, no relation exists between traders and producers. No information flows along the chain among actors.

Constraints for upgrading: Buyers have created a cartel and have become chain leaders. There is a win-lose situation due to lack of trust between producers and buyers. Thus, efforts are required to facilitate and network partnerships among farmers and other market players.

Opportunities for upgrading: In Kongwa District there was good example of marketing system for maize which can be used as a good lesson for various actors along cassava value chain.

(d) Horizontal coordination

Current situation: Farmers are not organized into groups, most of them sell the crop individually. Price differences exist from one farmer to another.

Constraints for upgrading: Farmers are not organized into groups at all. They lack direction and bargaining power. So effort should be made to establish farmers groups by mobilizing, sensitizing and training farmers on the importance of farmers group, group dynamic and management.

Opportunities for upgrading: The crop has markets hence it is very easy to organize farmers into cooperatives.

(e) Support markets

Current situation: Some financial services such as SACCOS exist. However, cassava producers are unable to access them due to lack of collaterals. No relationship exists between producers and input suppliers or research institutions.

Constraints for upgrading: The producers are not well organized, no information is available on who are the service providers and what they can provide. Thus, efforts to facilitate linkages between producers, traders and support services are required in order to increase efficiency in the chain.

Opportunities for upgrading: Some support services are available only when farmers are well organized. Thus, farmers have to be organized into stronger farmers groups.

(f) Value chain governance

Current situation: Buyers influence amount of crop to be produce. Farmers have no power to negotiate. The prices of the crop on the previous market day become the basis for negotiation and income from the chain is not well distributed among producers. Moreover, women are normally left out in deciding how to use money although they are the ones mostly working in the field due to culture and tradition.

Constraints for upgrading: Buyer hides information from producers. Being a cash crop most of the money accrued from cassava is controlled by male farmers. Women are normally excluded during decision making processes due to some cultural norms.

Opportunities for upgrading: Some producers' organizations existing in sun-flower. Their experience can also be applied in the cassava sub-sector. Some producers are aware of gender issues through trainings they receive from CGP-SUA Project. So, effort should be made to establish stronger farmers groups also to facilitate gender issues in the value chain.

4.2.13.2 Opportunities and constraints in sweet potato value chain

(a) End markets

Current situation: The market for sweet potato is very volatile, price do change every time depending on demand and supply.

Constraints for upgrading: The major constraint in the sweet potato market is the availability of reliable market information among farmers. Thus, efforts are required to facilitate the dissemination of market information through all possible mass media communication aids for the benefit of the farming community.

Opportunities for upgrading: The demand for sweet potato is still growing. Therefore, farmers should be encouraged to increase the scale of production. In this way, farmers will benefit fully from sweet potato production.

(b) Business enabling environment

Current situation: Sweet potato is not a priority crop in Mvomero and Kongwa District plans. Until now, no plans from the local government on how marketing should be improved as in other cash crop.

Constraints for upgrading: The crop is grown in few areas only. Hence its contribution to the economy is yet to be realized.

Opportunities for upgrading: The land for expansion of sweet potato production is available in both districts since the crop can grow in most of the areas which experience low rainfall. So, effort should be made to encourage farmers to undertake cultivation of sweet potato through provision of incentives and credit facilities.

(c) Vertical coordination

Current situation: Linkages among the actors is not visible, no relation exists between traders and producers. No information flows along the chain among actors due to poor linkages.

Constraints for upgrading: Buyers are leaders of the chain. They have created a cartel, there is a win-lose situation due to lack of trust between producers and middle men. So, efforts are requires to facilitate trust building among actors in the value chain.

Opportunities for upgrading: There is already some relationship between retailers and local processors in Kibaigwa and Wami-Dakawa markets. Therefore, effort should be made to facilitate linkages between producers, traders, processors and support services so as to increase efficiency in the chain.

(d) Horizontal coordination

Current situation: Farmers are not organized into groups, most of them sell the crop individually. Price differences exist from one farmer to another due to unreliable market information.

Constraints for upgrading: Farmers are not organized into groups at all. Hence they lack direction and bargaining power. So effort should be made to establish farmers groups by mobilizing, sensitizing and training farmers on the importance of farmers group, group dynamic and management.

Opportunities for upgrading: The crop has ready markets hence it is very easy to organize farmers into cooperatives.

(e) Support markets

Current situation: Some financial services such as SACCOS exist. However, producers are unable to access to due to lack of collaterals. No relationship exists between producers and input suppliers or research institutions.

Constraints for upgrading: The producers are not well organized, no information available on who are the service providers and what they can provide. Thus, efforts to organize farmers into groups and facilitate the dissemination of information about support services are required in order to increase efficiency in the chain.

Opportunities for upgrading: Some support services are available only when farmers are well organized. So, efforts are required to organize farmers into stronger producers organizations.

(f) Value chain governance

Current situation: The prices of the crop on the previous market day become the basis for negotiation. Buyers influence amount of crop to be produce while farmers have no

power to negotiate. Income from the chain is not well distributed among producers and due to culture and tradition women are normally left out in deciding how to use money while they are the ones mostly working in the field.

Constraints for upgrading: Buyer hides information from producers. Being a cash crop most of the money accrued from sweet potato is controlled by male farmers. This is due to culture and tradition.

Opportunities for upgrading: Some producers' organizations existing in sun-flower. Their experience can also be applied in sweet potato sub-sector. Some producers are aware of gender issues through training they receive from CGP-SUA Project.

4.3 Marketing Channels

Marketing channel analysis is a useful tool to examine the series of intermediaries and their systematic linkage in performing marketing functions and information flow in the market chain (Zeberga, 2010). The study revealed that generally farmers produce cassava and sweet potato purposely for subsistence and to a limited extent for sale. Although cassava and sweet potato farmers were engaged in the production of cash crops, they did not abandon the production of household food requirements partly because the farmers did not have confidence that the market would supply food products when needed at affordable prices.

The study also revealed that selling cassava and sweet potato to the major market centers was more profitable than selling in the farming communities. However, farmers in Mvomero and Kongwa Districts preferred selling at the farm gate as indicated in Fig. 9 and 10 and therefore failed to realize better market price and hence lower farmers' profitability.

The findings show that 90% of cassava producers sell their produce at their farm gate while 4% of cassava producers sell their produce direct on the village markets (Fig. 9). Generally, sales are conducted in July-December and November-June, averagely 6 and 8 months after harvest in Mvomero and Kongwa District respectively. The main reason behind this was due to lack of sufficient market awareness to farmers.

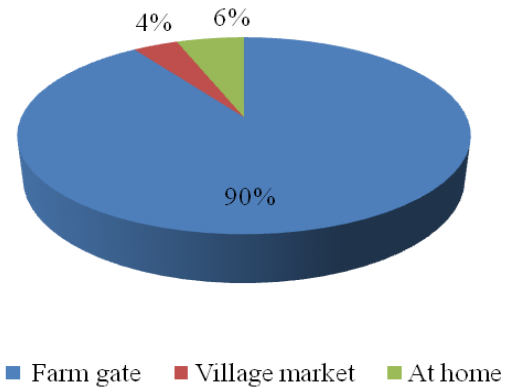


Figure 9: Percentage distribution of cassava producers by place of sale

Findings show that 55% of sweet potato producers sell their produce at their farm gate while 39% sell at their home place (Fig. 10). In general sales are conducted in June-August and June-September, on average, 3months after harvest in Mvomero and 4 months in Kongwa District. This was due to lack of sufficient market awareness to farmers.

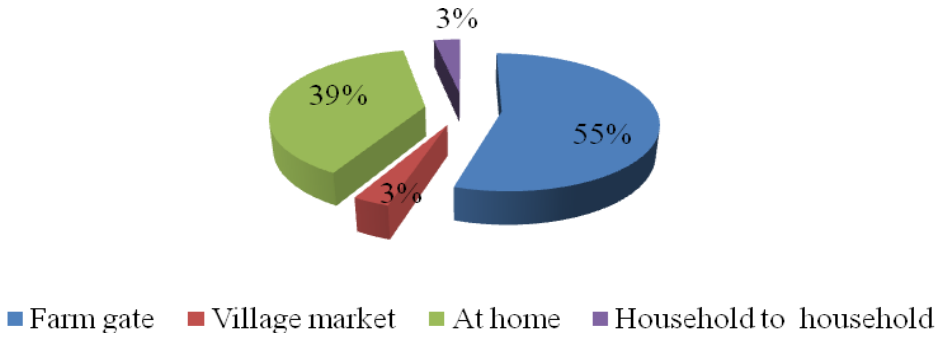


Figure 10: Percentage distribution of sweet potato producers by place of sale

4.3.1 Cassava and sweet potato marketing channels

Cassava and sweet potato marketing channels in surveyed two districts are characterized by a few number of small scale traders operating privately on individual basis. The market actors in the cassava and sweet potato marketing channels were producers, retailers, cooking vendors, local processors and consumers, which are the end users of the commodity. Fig. 11 presents varies marketing channels used in the flow of cassava and cassava products from their point of production to the end users (consumers). The most important channels (routes) involved in the transfer of cassava and cassava products in the study area are listed in 4.3.1.1 below. But a significant amount of cassava was channeled through the second channel.

4.3.1.1 Cassava marketing channels

Channel - I: Producers → consumers

Channel - II: Producers → retailers → consumers

Channel - III: Producers → cooking vendors → consumers

Channel - IV: Producers → local processors → consumers

Channel - V: Producers → retailers → local processors → consumers

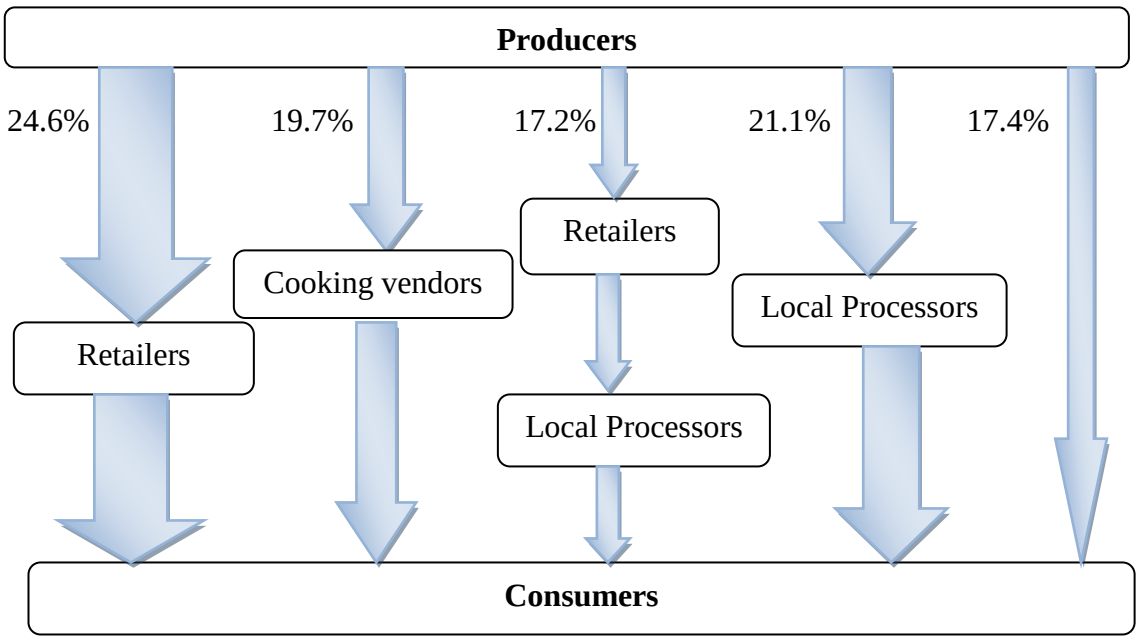


Figure 11: Cassava marketing channels in Mvomero and Kongwa Districts

Fig.12 represents various marketing channels used in the flow of sweet potato and sweet potato products from their point of production to the end users (consumers). The identified channels (routes) involved in the transfer of sweet potato and sweet potato products in the study area are listed in 4.3.1.2 below. However, significant amount of sweet potato was channeled through the first channel, direct selling of the commodities from farmers to consumers.

4.3.1.2 Sweet potato marketing channels

Channel - I: Producers →consumers

Channel - II: Producers → retailers →consumers

Channel - III: Producers →local processors →consumers

Channel - IV: Producers → retailers →local processors →consumers

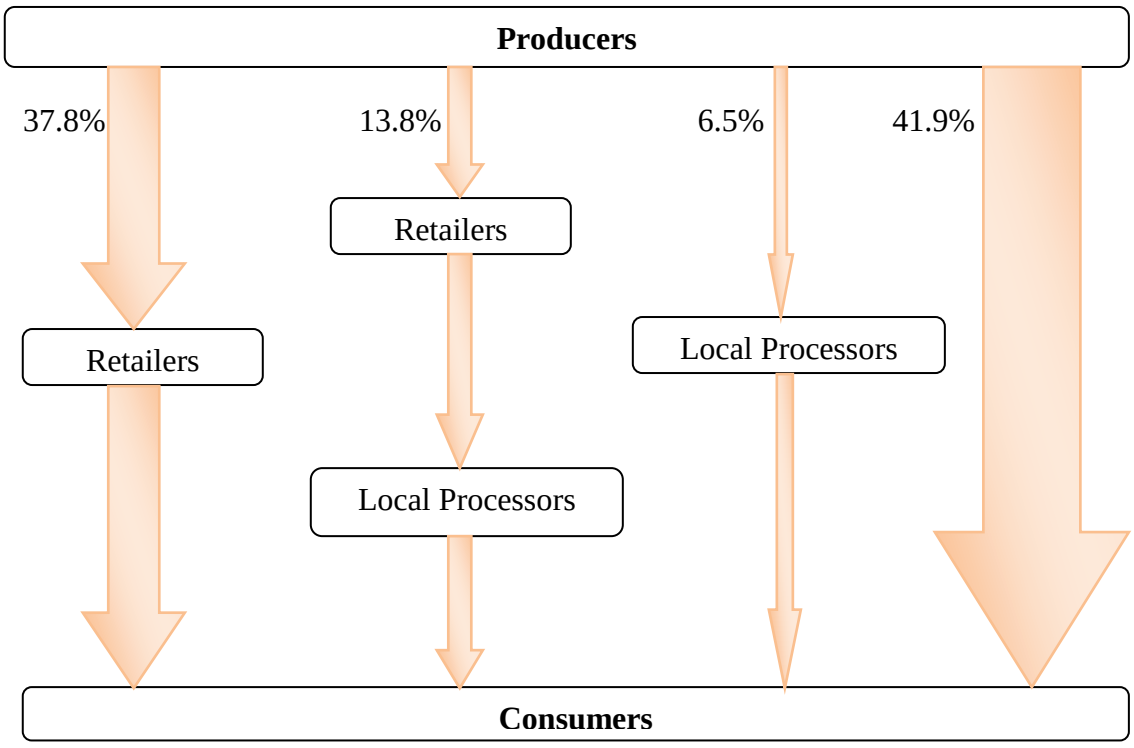


Figure 12: Sweet potato marketing channels in Mvomero and Kongwa Districts

4.4 Price Determination

Prices, whether those received by farmers or charged to cooking vendors, retailers, processors and final consumers are the most important elements in the marketing system in influencing the contribution of agriculture to economic development (Quaye and Kanda, 2004). Major investments in the improvements of marketing infrastructure will be ineffective if the price generated within the system is ineffective (Feldman and Ohene-Yankyerah, 1984). Data on prices at the various levels of the distribution chain is used in calculating the marketing margins.

Pricing of cassava and sweet potato like many agricultural commodities is not controlled by any external forces. Usually the prices of the commodity on the previous market day become the basis for price setting. Table 27 presents mode of price determination at the producer and traders levels. The findings showed that at all levels, price determination is highly fixed by the owner (seller).

Table 27: Mode of price determination

Mode	Cassava				Sweet potato			
	% Response at Producer level		% Response at Traders level		% Response at Producer level		% Response at Traders level	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
A price fixed by owner (seller)	47	90.4	23	92.0	27	87.0	14	93.3
A price fixed by buyer	1	1.9	0	00.0	2	6.5	0	00.0
Negotiation with a buyer	4	7.7	2	8.0	2	6.5	1	6.7
Total	52	100.0	25	100.0	31	100.0	15	100.0

4.4.1 Factors considered by producers and traders in setting selling price

4.4.1.1 Factors considered by cassava and sweet potato producers in setting selling price

In Kongwa, cassava producers reported that size (100%), quantity (90%), demand forces (80%) and supply forces (80%) were their primary criteria in cassava price setting (Table 28).

Table 28: Factors considered by cassava producers in setting selling price in Kongwa District

Factors	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Size	100.0	100.0	100.0
Quantity	80.0	100.0	90.0
Demand forces	73.3	86.7	80.0
Supply forces	93.3	66.7	80.0
Quality	13.5	13.3	13.5
Cost incurred	00.0	13.3	6.7
Moisture content	13.3	00.0	6.7

While in Mvomero, cassava producers reported that supply forces (100%), quantity (100%), demand forces (96%) and size (91%) were their primary criteria in cassava price setting (Table 29). Thus, size, quantity, supply and demand forces were found to be the most important factors considered by cassava producers in setting selling price in the two districts.

Table 29: Factors considered by cassava producers in setting selling price in Mvomero District

Factors	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Supply forces	100.0	100.0	100.0
Quantity	100.0	100.0	100.0
Demand forces	93.3	100.0	95.5
Size	86.7	100.0	90.9
Quality	6.7	57.1	22.7
Cost incurred	6.7	00.0	4.5

Table 30 shows that in Kongwa, sweet potato producers reported that quantity (94%), size (72%), supply forces (63%) and demand forces (63%) were found to be most important criteria in sweet potato price setting.

Table 30: Factors considered by sweet potato producers in setting selling price in Kongwa District

Factors	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Quantity	90.0	100.0	94.4
Size	80.0	62.5	72.2
Supply forces	60.0	62.5	61.1
Demand forces	60.0	62.5	61.1
Quality	20.0	00.0	11.1
Moisture content	20.0	00.0	11.1

While in Mvomero, sweet potato producers reported that quantity (100%), demand forces (96%), supply forces (92%) and size (85%) were their primary criteria in sweet potato price setting (Table 31). Thus, in both districts quantity, size, supply and demand forces were found to be the most important factors considered by sweet potato producers.

Table 31: Factors considered by sweet potato producers in setting selling price in Mvomero District

Factors	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Quantity	100.0	100.0	100.0
Demand forces	88.9	100.0	95.5
Supply forces	88.9	100.0	92.3
Size	88.9	75.0	84.6
Quality	33.3	00.0	23.1

4.4.1.2 Factors considered by cassava and sweet potato traders in setting selling price

With regard to cassava traders, the survey result highlighted that in Kongwa, 100%, 100%, 64% and 64% of cassava traders, respectively reported that the primary criteria considered by cassava price setting process were the size of cassava, quantity, demand forces and quality of cassava (Table 32).

Table 32: Factors considered by cassava traders in setting selling price in Kongwa District

Factors	Wards			District
	Iduo (%)	Mlali (%)	Kibaigwa (%)	Kongwa (%)
Size	100.0	100.0	100.0	100.0
Quantity	100.0	100.0	100.0	100.0
Demand forces	100.0	66.7	25.0	64.3
Quality	00.0	83.3	100.0	64.3
Supply forces	25.0	50.0	25.0	35.7

While in Mvomero, cassava traders reported that size (100%), quantity (100%), demand forces (60%) and supply forces (60%) were their primary criteria in cassava price setting (Table 33). Thus, in Mvomero, quality of cassava was found to be the least important factor considered in cassava price setting. With respect to sample locations, quality of cassava was found to be more important in Kongwa than Mvomero. This highlights that Kongwa consumers were more conscious of quality of cassava. However, size, quantity and demand are the most important factors considered in cassava price setting in both districts.

Table 33: Factors considered by cassava traders in setting selling price in Mvomero District

Factors	Wards		District
	Mtibwa (%)	Dakawa (%)	Mvomero (%)
Size	100.0	100.0	100.0
Quantity	100.0	100.0	100.0
Demand forces	66.7	50.0	60.0
Supply forces	66.7	50.0	60.0
Quality	33.3	25.0	30.0

Regarding to sweet potato traders, the findings highlighted that in Kongwa, sweet potato traders reported that the primary criteria considered by sweet potato price setting process were the size of sweet potato (100%), quantity (100%), demand forces (75%) and supply forces (50%) (Table 34).

Table 34: Factors considered by sweet potato traders in setting selling price in Kongwa District

Factors	Mlali Ward (%)	Kongwa District (%)
Size	100.0	100.0
Quantity	100.0	100.0
Demand forces	75.0	75.5
Supply forces	50.0	50.0
Quality	50.0	50.0

In Mvomero, sweet potato traders reported that quantity (100%), size (91%), demand forces (82%) and supply forces (82%) were their primary criteria in sweet potato price setting (Table 35).

Table 35: Factors considered by sweet potato traders in setting selling price in Mvomero District

Factors	Wards		District
	Mtibwa (%)	Dakawa (%)	Mvomero (%)
Quantity	100.0	100.0	100.0
Size	100.0	80.0	90.9
Demand forces	66.7	100.0	81.8
Supply forces	66.7	100.0	81.8
Quality	83.3	00.0	45.5

Quality of sweet potato was found to be the least important factor considered in sweet potato price setting in both districts. This was because of the fact that Mvomero and Kongwa consumers were not more conscious of quality of sweet potato due to high demand.

4.5 Marketing Profit of Cassava and Sweet Potato Trading

The marketing profit of cassava and sweet potato traders' category is summarized in Tables 36 and 37 respectively. The findings in Table 36 show marketing costs and profit margins for cassava traders per 90kg in the five channels for each group of market player. The high profit in the cassava marketing chain was attained by local processors' category.

Local processors made their maximum profit (34 355 Tshs/90kg) in channel IV and minimum profit (22 005 Tshs/90kg) in channel V. The highest profit in channel IV was made by local processors due to the value addition and exclusion of retailers from participation in the market channels. This suggests that as the number of intermediaries in the market channel decreases the profit margin increases and vice-versa (Table 36).

Table 36: Marketing costs and profit margins of cassava traders per 90kg

Group of market players	Cost/profit item	Marketing channels				
		I	II	III	IV	V
Cooking vendor	Buying price			19 950		
	Transport			3 675		
	Sack			1 500		
	Processing			6 335		
	Market fee			500		
	Profit margin			11 440		
	Selling price			43 400		
Retailer	Buying price		29 400			29 400
	Transport		3 836			3 836
	Sack		1 500			1 500
	Levy		1 500			1 500
	Loading		1 000			1 000
	Unloading		500			500
	Market fee		500			500
	Profit margin		13 326			6 764
	Selling price		51 562			45 000
Processor	Buying price				28 000	45 000
	Transport				3 550	2 000
	Sack				1 500	1 500
	Levy				1 500	-
	Loading				900	-
	Unloading				700	-
	Market fee				500	500
	Processing				29 995	29 995
	Profit margin				34 355	22 005
Consumer price		25 139	51 562	43 400	101 000	101 000

Retailers made their maximum profit (13 326 Tshs/90kg) in channel II and minimum profit (6 764 Tshs/90kg) in channel V. This highest profit was maintained by retailers in channel II due to the fact that they directly purchase cassava from producers in either

farm gate or local markets and sold directly to consumers. But cooking vendors in channel III account for a margin of 11 440 Tshs/90kg which was the highest marketing profit for these traders' category across the total cassava marketing channel due to the fact that they directly purchase cassava from producers in either farm gate or local markets and sold directly to consumers.

Marketing costs and profit margins of sweet potato traders per 90kg in the four channels for each group of market player are presented in Table 37. The findings show that the highest profit in the sweet potato marketing chain was attained by local processors' category in channel III which accounts 15 550 Tshs/90kg (Table 37).

Table 37: Marketing costs and profit margins of sweet potato traders per 90kg

Group of market players	Cost/profit item	Marketing channels			
		I	II	III	IV
Retailer	Buying price		32 438		32 438
	Transport		2 786		2 786
	Sack		1 500		1 500
	Levy		1 500		1 500
	Loading		1 300		1 300
	Unloading		1 000		1 000
	Market fee		500		500
	Profit margin		13 676		13 576
	Selling price		54 700		54 600
Processor	Buying price			35 000	54 600
	Transport			2 250	1 050
	Sack			1 400	-
	Levy			1 500	-
	Loading			2 000	-
	Unloading			1 000	-
	Market fee			500	500
	Processing			33 600	33 600
	Profit margin			15 550	3 050
Consumer price		38 257	54 700	92 800	92 800

This highest profit was made by the local processors due to value addition and exclusion of retailers from participation in the market channel. Retailers made their maximum profit (13 676 Tshs/90kg) in channel II and minimum profit (13 576 Tshs/90kg) in channel IV.

Local processors attained the lowest marketing profit (3 050 Tshs/90kg) in channel IV of the sweet potato marketing chain. The lowest profit was made by local processors due to the inclusion of retailer participation in the market channel. This shows that as the length of the market channel increases the market cost increases and vice-versa. In other words, the more the number of intermediaries involved between the producer and the ultimate consumers, the more is the marketing cost of the intermediaries.

4.6 Cost and Profitability Analysis

4.6.1 Cost and profitability analysis of cassava production

Cost and return components were employed to determine cassava production profitability (Table 38). Costs and profitability were calculated on a channel basis. The average selling price per 90kg was Tshs 25 139 for channel I, Tshs 29 400 for channel II and V, Tshs 19 950 for channel III and Tshs 28 000 for channel IV. From the cost components, weeding was the major cost of cassava producers constituting about 43% of the total production cost (Table 38).

Table 38: Cost and profitability analysis of cassava production

Cost/profit item	**Marketing channels**				
	I	**II**	**III**	**IV**	**V**
Land rent	19 800	19 800	19 800	19 800	19 800
Land clearing and preparation	17 519	17 519	17 519	17 519	17 519
Planting materials/seed	10 542	10 542	10 542	10 542	10 542
Planting	18 667	18 667	18 667	18 667	18 667
Weeding	49 074	49 074	49 074	49 074	49 074
Total cost/acre	115 602	115 602	115 602	115 602	115 602
Total cost/90kg	3 290.69	3 290.69	3 290.69	3 290.69	3 290.69
Cassava selling average price/producers price/90kg	25 139	29 400	19 950	28 000	29 400
Total value of cassava production in one acre	883 133.07	1 032 822	700 843.5	983 640	1 032 822
Profit/acre	767 531.07	917 220	585 241.5	868 038	917 220
Profit/90kg	21 848.31	26 109.31	16 659.31	24 709.31	26 109.31

4.6.2 Cost and profitability analysis of sweet potato production

Cost and return components were employed to determine sweet potato production profitability (Table 39). Costs and profitability were calculated on a channel basis. It can be indicated that the average selling price per 90kg of sweet potato in channels I, II, III and IV was Tshs 38 257, 32 438, 35 000 and 32 438 respectively. From the cost components, planting material cost covers the largest portion, which was about 32% of the total production cost (Table 39).

Table 39: Cost and profitability analysis of sweet potato production

Cost/profit item	**Marketing channels**			
	I	**II**	**III**	**IV**
Land rent	13 000	13 000	13 000	13 000
Land clearing and preparation	24 147	24 147	24 147	24 147
Planting materials/seed	29 174	29 174	29 174	29 174
Planting	14 778	14 778	14 778	14 778
Weeding	11 167	11 167	11 167	11 167
Total cost/acre	92 266	92 266	92 266	92 266
Total cost/90kg	8 372.59	8 372.59	8 372.59	8 372.59
Cassava selling average price/producers price/90kg	38 257	32 438	35 000	32 438
Total value of cassava production in one acre	421 592.14	357 466.76	385 700	357 466.76
Profit/acre	329 326.14	265 200.76	293 434	265 200.76
Profit/90kg	29 884.41	24 065.41	26 627.41	24 065.41

4.7 Marketing Cost and Margins

4.7.1 Marketing cost in cassava and sweet potato marketing chains

The marketing cost of cassava and sweet potato trading for varies marketing stages was calculated and depicted. The average marketing cost per 90kg in cassava trading was about Tshs 8 836 in retail level, Tshs 12 010 in cooking vendor level, Tshs 38 645 in local processor level 1 and Tshs 33 995 in local processor level 2 (Table 40). The highest average marketing cost in the flow of cassava from the point of production to the end users was attributed to processing, transportation and sack cost (Table 40).

Table 40: Marketing costs at various levels of cassava distribution chain

Cost item	Marketing costs			
	Retail level	Cooking vendor level	Local processor level 1	Local processor level 2
Transport	3 836	3 675	3 550	2 000
Sack	1 500	1 500	1 500	1 500
Levy	1 500	-	1 500	-
Loading	1 000	-	900	-
Unloading	500	-	700	-
Market fee	500	500	500	500
Processing	-	6 335	29 995	29 995
Total marketing costs	8 836	12 010	38 645	33 995
Total marketing costs as % of retailing price	17.1	27.7	38.3	33.7

The average marketing cost per 90kg in sweet potato trading was Tshs 8586 in retail level, Tshs 42 250 in local processor level 1 and Tshs 35 150 in local processor level 2 (Table 41). The highest marketing cost in the flow of sweet potato from the point of production to the end users was mainly due to processing, transportation and loading and unloading costs (Table 41). Higher marketing costs by actors in the marketing channels reduce the relative competence of the marketing channel in the market chain. The main reason behind this was that as the marketing costs of the intermediaries in the marketing channel increases, the marketing efficiency decreases and vice-versa.

Table 41: Marketing costs at various levels of sweet potato distribution chain

Cost item	Marketing costs		
	Retail level	Local processor level 1	Local processor level 2
Transport	2 786	2 250	1 050
Sack	1 500	1 400	-
Levy	1 500	1 500	-
Loading	1 300	2 000	-
Unloading	1 000	1 000	-
Market fee	500	500	500
Processing	-	33 600	33 600
Total marketing costs	8 586	42 250	35 150
Total marketing costs as % of retailing price	15.7	45.5	37.9

4.7.2 Marketing margin in cassava and sweet potato marketing chains

The efficiency of marketing system reflects the marketing margins and marketing costs between different intermediaries (Dastagiri *et al*., 2010). Less is market cost and more is the margins in the market is said to be efficient. The information related to cassava and sweet potato marketing margins and marketing costs were presented in Tables 42 and 43.

Marketing margins maintained by each actor in varies cassava marketing channels were presented in Table 42. Total gross marketing margin in cassava trading is highest in channel IV and it accounts a TGMM of 72%. The farmer's share of the total consumer price was 100% in the channel I, 57% in channel II, 46% in channel III, 28% in channel IV and 29% in channel V. This suggests that 43% of the total consumer price in channel II, 54% of the total consumer price in channel III, 72% of the total consumer price in channel IV and 71% of the total consumer price in channel V results of marketing activities by traders. Table 42, shows the marketing margin of cassava traders as a proportion of the final consumer price and total channel marketing margin. In channel II, the retailer's market margin constituted 43% of the final consumer price and 100% of the total marketing margin. In channel III, the cooking vendor's market margin constituted 54% of the final consumer price and 100% of the total marketing margin. In channel IV, the local processor's market margin constituted 72% of the final consumer price and 100% of the total marketing margin. In channel V, the retailer's market margin constituted 35% of the final consumer price while the local processor's market margin represent 55% of the final consumer price. This shows that a large proportion of total marketing margin generated in channel V goes to the local processor.

Local processors enjoy the highest net marketing margin that is 34% in channel IV, followed by cooking vendors who have net marketing margin of 26% in channel III.

Producers' share of the price paid by consumers was highest in channel I which accounts 100% of the price paid by consumers. The lowest net marketing margin was associated with local processors in channel V of cassava marketing system due to inclusion of retailer participation in the market channel. Similar findings were reported by Gebregziabher (2010) who noted that net marketing margin of the intermediaries in the marketing channel decreases as the number of intermediaries involved between the producer and ultimate consumer increases and vice-versa.

Table 42: Percentage marketing margins for different cassava marketing channels

Marketing margins	**Marketing channels**				
	I	**II**	**III**	**IV**	**V**
TGMM	0	43.0	54.0	72.3	70.9
GMM_P	100	57.0	46.0	27.7	29.1
GMM_R		43.0	-	-	34.7
GMM_{CV}		-	54.0	-	-
GMM_L		-	-	72.3	55.4
MC_R		17.1	-		17.1
MC_{CV}		-	27.7	-	-
MC_L		-	-	38.3	33.7
NMM_R		25.9	-	-	17.6
NMM_{CV}		-	26.3	-	-
NMM_L		-	-	34	21.7

Marketing margins maintained by each actor in varies sweet potato marketing channels were presented in Table 43. Total gross marketing margin in sweet potato trading was highest in channel IV and it accounts a TGMM of 65%. The farmer's share of the total consumer price was 100% in the channel I, 59% in channel II, 38% in channel III and 35% in channel IV. This suggests that 41% of the total consumer price in channel II, 62% of the total consumer price in channel III and 65% of the total consumer price in channel IV results of marketing activities by traders. In channel II, the retailer's market margin constituted 41% of the final consumer price and 100% of the total marketing margin. In channel III, the local processor's market margin constituted 62% of the final consumer

price and 100% of the total marketing margin. In channel IV, the retailer's market margin constituted 41% of the final consumer price while the local processor's market margin represents 41% of the final consumer price (Table 43). This shows that a large proportion of the total marketing margin generated in channel IV goes to the local processor due to exclusion of retailer from participation in the market channel. Dastagiri *et al*. (2010) validate this finding that the fewer the numbers of intermediaries in the marketing channel, the higher was the total marketing margin and vice-versa.

Table 43: Percentage marketing margins for different sweet potato marketing channels

Marketing margins	**Marketing channels**			
	I	**II**	**III**	**IV**
TGMM	0	40.7	62.3	65.0
GMM_P	100	59.3	37.7	35.0
GMM_R		40.7	-	40.6
GMM_L		-	62.3	41.2
MC_R		15.7	-	15.7
MC_L		-	45.5	37.9
NMM_R		25.0	-	24.9
NMM_L		-	16.8	3.3

The highest producers' share was observed in channel I of sweet potato marketing chain that was 100% out of the price paid by consumers. The highest net marketing margin in the sweet potato marketing chain was observed in channel II by the retailers i.e. 25%. The lowest marketing margin in the sweet potato marketing chain was observed in channel IV that accounts for 3% and this was obtained by local processors due to inclusion of retailer participation in the marketing chain (Table 43). Thus, the marketing margin analysis of cassava and sweet potato subsectors revealed that producers share and net marketing margin maintained by varies chain actors were extraordinarily varied across the different marketing channels. The main reason behind this was due to the number of intermediaries involved between the producer and the ultimate consumers.

4.8 Determinants of Cassava and Sweet Potato Profitability at Farm Level

4.8.1 Determinants of cassava profitability at farm level

Findings from regression analysis show that 90% of the variation in cassava profitability generated at farm level is due to the independent variables included in the regression model (Table 44). This implies that the specified independent variables explained the dependent variable (profit margin) by 90%. The remaining 10% explains the error term. The findings show that experience of household head in cassava production was statistically significant and positive at P<0.01 level (Table 44). This is implies that farmers with high experience have higher chances of earning larger gross margin than those with low experience. A unit increase in the experience of cassava producers increased profit margin by Tshs 118 202.679. A similar result was obtained by Sewando (2012) who found that experience of household head in cassava production was statistically significant at P<0.01 and positively related with profit margin.

Table 44: Linear regression model results of determinants of cassava profitability

Variables	Coefficient	Expected sign	Std. Error	Probability
Constant	-106 093.449		230 293.023	0.647
GENDER	-37 106.891		68 085.290	0.588
EDUC	16 844.609		76 625.006	0.827
EXPHH	118 202.679	+ve	32 506.102	0.001***
FARMSIZE	748 184.119	+ve	74 996.225	0.000***
FARMLOC	-14 000.290	-ve	7 703.158	0.032**
FARMGPRICE	4.024		5.019	0.426
R	0.946			
R Square	0.895			
Adjusted R Square	0.884			
F-value	79.879			
(***) and (**)	Significant at 1 and 5 percent level respectively			

Moreover, farm size was also statistically significant at P<0.01 and positively related with cassava profit margin (Table 44). This suggests that farmers with large farms have higher chances of earning larger gross margin than those with small farms. An increase in one

unit of farm size leads to increase in profit margin of Tshs 748 184.119. Similar findings were reported by Mafimisebi (2008) who noted that farm size was statistically significant at P<0.01 and positively related with profit margin. The parameter estimates of each of these variables also carried a sign that conformed to a priori expectations.

Farm location was statistically significant at (P<0.05) but negatively related to profit margin as it was hypothesized. This implies that farmers with cassava plot near main market have higher chances of getting larger gross margin than those with cassava plot far from the main market. A unit increase in the distance of cassava plot from the main market decreased profit margin by Tshs 14 000.290. The findings are similar to those of Makindara (2012) who reported that farm location was statistically significant at (P<0.01) but negatively related to gross margin.

4.8.2 Determinants of sweet potato profitability at farm level

Findings from regression analysis show that 81% of the variation in sweet potato profitability generated at farm level is due to the independent variables included in the regression model (Table 45). This implies that the specified independent variables explained the dependent variable (profit margin) by 81%. The remaining 19% explains the error term.

The findings show that experience of household head in sweet potato production was statistically significant at P<0.05 and positively correlated with profit margin of sweet potato as it was hypothesized (Table 45). This is implies that farmers with high experience have higher chances of getting larger gross margin than those with low experience. A unit increase in the experience of sweet potato producers increased profit margin by Tshs 126 556.880.

Table 45: Linear regression model results of determinants of sweet potato profitability

Variables	Coefficient	Expected sign	Std. Error	Probability
Constant	-1.024E6		297 826.453	0.002
GENDER	33 959.186		95 647.726	0.726
EDUC	73 488.766		94 637.995	0.445
EXPHH	126 556.880	+ve	45 759.582	0.011**
FARMSIZE	312 002.225	+ve	93 615.074	0.003***
FARMLOC	-8 148.740	-ve	281.596	0.001***
FARMGPRICE	2.507		7.361	0.736
R	0.898			
R Square	0.806			
Adjusted R Square	0.758			
F-value	16.621			
(***) and (**)	Significant at 1 and 5 percent level respectively			

Moreover, farm size was also statistically significant at P<0.01 and positively related to sweet potato profit margin as it was hypothesized (Table 45). This suggests that farmers with large farms have higher chances of getting large gross margin than those with small farms. An increase in one unit of farm size leads to increase in profit margin of Tshs 312 002.225.

Farm location was statistically significant at (P<0.01) but negatively related to profit margin as it was hypothesized. This implies that farmers with sweet potato plot near main market have higher chances of getting larger gross margin than those with sweet potato plot far from the main market. A unit increases in the distance of sweet potato plot from the main market decreased profit margin by Tshs 8 148.740.

4.8.3 Multicollinearity diagnosis

Multicollinearity is the problem which occurs when two or more predictors in the model are correlated and provide redundant information about the response. Variance Inflation Factor (VIF) was used to test for the presence of multicollinearity problem. VIF greater

than 5 indicates the presence of multicollinearity problem. Since all independent variables for cassava and sweet potato farmers have VIF of less than 5 (Table 46), multicollinearity problem was not encountered in the model.

Table 46: Multicollinearity diagnosis

Variables	Cassava farmers VIF	Sweet potato farmers VIF
GENDER	1.154	1.114
EDUC	1.462	1.063
EXPHH	2.333	2.236
FARMSIZE	2.364	2.138
FARMLOC	1.710	1.136
FARMGPRICE	1.622	1.209

4.9 Marketing Efficiency

Marketing efficiency measures how efficiently the produce is marketed in a given channel (Dastagiri *et al*., 2010). The results of market efficiencies calculated conventionally as a ratio between the value added by the market system and consumers/retailers price, following Shepherd's method and Acharya's modified marketing efficiency methods are presented in Tables 47 and 48.

4.9.1 Marketing efficiency of cassava under different marketing channels

The marketing efficiency ratios of cassava under different marketing channels in Mvomero and Kongwa District are presented in Table 47. The marketing efficiency was found to be highest in channel II (2.51), followed by channel III (1.95) and then by channel IV (1.89) and least in channel V (1.67) when calculated by conventional method (i.e. value added by the marketing system divided by total marketing cost) (Table 47). On the other hand when marketing efficiency was calculated by Shepherd's method (i.e. consumer price divided by total marketing cost minus one), it was found to be highest in channel II (4.84); followed by channel III (2.61); then by channel IV (1.61) and

lowest in channel V (1.36). These findings show that the more intermediaries in the marketing channels, the lower the market efficiency and vice-versa (Table 47).

The efficiency of marketing system reflects the marketing cost and marketing margins between different intermediates. Marketing cost and marketing margin vary considerably from channel to channel and were related directly to the length of the channel, i.e. as the length of channel increases the marketing cost and marketing margin increases and vice-versa. In other words, the more the numbers of intermediaries involved between the producer and the ultimate consumers, the more is the marketing cost and marketing margin of intermediaries.

Table 47: Measurement of marketing efficiency of cassava

S/N	Particulars	Marketing channels				
		I	II	III	IV	V
1	Consumer price (CP)	25 139	51 562	43 400	10 1000	10 1000
2	Total marketing cost (MC)	-	8 836	12 010	38 645	42 831
3	Total margins of intermediaries (MM)	-	13 326	11 440	34 355	28 769
4	Price received by farmers (FP)	25 139	29 400	19 950	28 000	29 400
5	Value added by the marketing system (1-4)	0.0	22 162	23 450	73 000	71 600
Index of Marketing Efficiency						
Convention method (E) 5/2		-	2.51	1.95	1.89	1.67
Shepherd's method (ME) ½-1		-	4.84	2.61	1.61	1.36
Acharya's method (MME) [4/(2+3)]		-	1.33	0.85	0.38	0.41

When calculated by Acharya's method (i.e. price received by farmers divided by the total marketing cost and margin), it was found to be highest in channel II (1.33); followed by channel III (0.85); followed by channel V (0.41) and lowest in channel IV (0.38) (Table 47). The findings show that as the marketing costs and/or margins of intermediaries in the marketing channel increase, market efficiency decreases and vice-versa. The main reason behind this is lack of sufficient market awareness to farmers to

realize better market price. Similar findings was reported by Dastagiri *et al*. (2010) who noted that the marketing cost, marketing margin, transport cost, labour wages and the length of the marketing channel had negative influence on the marketing efficiency.

4.9.2 Marketing efficiency of sweet potato under different marketing channels

The marketing efficiency ratios of sweet potato under different channels in Mvomero and Kongwa Districts are presented in Table 48. The marketing efficiency was found to be highest in channel II (2.59), followed by channel IV (1.38) and least in channel III (1.37) when calculated by conventional method (i.e. value added by the marketing system divided by total marketing cost) (Table 48). On the other hand when marketing efficiency was calculated by Shepherd's method (i.e. consumer price divided by total marketing cost minus one), it was found to be highest in channel II (5.37); followed by channel III (1.19) and lowest in channel IV (1.12).

Table 48: Measurement of marketing efficiency of sweet potato

S/N	Particulars	Marketing channels			
		I	II	III	IV
1	Consumer price (CP)	38 257	54 700	92 800	92 800
2	Total marketing cost (MC)	-	8 586	42 250	43 736
3	Total margins of intermediaries (MM)	-	13 676	15 550	16 626
4	Price received by farmers (FP)	38 257	32 438	35 000	32 438
5	Value added by the marketing system (1-4)	0.0	22 262	57 800	60 362
Index of Marketing Efficiency					
Convention method (E) 5/2		-	2.59	1.37	1.38
Shepherd's method (ME) ½-1		-	5.37	1.19	1.12
Acharya's method (MME) [4/(2+3)]		-	1.46	0.61	0.54

When calculated by Acharya's method (i.e. price received by the farmers divided by the total marketing cost and margin), it was found to be highest in channel II (1.46); followed by channel III (0.61) and lowest in channel IV (0.54). The findings show that market

efficiency decreases as the marketing costs and/or margins of intermediaries in the marketing channel increases and vice-versa. Dastagiri *et al*. (2010) validated this finding that the more intermediaries in the marketing channel, the higher were the marketing cost, hence market efficiency decrease and vice-versa.

4.10 Major Challenges in the Production of Cassava and Sweet Potato in Mvomero and Kongwa Districts

Challenges faced in the production of cassava and sweet potato were almost similar in Mvomero and Kongwa Districts as presented in Tables 49, 50, 51 and 52. The researcher assessed the challenges faced by cassava farmers in Kongwa and Mvomero Districts. The major production challenges pointed out by Kongwa farmers were the prevalence of pests and diseases, livestock keepers, unreliable rainfall, followed by poor access to chemical inputs and poor farm inputs. Other challenges were poor access to ownership of land, theft and high input cost (Table 49).

Table 49: Production challenges faced by cassava farmers in Kongwa District

Production challenges faced	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Prevalence of pests and diseases	100.0	94.0	97.0
Livestock keepers	80.0	100.0	91.0
Unreliable rainfall	47.0	59.0	53.0
Poor access to chemical inputs	67.0	00.0	47.0
Poor farm inputs	40.0	6.0	22.0
Poor access to ownership of land	33.0	6.0	19.0
Thief	00.0	29.0	16.0
High input costs	13.0	6.0	9.0
Destructive weed	7.0	12.0	9.0
Lack of funds	7.0	00.0	3.0

In the case of Mvomero, farmers indicated the most challenging production issues as being prevalence of pests and diseases, livestock keepers, unreliable rainfall, followed by poor access to chemical inputs and poor farm inputs (Table 50). Therefore, prevalence of

pests and diseases, livestock keepers, unreliable rainfall, poor access to chemical inputs and poor farm inputs were the most production challenging issues faced by cassava farmers in both districts.

Table 50: Production challenges faced by cassava farmers in Mvomero District

Production challenges faced	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Prevalence of pests and diseases	94.0	100.0	97.0
Livestock keepers	94.0	60.0	77.0
Unreliable rainfall	63.0	60.0	61.0
Poor access to chemical inputs	69.0	27.0	48.0
Poor farm inputs	00.0	27.0	13.0
High input costs	13.0	7.0	10.0
Poor access to ownership of land	00.0	13.0	6.0
Thief	6.0	7.0	6.0
Destructive weed	6.0	00.0	3.0

Most respondents in Kongwa and Mvomero indicated a number of sweet potato production challenges ranging from livestock keepers, unreliable rainfall, to the prevalence of pests and diseases (Table 51 and 52). However, the most challenging production issues vary by district. In Kongwa, the most production issues were the prevalence of pests and disease, followed by unreliable rainfall, then livestock keepers (Table 51).

Table 51: Production challenges faced by sweet potato farmers in Kongwa District

Production challenges faced	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Prevalence of pests and diseases	100.0	86.0	92.0
Unreliable rainfall	83.0	93.0	89.0
Livestock keepers	92.0	79.0	85.0
Thief	42.0	21.0	31.0
Poor farm inputs	8.0	14.0	12.0
Poor access to ownership of land	25.0	00.0	12.0
High input costs	8.0	00.0	4.0

In Mvomero, farmers indicated the most challenging production issues as being unreliable rainfall, followed by the prevalence of pests and diseases and livestock keepers (Table 52). Therefore, prevalence of pests and diseases, unreliable rainfall, and livestock keepers were the most challenging issues mentioned in both districts.

Table 52: Production challenges faced by sweet potato farmers in Mvomero District

Production challenges faced	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Unreliable rainfall	93.0	80.0	88.0
Prevalence of pests and diseases	100.0	60.0	84.0
Livestock keepers	60.0	60.0	60.0
Poor farm inputs	00.0	30.0	12.0
Poor access to ownership of land	13.0	00.0	8.0
Poor access to chemical inputs	7.0	10.0	8.0
High input costs	7.0	00.0	4.0
Thief	7.0	00.0	4.0

4.11 Major Challenges in the Marketing of Cassava and Sweet Potato in Mvomero and Kongwa District

Cassava and sweet potato farmers were assessed in terms of marketing challenges they faced. Their responses are presented in Tables 53, 54, 55 and 56. The findings show that the main marketing challenges identified by most of the cassava farmers in Kongwa District were: market are too far, lack of market information, followed by no reliable transport and high cost of transportation. Other challenges were open market prices are too low and no enough buyers within the village (Table 53).

Table 53: Marketing challenges faced by cassava farmers in Kongwa District

Marketing challenges faced	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Market too far	100.0	88.0	94.0
Lack of market information	100.0	88.0	94.0
No reliable transport	80.0	71.0	75.0
High cost of transportation	80.0	71.0	75.0
Open market price too low	40.0	71.0	56.0
No enough buyers within the village	33.0	00.0	16.0

In the case of Mvomero, cassava farmers indicated the most marketing challenges as lack of market information, no reliable transport, open market prices too low, market too far followed by high cost of transportation and price fluctuation (Table 54).

Table 54: Marketing challenges faced by cassava farmers in Mvomero District

Marketing challenges faced	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Lack of market information	88.0	33.0	61.0
No reliable transport	75.0	40.0	58.0
Open market price too low	81.0	33.0	58.0
Market too far	69.0	40.0	55.0
High cost of transportation	56.0	40.0	48.0
Price fluctuation	19.0	00.0	10.0

Marketing challenges faced by sweet potato farmers were also assessed. The study reveals the marketing challenges as being lack of market information, market too far, no reliable transport, high cost of transportation and open market prices is too low. Other marketing challenges were absence of farmers association and no enough buyers within the village. However, the most challenging marketing issues vary by district. In Kongwa, the most challenging marketing issues were lack of market information, followed by the market too far, no reliable transport, high cost of transportation and open market prices too low (Table 55).

Table 55: Marketing challenges faced by sweet potato farmers in Kongwa District

Marketing challenges faced	Villages		District
	Masinyeti (%)	Ihanda (%)	Kongwa (%)
Lack of market information	83.0	43.0	62.0
Market too far	83.0	36.0	58.0
No reliable transport	75.0	21.0	46.0
High cost of transportation	67.0	14.0	39.0
Open market price too low	33.0	21.0	27.0
No enough buyers within the village	33.0	00.0	15.0
No specific measurement	00.0	7.0	4.0
Absence of farmers association	8.0	00.0	4.0

While in Mvomero, sweet potato farmers mentioned the most challenging marketing issues as being lack of market information, followed by no reliable transport and market too far, then open market price too low and high cost of transportation (Table 56).

Table 56: Marketing challenges faced by sweet potato farmers in Mvomero District

Marketing challenges faced	Villages		District
	Kunke (%)	Wami-Luhindo (%)	Mvomero (%)
Lack of market information	60.0	40.0	52.0
No reliable transport	60.0	30.0	48.0
Market too far	53.0	40.0	48.0
Open market price too low	60.0	20.0	44.0
High cost of transportation	53.0	30.0	44.0

Therefore, lack of market information, market being too far, no reliable transport, high cost of transportation and open market prices being too low are mentioned as the most challenging marketing issues in both districts.

4.12 Major Trading Challenges

The researcher assessed challenges faced by cassava traders in Mvomero and Kongwa Districts. The findings show that the major trading challenges mentioned by Mvomero traders were inadequate capital and lack of credit facilities (18%), seasonal availability of the crop produce (18%), customers complain (18%), lack of customers (18%) and followed by poor transport system (9%), untruthful traders (9%) and unreliable market/price fluctuations (9%) (Table 57).

Table 57: Challenges faced by cassava traders in Mvomero District

Traders business challenges faced	Frequency	Percent
Inadequate capital and lack of credit facilities	2	18.2
Seasonal availability of crop produce	2	18.2
Customers complain	2	18.2
Lack of customers	2	18.2
Poor transport system	1	9.1
Unfaithful traders	1	9.1
Unreliable market/price fluctuations	1	9.0
Total	11	100.0

In the case of Kongwa, traders indicated the most challenging trading issues as being unreliable market/price fluctuations (29%), followed be lack of customers (21%), poor transport system (14%), unfaithful traders (14%) and inadequate capital and lack of credit facilities (14%). Other challenges were poor storage facilities and lack of security (7%) (Table 58). Thus, lack of customers, unreliable market/price fluctuations, inadequate capital and lack of credit facilities, unfaithful traders and poor transport system were the most challenging issues mentioned in both districts.

Table 58: Challenges faced by cassava traders in Kongwa District

Traders business challenges faced	Frequency	Percent
Unreliable market/price fluctuations	4	28.6
Lack of customers	3	21.4
Poor transport system	2	14.3
Unfaithful traders	2	14.3
Inadequate capital and lack of credit facilities	2	14.3
Poor storage facilities and lack of security	1	7.1
Total	14	100.0

Trading challenges faced by sweet potato traders in Mvomero and Kongwa Districts were also assessed. The findings show that the trading challenges as being unreliable market/price fluctuations, poor storage facilities and lack of security, seasonal availability of the crop, inadequate capital and lack of credit facilities, customers complaint, lack of customers and poor transport system. However, the most challenging trading issues vary in each district. In Mvomero, the most challenging trading issues were unreliable

market/price fluctuations (45%), poor storage facilities and lack of security (18%), and seasonal availability of the crop produce (18%), followed by inadequate capital and lack of credit facilities (9%) and customers complaints (9%) (Table 59).

Table 59: Challenges faced by sweet potato traders in Mvomero District

Traders business challenges faced	Frequency	Percent
Unreliable market/price fluctuations	5	45.4
Poor storage facilities and lack of security	2	18.2
Seasonal availability of crop produce	2	18.2
Inadequate capital and lack of credit facilities	1	9.1
Customers complaint	1	9.0
Total	11	100.0

In the case of Kongwa, traders indicated the most trading challenges as being unreliable market/price fluctuations (25%), poor storage facilities and lack of security (25%), lack of customers (25%) and poor transport system (25%) as indicated in Table 60.

Table 60: Challenges faced by sweet potato traders in Kongwa District

Traders business challenges faced	Frequency	Percent
Unreliable market/price fluctuations	1	25.0
Poor storage facilities and lack of security	1	25.0
Lack of customers	1	25.0
Poor transport system	1	25.0
Total	4	100.0

Therefore, unreliable market/price fluctuations and poor storage facilities and lack of security were the most challenging issues mentioned in both districts. These challenges affect the quality of sweet potato sold and finally influence the price offered for sweet potatoes. Thus, if the prices are low, the expected profit will be low. The low profit experienced by sweet potato traders will force them to shy away from sweet potato trade and look for alternative business which is more profitable. Hence, sweet potato chain sustainability will be in trouble.

4.13 Major Processing Challenges

The study involved an assessment of the challenges faced by processors of cassava and sweet potato in terms of buying, storing and marketing patterns. The findings from cassava processors show that the main buying challenges identified by most of the processors were seasonal availability of the crop produce, price fluctuation, the measurement problem, high fiber content of some of the crop produce, bitterness of some of the crop produce and some of crop produce are not easy to cook. On the other hand the major storage challenges pointed out by Mvomero and Kongwa processors were the quality of the crop produce soon after storage, poor storage facilities and lack of security as presented in Tables 61 and 62. In Mvomero, processors mentioned the most challenging marketing issues were customers' complaints, unreliable markets and lack of price/market information (Table 61).

Table 61: Challenges faced by cassava processors in Mvomero District

Processors business challenges faced	Frequency	Percent
In buying		
Bitterness of some of crop produce	5	55.6
High fiber content to some of the crop produce	2	22.2
Some of crop produce are not easy to cook	1	11.1
Seasonal availability of crop produce	1	11.1
Total	9	100.0
In storage		
The quality of the crop produce	2	100.0
Total	2	100.0
In marketing		
Customers complain	2	50.0
Unreliable markets	1	25.0
Lack of price/market information	1	25.0
Total	4	100.0

In Kongwa, processors mentioned the most challenging marketing issues were dishonesty buyers, customer complaints unreliable market and the measurement problem (Table 62).

Table 62: Challenges faced by cassava processors in Kongwa District

Processors business challenges faced	Frequency	Percent
In buying		
High fiber content to some of the crop produce	4	40.0
Some of crop produce are not easy to cook	2	20.0
Price fluctuation	2	20.0
Seasonal availability of crop produce	1	10.0
No specific measurement	1	10.0
Total	10	100.0
In storage		
Poor storage facilities and lack of security	2	66.7
The quality of the crop produce	1	33.3
Total	3	100.0
In marketing		
Dishonesty buyers	3	37.5
Customers complain	2	25.0
Unreliable markets	2	25.0
Measurement problem	1	12.5
Total	8	100.0

Buying, storage and marketing challenges faced by sweet potato processors in Mvomero and Kongwa Districts were also assessed. The findings show that the main buying challenges mentioned by most of the processors was seasonal availability of the crop produce and price fluctuation. On the other hand the major storage challenges identified by Mvomero and Kongwa processors were the quality of the crop produce soon after storage, poor storage facilities and lack of security (Tables 63 and 64).

Table 63: Challenges faced by sweet potato processors in Mvomero District

Processors business challenges faced	Frequency	Percent
In buying		
Some of crop produce are not easy to cook	2	100.0
Total	2	100.0
In storage		
The quality of the crop produce	2	100.0
Total	2	100.0
In marketing		
Dishonesty buyers	2	100.0
Total	2	100.0

For marketing, the most pointed out challenging issue was dishonest buyers in Mvomero while in Kongwa, processors mentioned customers complain and low prices as the major challenging marketing issues faced (Table 63 and 64).

Table 64: Challenges faced by sweet potato processors in Kongwa District

Processors business challenges faced	Frequency	Percent
In buying		
Price fluctuation	1	50.0
Seasonal availability of crop produce	1	50.0
Total	2	100.0
In storage		
Poor storage facilities and lack of security	1	50.0
The quality of the crop produce	1	50.0
Total	2	100.0
In marketing		
Customers complain	1	50.0
Lower prices	1	50.0
Total	2	100.0

These challenges affect the quality and quantity of cassava and sweet potato sold and ultimately influence cassava and sweet potato price offered. Therefore, if the prices are low, the expected profit will be low. The low profits experienced by processors will force them to shy away from cassava and sweet potato and look for alternative business which is more profitable. Hence, cassava and sweet potato chains sustainability will be in danger.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study aimed to analyse cassava and sweet potato value chains so as to identify potential area for intervention in order to improve small-scale farmers' access to markets in Mvomero and Kongwa Districts. Specifically, the study mapped cassava and sweet potato value chains; examined how the value chain was organized, coordinated and governed among the key actors along the value chain; determined profit and marketing margins obtained by actors at various nodes of cassava and sweet potato value chains; analysed the determinants of cassava and sweet potato farmers' profitability and analysed the marketing efficiency in various cassava and sweet potato marketing channels. The study also identified challenges faced by actors in cassava and sweet potato value chains. The targeted populations were producers (farmers), processors, traders/ transporters (retailers) and consumers of cassava and sweet potato in Mvomero and Kongwa Districts.

The first objective was to map cassava and sweet potatoes value chains in Mvomero and Kongwa Districts. The findings show that there are several constraints which exist in all the two sub-sectors which among other things include low production, poor access to inputs, lack of market information, poor support services, poor linkages, lack of value addition and poor infrastructures. In the cassava subsector there is a problem of poor packaging which lead to the reported loss of produce to many traders during transport.

The findings also show that through the participation of women in cassava and sweet potatoes is generally high by about 57% against 43% for men in cassava and 73% against

27% for men in sweet potatoes, it is the men who benefit most from the income accrued from these sub-sectors. Women do most of the activities involved in the production such as land clearance, land preparation (cultivation), planting, weeding and harvesting. During the value chain analysis it was observed that women in almost both districts and in all subsectors are normally left out in the decision making on the use of income they get after sales. Currently only 41% of the interviewed participants said women are involved in decision making on the use of money accrued from cassava farming and only 43% said so in sweet potato farming.

The second objective was to examine how the value chain was organized, coordinated and governed among the key actors along the value chains. It was observed that the farmers were absolutely unorganized and hence they lack bargaining power, no any formal markets or production contracts between farmers and buyers, no relationship existing between buyers and farmers in the area. Most buyers for both cassava and sweet potato do not trust farmers likewise farmers do not trust buyers. The findings also show that there is lack of system for timely information flow on market prices to the farmers. Traders are better informed with market prices than farmers. In addition due to the small scale of production by farmers as well as small scale operation by traders, both (farmers and traders) lack competitiveness (in term of offering low prices to consumers).

The third objective was to determine profit and marketing margins obtained by actors at various nodes of cassava and sweet potatoes value chains. Regarding the structure of cassava and sweet potato marketing system, the findings show that there are about 5 and 4 marketing channels in cassava and sweet potato marketing systems respectively. Market actors in the cassava marketing channel were farmers, cooking vendors, retailers, local processors and consumers. While the market actors in the sweet potato marketing channel

were farmers, retailers, local processors and consumers. The average marketing cost per 90kg in cassava trading is about Tshs 8836 at retail level, Tshs 12 010 at cooking vendor level, Tshs 38 645 at local processor level 1 and Tshs 33 995 at local processor level 2. Local processors incur the highest marketing cost in cassava trading business. This is due to higher cost of processing functions. The average marketing cost per 90kg in sweet potato trading is Tshs 8586 at retail level, Tshs 42 250 at local processor level 1 and Tshs 35 150 at local processor level 2. Higher marketing cost by actors in marketing channels reduces the relative competence of the marketing channel in the market chain.

The total gross marketing margin (TGMM) in cassava trading is highest in channel IV and it accounts a TGMM of 72%. The farmer's share of the total consumer price was 100% in the channel I, 57% in channel II, 46% in channel III, 28% in channel IV and 29% in channel V. The lowest net marketing margin is associated with local processors in channel V of cassava marketing chain. The highest producer share is observed in channel I of sweet potato marketing chain that is 100% of the price paid by consumers. The highest net marketing margin in the sweet potato marketing chain is observed in channel II by the retailers' group that is 25%. The marketing margin analysis of cassava and sweet potato subsectors revealed that producers share and net marketing margin maintained by varying chain actors are really varied across the different marketing channels. The high profit in the cassava marketing chain is attained by local processors' category in channel IV which accounts 34 355 Tshs/90kg.

The highest profit in channel IV was made by local processors due to value addition and the exclusion of retailers from participation in the market channel. Local processors attained the lowest marketing profit (3050 Tshs/90kg) in channel IV of the sweet potato marketing chain. The lowest profit was made by local processors due to the inclusion of

retailers' participation in the market channel. From the above analysis one can conclude that cassava and sweet potato trading are operating profitably and the distribution of the profit margin is comparatively fair when compared to other agricultural commodities.

Cassava producers earned a gross margin of 21 848.31 Tshs/90kg in channel I, 16 659.31 Tshs/90kg in channel III, 24 709.31 Tshs/90kg in channel IV, and 26 109.31 Tshs/90kg in channel II and V. While sweet potato producers earned a gross margin of 29 884.41 Tshs/90kg in channel I, 26 627.41 Tshs/90kg in channel III and 24 065.41 Tshs/90kg in channel II and IV. Therefore, cassava and sweet potato production during that particular period was profitable to producers.

The fourth objective was to analyze the determinants of cassava and sweet potato farmers' profitability in Mvomero and Kongwa Districts. The findings show that profitability of cassava and sweet potato in the study area is enhanced by area under cassava/sweet potato cultivation in 2011/2012 growing season and experience of the household in cassava/sweet potato production. On the other hand farm location is significant factor that reduce cassava and sweet potato farmers' profitability.

The fifth objective was to analyze the marketing efficiency in various cassava and sweet potato marketing channels. The result obtained while calculating the marketing efficiency by employing convertion method, Shepherd's method and Acharya's method show that market efficiency in all the two sub-sectors decreases as the marketing costs and/or margins of intermediaries in the marketing channel increases and vice-versa. This was due to lack of sufficient market awareness to farmers to grasp better market price.

The sixth objective was to identify challenges faced by actors in cassava and sweet potatoes value chains. The findings show that cassava and sweet potato farmers are challenged with the problems of pest and diseases which affect farm yield, livestock keepers, unreliable rainfall, poor access to chemical inputs and poor farm inputs. From marketing perspectives, cassava and sweet potato farmers are faced with lack of market information, market too far, no reliable transport, high cost of transportation and too low open market prices.

Traders, according to the study findings, experience challenges as farmers, whereby traders were faced with a lack of customers, unreliable market/price fluctuations, seasonal availability of the crop produce, inadequate capital and lack of credit facilities, unfaithful traders, poor transport system, poor storage facilities and lack of security. For processors, the study found out that seasonal availability of crop produce, unreliable market/price fluctuation, quality of crop produce after storage, customers complain and lack of price/market information are the most challenges faced. With all these challenges, the potential for the development of a sustainable cassava and sweet potato value chains is questionable. Thus, cassava and sweet potato value chain sustainability will highly depend on the elimination of the challenges faced by the farmers, traders and processors.

5.2 Recommendations

Based on the findings of the study the following recommendations are suggested for the development of sustainable cassava and sweet potato value chains.

5.2.1 Recommendations for ensuring value chain sustainability

This study identified the potential area for the development of cassava and sweet potato value chains in Mvomero and Kongwa Districts. The challenges facing cassava and sweet

potato value chains actors affect chain sustainability. Therefore, to ensure cassava and sweet potato value chains sustainability, all these challenges should be eliminated not only by the value chain actors but also by other stakeholders in the value chain development like the policy makers (government) and research organizations.

5.2.2 Recommendations for cassava and sweet potato value chains players

For the development of sustainable cassava and sweet potato value chains in Mvomero and Kongwa Districts it is recommended that modern technologies should be expanded to chain players. For example, farmers should be provided with improved seed varieties (planting materials), modern farming equipment/tools as well as market information. Also, if the value chain is a buyer driven, contract farming should be introduced and should go hand in hand with the accessibility of farm inputs, improved technologies and extension services.

The following are chain players' specific recommendations:

Farmers: are recommended to use modern farming equipment/tools, use improved seed varieties (planting materials) and to form stronger organizations/associations for specific crops in the study area which will facilitate market channel as well as proper technology transfer and effective capacity building. In addition, farmers should increase the scale of production. In this way, farmers will participate and benefit fully from cassava and sweet potato value chains.

Traders: are recommended to increase the volume of handling through organized retail chain to make the business more commercialized. This increased volume of trading is also likely to offer more stabilized price at the market, benefiting both consumers and producers and attract other farmers to diversify their cropping system, thereby increasing

the area under cassava and/or sweet potato cultivation. Additionally, traders should assist farmers with market information to encourage them to participate in the chain.

Processors: are recommended to use proper storage facility and to look for new markets and new products to ensure sustainability of cassava and sweet potato products in the market. In addition, processors should link with traders and if possible to enter into contracts with traders to ensure consistency in the supply of cassava and/or sweet potato to their business area. Also cassava and sweet potato products supplied to consumers should be consistent in terms of quantity and quality and should be of competitive prices. In this way, it is possible to establish a sustainable cassava and sweet potato value chains.

5.2.3 Recommendations for government policy

Government is one of the institution which are required to create a conducive environment for the development of sustainable cassava and sweet potatoes value chains. Thus, the government policies and interventions affect cassava and sweet potatoes value chains development potential as well as chain sustainability. Therefore, in order to have sustainable cassava and sweet potato value chains the study recommends that the government should:

i. Formulate some by-laws through district councils concerning the marketing of the crop.
ii. Strengthen transportation infrastructure for transporting the produce to the consuming markets so as to take benefit of higher prices in these markets.
iii. Facilitate the dissemination of market information through all possible mass media for the benefit of the farming community.

5.2.4 Recommendation for further research

This study recommends that research on post harvest management of cassava and sweet potato should be undertaken.

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APPENDICES

Appendix 1: Producer survey questionnaire

Analysis of cassava and sweet potatoes value chains in Mvomero and Kongwa Districts

1.0 Region …….. 1.1 District ……
1.2 Ward..... 1.3 Village …….....
1.4 Sub-village……
2. Sex of household head: (circle) 1 = Male 2 = Female
3. Age of household head.....
4. Marital status of household head: (circle)
1= Married 2 = Single 3 = Divorced 4 = Widowed
5. Level of education of household head: (circle)
1= No formal education 2 = Primary education 3 = Secondary education
4= Tertiary education.
6. State your most important sources of income……....
7. Which roots crop do you produce most? (circle) 1 = Cassava 2 = Sweet potato
8. Do you practice irrigation farming? (circle) 1 = Yes 2 = No
9. How many acre(s) of cassava/sweet potato did you cultivate last year?.....
10. Did you rent land for cassava/sweet potato production during the last season? (circle)
1= Yes 2 = No
11. If yes, how many acres did you rent?.....
12. What is the unit cost of renting an acre of land (Rent/acre) ……

13. What kind of planting materials do you use in production? (circle) 1 = Local variety	2 = Improved variety
Please list them ……..…..., ……..……... ……..…..., ……..……...	Please list them ……..…..., ……..……. ……, ……..…….

14. List and rank your most intensive and important inputs in your production process?

☐ ..... ☐ ..... ☐ .....
☐ ..... ☐ ..... ☐ .....
☐ .....

15. Rank the inputs above in terms of money spend on them?

☐ ..... ☐ ..... ☐ .....
☐ ..... ☐ ..... ☐ .....
☐ .....

16. Who are your most important input suppliers and what do you buy from each?

Input supplier	Type of inputs	Quantity of input	Unit cost of input (Tshs)

17. Are there problems in obtaining some of these inputs? (circle) 1 = Yes 2 = No
18. If yes, what are those problems?
……
……
19. Please tick the farming equipment/tools you have. *You may add to the list if necessary*
1= Hand hoe 2 = Oxen Plough 3 = Tractor 4 = Other (Specify)……
20. Approximately what was the total amount of cassava/sweet potato you produced last year?
.....bags .....kg. *(Select the appropriate units)*
21. Costs incurred in producing cassava/sweet potato? Please complete the table below;

	Field activities					
	Land preparation	Planting	Weeding	Spraying	Fertilizing	Harvesting
Number of events						
Cost (Tshs/acre)						

Other costs (Specify).....

22. Did you sell any crop produce during the last seasons? (circle)
1 = Yes 2 = No

If 'Yes'	If 'No'
What was the total quantity of crop produce sold?……. bags ……. kgs. (Select the appropriate units)	Why?
What was your average price for a crop produce last seasons?……..... Tshs/bag..... Tshs/kg. (Select the appropriate units)	

23. Did you realize any income from sales of other products obtains from cassava/sweet potato? (circle)
1= Yes 2 = No
24. If you realized income from sales of other cassava/sweet potato (by-) products, what were these products and their respective total income earned?
1st product…….... Income earned……...……
2nd product…….. Income earned……
3rd product……... Income earned……...……...……...

25. Where/ to whom do you sell your harvest?

☐ Local Assembler ☐ Local Processors ☐ Wholesalers
☐ Other (Specify)……..…..…

26. In what terms do you sell your harvest?

☐ Cash ☐ credit

27.At what price do you sell your cassava/sweet potato presently? (InTshs)…/kg/bag/tone. *(Select the appropriate units)*
28. Who sets price for crop produce/crop products? (circle)
1= Buyer 2 = Seller 3 = Both 4 = Other (Specify).....
29. What factors are considered in setting the price for cassava /sweet potato?

☐ Moisture Content ☐ Size ☐ Weight
☐ Supply forces ☐ Demand forces ☐ Quantity
☐ Other (Specify).....

30. What was the mode of the trade? (circle)
1= Contract sale 2 = First come/first served 3 = other (Specify)…….

31. What techniques do you use in storing cassava/sweet potato to increase its shelf life?
……
……
32. During the last cropping season, did you experience any post-harvest losses? (circle)
1= Yes 2 = No .
33. If yes, please select and rank the main causes in order of magnitude of damage?

☐ Storage pests ☐ Spillage in store ☐ Spillage when transporting

☐ Excessive humidity ☐ Other (Specify)……..…….……

34. Did the traders pay a lower price for some of your crop produce due to post-harvest quality deterioration? (circle)
1= No 2 = Yes, for a few of my produce 3 = Yes, for most of my produce
35. What is your main market outlet/crop depot for cassava/sweet potato? (circle)
1 = At farm gate 2 = In the village market 3 = In markets outside the village
4= NGO or donor project 5 = Farmers groups or organization
6 = other (specify)……...
36. Do you have any contractual agreement with the buyers/processors? (circle)
1 = Yes 2 = No

If 'Yes'	If 'No'
Please indicate the kind of agreement? 1 = formal contracts 2 = informal contracts	If your answer is no, are you willing to enter into a contract agreement with the processors/traders in the future? 1 = Yes 2 = No If no, why?
What does the contract specify? Price..... Quality..... Time.....	
Are you willing to continue such contractual agreement in future? 1 = Yes 2 = No	
If yes, how is this contract benefiting you?	
If your answer is no, why? ……..	

37. What is your source of market information and prices of a crop produce and its products?
1 = Direct visit to the market 2 = Cross check with fellow producers 3 = From friends
4 = From extension officers 5 = Other (Specify)…….
38. Is there any credit institution in your village? (circle) 1 = Yes 2 = No
39. If yes, list them and briefly explain how they support you?
....
....
40. What are their interest rates? ....
41. Did you get any training on farming? (circle) 1 = Yes 2 = No
42. If yes from whom and on what issues?
.....
.....
43. Do you need training on farming? (circle) 1 = Yes 2 = No
44. If your answer is yes, on what issues and why? ....
45. Are you a member of any farmer association/cooperatives? (circle) 1 = Yes 2 = No
46. If yes, please list the benefits you get by being a member of the association or organization?
.....
.....

47. Please list (if there are) the disadvantages of being part of this cooperative?
.....
.....

48. Does your association/cooperative help you to bargain market prices when selling your crop produce and/or crop products? (circle) 1 = Yes 2 = No

49. What are the five main production problems facing your household at the moment

☐ Poor farm inputs ☐ Soil fertility problems ☐ Poor access to ownership of land

☐ High input costs ☐ Unreliable rainfall ☐ Poor access to chemical inputs

☐ Destructive weed ☐ Lack of appropriate irrigation equipment

☐ Prevalence of pests & diseases ☐ Other (Specify)……

50. What are the five main marketing problems facing your household at the moment

☐ No reliable transport ☐ Market too far ☐ Open market prices too low

☐ High cost of transportation ☐ No buyers within the village

☐ Farmer association problems ☐ Government regulatory board problems

☐ Lack of market information ☐ Other (Specify)……..……

51. What marketing costs did you incur in cassava/sweet potato?

Cost item	**Unit**	**Cost/unit (Tshs)**
Transport		
Levy and market fees		
Hired labour		
Storage		
Others (specify)		

52. What kinds of interventions are required to improve the productivity of cassava/sweet potato in your area?

.....

.....

Gender in cassava and sweet potato value chain

Mapping of Cassava and sweet potatoes value chains with gender perspective will be assessed because both men and women are potential actors in the chain.

53. Who decides on which crop to grow at household level? (circle)
1= Men 2= Women 3 = Both men and women
54. Who decides on the amount and price of crop produce to sell? (circle)
1= Men 2 = Women 3 = Both men and women
55. Who decides on the use of income earned from crops? (circle)
1 = Men 2 = Women 3 = Both men and women

Harvard tool 1: Activity Profile

This tool identifies all relevant production and reproductive tasks and answers the question: who does what?

List of activities	**Women/Girls**	**Men/Boys**	**Both**
Land clearance			
Land preparation			
Sowing/planting			
Weeding			
Fertilizer application			
Harvesting			
Processing			
Marketing			

Harvard tool 2: Access and Control Profile

	Access			Control		
	Women	**Men**	**Both**	**Women**	**Men**	**Both**
Inputs (i.e. planting materials)						
Land						
Equipments						
Labour						
Cash						
Basic needs (food, clothing & shelter)						
Income						
Asset ownership						

Harvard tool 3: Influencing factors

Influencing factors	**Constraints**	**Opportunities**
Community norms and social hierarchies		
Demographic conditions		
Institutional structures		
Economic factors		
Political factors		
Legal parameters		
Training and education		
Attitude of community to development/assistance workers		

56. What is your suggestion/comment?

.....

.....

THANK YOU FOR YOUR TIME

END

Appendix 2: Traders (Transporters/retailers) survey questionnaire

Analysis of cassava and sweet potatoes value chains in Mvomero and Kongwa Districts

1.0 Region …….. 1.1 District ……
1.2 Ward..... 1.3 Village …….....
1.4 Sub-village……
2. Sex of respondent: (circle) 1 = Male 2 = Female
3. Age of respondent.....
4. Marital status of respondent: (circle)
1 = Married 2 = Single 3 = Divorced 5 = Widowed
5. Level of education of respondent: (circle)
1 = No formal education 2 = Primary education 3 = Secondary education
4 = Tertiary education
6. Which roots crop do you sell usually? (circle)
1 = Cassava 2 = Sweet potato
7. Type of trader involved: (circle)
1 = Wholesaler 2 = Retailer
8. What was your initial capital? (In Tshs)…… Source……..
9. Who are your sources of the crop produce/crop products?
☐ = Farmers ☐ = Local assembler ☐ = Local processors ☐ = Transporters
☐ = Wholesalers ☐ = Other (specify) ……

10. If crop produce	11. If crop product (specify the product)……
At what average price do you buy crop produce? (InTshs)……/kg/bag/tone. (Select the appropriate units).	At what average price do you buy crop product? (In Tshs……../kg/bag/tone. (Select the appropriate units).
Approximately what was the total amount of crop produce did you buy last year..... bags ..... kgs. (Select the appropriate units)	Approximately what was the total amount of the crop product did you buy last year..... bags ..... kgs. (Select the appropriate units)

12. Who sets price for crop produce/crop products? (circle)
1 = Buyer 2 = Seller 3 = Both 4 = Other (Specify).....
13. What factors are considered in setting the buying price for crop produce/crop products? (rank)
☐ = Moisture content ☐ = Size ☐ = Weight ☐ = Supply forces
☐ = Demand forces ☐ = Quantity ☐ = Other (Specify)……..
14. What was the mode of the trade? (circle)
1 = Contract sale 2 = First come/first served 3 = Others (Specify)……..
15. What was the mode of payment? (circle)
1 = Cash 2 = Credit 3 = Other (Specify)……...
16. In what form do you buy crop product? (circle)
1 = Raw 2 = Processed 3 = Other (Specify)……
17. After purchase, what kind of activities do you do before selling crop product?

Activities	**Tick where appropriate**	**Cost associated per kg/bag/tone. (Select the appropriate units).**	**New price after the activities**	**Constraints in the activities**
Preservation/handling				
Storage				
Transport				
Processing				
Other (specify)				

18. If storage, what are some storage techniques you are engaged in and how long do they help preserve this crop produce?

Technique	**Duration of storage**
……	……..……
……	……..……

19. If transportation, what mode of transport do you use? (circle)
    1 = By head 2 = Bicycle 3 = Public transport 4 = Truck/ pick- up
    5 = Other (specify) ……
20. Is the transport mode own or hired? (circle)
    1 = Own 2 = Hired
21. Do you share this mode of transport with others? (circle)
    1 = Yes 2 = No
22. If yes, how do you share the costs? (circle)
    1 = By weight/ volume 2 = Per trip 3 = Equally 4 = Per distance
    5 = Other (Specify)…….
23. How is the transport cost determined? (circle)
    1 = Per weight/volume 2 = Per distance 3 = Per trip 4 = Other (specify)……
24. Where/to whom do you sell your product?
    ☐ = Wholesalers ☐ =Industrial processors ☐ = Retailers ☐ = Consumers
    ☐ = Other (Specify)……
25. At what price do you sell your products? (In Tshs)……. /kg/bag/tone. (Circle the appropriate unit).
26. What quantity did you sell last year?…… bags…..kgs (Select the appropriate units)
27. What criteria do you use in determining the selling price?
    ☐ = Moisture content ☐ = Size of cassava ☐ = Weight ☐ = Supply forces
    ☐ = Demand forces ☐ = Quantity ☐ = Grades ☐ = Other (Specify)……
28. Do you buy products on behalf of others? (circle)
    1 = Yes 2 = No
29. If yes, how much commission do you get? (In Tshs)……..…/Kg/ bag/ tone (Select the appropriate units)
30. Are you a member of any association/cooperatives? (circle)
    1 = Yes 2 = No
31. If yes, what benefits do you get by being a member of the association or any other organization?
    .....

32. Do you have any contractual agreement with suppliers of products? (circle) 1 = Yes 2 = No	33. Do you have any contractual agreement with buyers of products? (circle) 1 = Yes 2 = No
If yes, please indicate the kind of agreement? 1 = formal contracts 2 = informal contracts	If yes, please indicate the kind of agreement? 1 = formal contracts 2 = informal contracts
What does the contract specify? ☐ Price..... ☐ Quality..... ☐ Time.....	What does the contract specify? ☐ Price..... ☐ Quality..... ☐ Time.....

34. Is there any credit institution in your village/town? (circle) 1 = Yes 2 = No
35. If yes, list them and briefly explain how they support you?
    ……..... ……
    …… ……
36. What are their interest rates? ……
37. What is your opinion on the quality of products that you buy?
    ……
    ……
38. Please list major business constraints faced and proposed solutions?

Constraints	**Proposed solutions**
……	……..……
……	…….

THANK YOU FOR YOUR TIME

END

Appendix 3: Processor survey questionnaire

Analysis of cassava and sweet potatoes value chains in Mvomero and Kongwa Districts

1.0 Region ……. 1.1 District ……..
1.2 Ward..... . 1.3 Village …….....
1.4 Sub-village……
2. Sex of respondent: (circle) 1 = Male 2 = Female
3. Age of respondent.....
4. Marital status of respondent: (circle)
1 = Married 2 = Single 3 = Divorced 4 = Widowed
5. Level of education of respondent: (circle)
1 = No formal education 2 = Primary education 3 = Secondary education
4 = Tertiary education
6. Do you add value to a roots crop produce after purchase? (circle)
1 = Yes 2 = No
7. If yes, which roots crop do you add value? (circle)
1 = Cassava 2 = Sweet potato
And, how do you add this value?
……
……
8. Are there other processing methods you know? (circle)
1 = Yes 2 = No
If yes, list them
…… ……..
…… ……..
9. What is preventing you from using the above listed approach(s)?.....
10. Approximately what was the total amount of crop produce did you buy last year?
.....bags .....kgs. (Select the appropriate units)
11. What quantity did you processed last year?
…….bags…….kgs. (Select the appropriate units)
12. What causes the difference?.....
13. Who are your sources of the crop produce?
☐ = Farmers ☐ = Processors ☐ = Wholesalers ☐ = Retailer
☐ = Other (specify)……
14. At what average price do you buy this crop produce? Tshs…….. /kg/bag/tone. (Circle the appropriate unit)
15. Who sets price for crop produce? (circle)
1 = Buyer 2 = Seller 3 = Both 4 = Other (Specify).....
16. What factors are considered in setting the buying price for a crop produce?
☐ = Moisture content ☐ = Size ☐ = Weight ☐ = Supply forces
☐ = Demand forces ☐ = Quantity ☐ = Other (Specify)……
17. What other costs did you incur in buying crop produce? (Estimate cost in Tshs per category)
1= Transport……..…….. 2= Storage…….
3= Preservation…….... 4= Other (Specify)…….……
18. Do you have an association/cooperative as processors which help you to bargain on influence market price when buying/selling your crop produce/crop products? (circle)
1 = Yes 2 = No
19. Where do you sell your products and in which form?
…… ……...……
20. What is the selling price? (In Tshs)…… /kg/bag/tone. (Select the appropriate units).
21. What are some storage techniques you are engaged in and how long do they help preserve this crop produce/crop products?

Technique	**Duration of storage**
……	……..
……	……

22. What are other raw materials required?.....
And where do you get them?……..……

23. Please complete the table below

Equipments/tools for processing	**Supplier/ Where you bought it from**	**How much did you purchase it**	**How much can you sell them now**

24. How can you describe your relationship with the supplier and buyer of crop produce/crop products? (circle)

Supplier 1 = Very good 2 = Good 3 = Average 4 = Poor

Buyer 1 = Very good 2 = Good 3 = Average 4 = Poor

25. Do you have any contractual agreement with suppliers of crop products? (circle) 1 = Yes 2 = No	26. Do you have any contractual agreement with buyers of products? (circle) 1 = Yes 2 = No
If yes, please indicate the kind of agreement? 1 = formal contracts 2 = informal contracts	If yes, please indicate the kind of agreement? 1 = formal contracts 2 = informal contracts
What does the contract specify? ☐ Price …… ☐ Quality……. ☐ Time ……	What does the contract specify? ☐ Price …… ☐ Quality……. ☐ Time ……...

27. Is there any credit institution in your village? (circle) 1 = Yes 2 = No

28. If yes, list them and briefly explain how they support you?

…… ……

…… ……

29. What are their interest rates?.....

30. Did you get any training on processing? (circle) 1 = Yes 2 = No

31. If yes, from whom and on what issues?

…….. ……...

…….. ……...…

32. Do you need training on processing? (circle) 1 = Yes 2 = No

33. If your answer is yes, on what issues and why?

…….. ……

……..…

34. Please list major business constraints faced and proposed solution:

	Constraints	**Proposed solutions**
In buying	…… ……	…….. ……..
In storage	……. …….	……... ……...
In marketing	…… ……	…… ……

THANK YOU FOR YOUR TIME

END

Appendix 4: Domestic consumers survey questionnaire

Analysis of cassava and sweet potatoes value chains in Mvomero and Kongwa Districts

1.0Region …… 1.1 District …….
1.2 Ward..... 1.3 Village …….....
1.4 Sub-village…….
2. Sex of respondent: (circle) 1 = Male 2 = Female
3. Age of respondent.....
4. Marital status of respondent: (circle)
1 = Married 2 = Single 3 = Divorced 4 = Widowed
5. Level of education of respondent: (circle)
1 = No formal education 2 = Primary education 3 = Secondary education
4 = Tertiary education
6. Which roots crop do you buy most? (circle)
1 = Cassava 2= Sweet potato
7. Where/ from whom do you usually buy a crop produce/crop product?
☐ = Retailers ☐ = Wholesalers ☐ = Small-scale processors ☐ = Farmers
☐ = Other (specify)……
8. At what price do you buy a crop produce/crop product? Tshs..... /kg/bag/tone. (Select the appropriate units).
9. What do you look at when buying a crop produce/crop product?
☐ = Quantity ☐ = Size ☐ = Cost ☐ = Other (specify)……
10. Who set the price of a crop produce/crop products? (circle)
1 = Buyer 2 = Seller 3 = Both 4 = Other (Specify)……
11. What factors are used to set the price?
☐ = Supply forces ☐ = Demand forces ☐ = Quality ☐ = Grade
☐ = Other (Specify)……...
12. What quality attributes are you looking at when buying a crop produce/crop products?
☐ = Size ☐ = Colour ☐ = Test ☐ = Shape ☐ = Other (Specify)……
13. Are you satisfied with the way in which the product is packaged and measured? (circle)
1 = Yes 2 = No.

If 'Yes' why?	If 'No' why?
…… ……	…… ……

14. What changes would you like to see so as to improve the quality of the product being sold for human consumption?
……

THANK YOU FOR YOUR TIME

END

Appendix 5: Focus Group Discussion Guide

Analysis of cassava and sweet potatoes value chains in Mvomero and Kongwa Districts

A: Cassava and sweet potatoes production

1. How is land acquired? Communal, lease/hired, inherited, family, husband? (Prioritize from the most to the least frequent mode of acquiring)
2. On average, how much land is available per household in this village?
3. What is proportion of that land dedicated to cassava and sweet potato production? Why?
4. What cassava and sweet potato varieties do you commonly grow? [*List in ranks all mentioned*]why each variety?
5. What are the common production practices carried out on cassava and sweet potatoes [*Ask for each crop separately*]why?
    i. How is the land cultivation done?
    ii. What methods of planting are used?
6. How do you prefer consuming the cassava/sweet potatoes? [*Raw, cooked, mixed with other food, roots, and leaves*]Why?
7. Do you feed by-products of cassava and/or sweet potatoes to livestock? If yes, which livestock?
    i. What is fed to cattle or goats and in what form[*Roots, leaves or wastes such as peels*]?
    ii. If not fed to cattle and goats, why?

B: Cassava and sweet potato multiplication

1. What are the most common sources of planting materials? Why? Are there other souces?
2. If a new variety was introduced in the past, what are some multiplication and distribution strategies of planting materials to other farmers you were engaged in?
3. What criteria were used to select farmers for seed multiplication?
4. How should the pricing of planting materials be set?
5. How much money was charged for each crop type? [*cassava cuttings and sweet potato vines*]

C: Marketing and market participation

1. What are the current markets for cassava and sweet potatoes [*Develop a participatory market chain map for cassava and sweet potatoes and ask the following questions for each as it is drawn*]
    a. What are the main markets?
    b. Who sell to these markets[*Men, Women, Children*]?
    c. What are the prices in these markets?
    d. How do the prices vary by season?
    e. How do the products move from these markets all the way to the consumers[*Other transaction in the chain including middle men, wholesalers, retailers etc*]?
    f. What are the prices at these different levels of the chain?
    g. What are the quality requirements for the different markets?
    h. Which of the markets are more profitable than others?
    i. What periods during the year is there high demand, low demand?
    j. What are the constraints to cassava and sweet potato marketing in your community?
    k. Who manage the income from cassava and sweet potato sales [*Men, Women, Joint, Other (Specify)……*]?
    l. What are the challenges faced by each actor in the chain?

D: Institutional and legal framework

1. Is there any associations (internal organization) exist within your community? What external organizations work with the community?
    a. For all internal and external organizations, name them, their functions, what are the leadership gender ratios and roles for men and women (internal organizations include groups, co-operatives etc)?

E: Credit availability

1. Are there any credit institutions? Do you use them? What are their rates of interest?

THANK YOU FOR YOUR TIME

END