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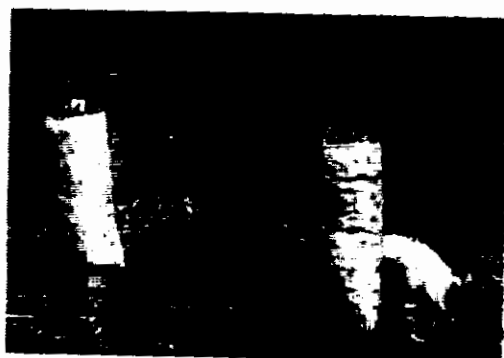
IITA



**Southern Africa Root Crops Research Network**

**(SARRNET)**

**A Comparative Analysis of the Marketing of Cassava and Sweet  
Potato in Southern Africa: The case of Malawi, Tanzania  
and Zambia**



*A summary Synthesis*

February, 2003

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### Acronyms

ESARRN	Eastern and Southern Africa Root Crops Research Network
FAO	Food and Agriculture Organisation
FEWS	Farming Early Warning System
GOM	Government of Malawi
IITA	International Institute of Tropical Agriculture
NASFAM	National Smallholder Farmers Association of Malawi
RTIP	Root and Tuber Improvement Programme
SADC	Southern African Development Committee
SIDA	Swedish International Development Authority

## **Executive summary**

This report presents a summary synthesis of results of a three-phased sub-sector analysis study on marketing of cassava and sweet potato, which was concurrently conducted in Malawi, Tanzania and Zambia. The three major phases were comprehensive literature review, qualitative assessments (pre-survey) and quantitative study. The study was done over a period of two years from 2000 to 2001.

The general objective of the study was to understand the structure and performance of cassava and sweet potato markets in Malawi, Zambia, and Tanzania and draw inferences for Southern Africa. The underlying hypothesis of the study was that a clear understanding of the marketing aspects and dynamics of cassava and sweet potato markets would help both researchers and policy makers to design and adopt appropriate strategies in the promotion of cassava and sweet potato in Southern Africa.

The study was conducted in selected areas in Malawi, Zambia and Tanzania targeting production and consumption areas including major markets. Various players in the marketing chain were interviewed using standard study tools to allow for comparison of information across the three countries. Data was thus collected at farm, rural market, wholesaler, transporter, retailer and at industrial processor level covering all marketing aspects including marketing opportunities for processed products. The study also addressed the demand and supply of fresh and processed products year-round and price sensitivity.

Cassava and sweet potato are now important crops in the SADC countries, in terms of area planted and contribution to food requirements. Malawi, Tanzania and Zambia are the main countries in the region where expansion of cassava for production has been very significant. It is estimated that 30% of both Zambian and Malawian population depends on Cassava as the major staple food. Amongst their several advantages, these crops are tolerant to drought and have low requirements for external inputs like fertilisers while at the same time being able to provide yields in agro-ecologies and seasons where other crops would fail. Cassava and sweetpotato are also slowly gaining importance as cash crops in some of these countries especially Malawi and Zambia.

Although cassava and sweetpotato have become important crops in most SADC countries such as Malawi, Zambia and Tanzania, information is lacking on the supply and household demand for fresh and processed products from these crops. It has, therefore, been difficult to develop reliable strategies that address issues on post-harvest utilisation and commercialisation of cassava and sweetpotato in the three countries. It is thus believed that the results of this study and lessons learnt would help in designing strategies of how to better organise farmers in the production and commercialisation of the two crops to their benefit.

## **Major findings**

### **Trends of production and consumption**

The region has experienced a rapid increase in production as well as consumption of cassava and sweet potato over the last decade. The increase has been much more significant in Zambia and Malawi. Not only has production increased in the traditionally producing areas, but evidence shows production has also extended to other areas where it is grown mainly as a cash crop. Cassava and sweet potato have therefore become important food and cash crops in the region.

A number of factors are believed to have led to this trend, such as, persistent drought in the region and problems in soil fertility management, which have forced farmers to diversify out of maize, the leading food grain. However, most important to note is the expansion of cassava and sweet potato production as cash crops. Most farmers (more than 50%) indicated they grew cassava for food and cash. In places where cassava is not a staple food, about 90% of the cassava produced was sold. There is high demand of cassava and sweet potato on the fresh market in the urban centers hence the production and supply of these two crops on the fresh market is demand driven. This increase in demand could be explained by the rising levels of poverty in both rural and urban centers such that most households are looking for cheaper foodstuffs to replace what have become luxurious foods. Cassava and sweetpotato have been reported to be direct substitutes of bread and other food stuffs mainly those taken during breakfast. It has been found out that the major form in which cassava or sweet potato is consumed is fresh boiled roots and these are mainly taken together with tea. This substitution of bread for cassava or sweet potato is taking place mainly within low or middle-income households, an indication that the relative prices between the two factors and the income constraint are the major determinants of this trend.

It has also been found out that consumers preferred sweet varieties of cassava and sweet potato with high dry matter content and low fiber content and those which cook faster. But storage of these products was very insignificant meaning they were mainly bought for fresh produce consumption.

#### **Level of domestic processing and linkage between producers and industrial processors**

No significant processing takes place in the cassava supply chain. Cassava and sweet potato processing into various types of products for the market is not a common practice on the cassava food chain. Almost no processing of cassava at household-farm level exists in areas where the crop is grown mainly for the fresh market. However processing was mostly reported in areas where cassava is a staple food. The simple processing reported amongst consumers and traders was mainly peeling and boiling or frying. Amongst producers, processing involved peeling, slicing and drying (makaka) or soaking/fermenting and drying into cassava chips or pounding into flour. Thus processing at domestic level has mainly been for storage purposes due to seasonal supply and perishability of the products but also to diversify the form in which the produce can be consumed. However, it has been found out that there are limited recipes in which cassava or sweet potato is prepared at household level. This means that there is significant room for exploring various ways and means to process cassava and sweet potato and this could be another avenue through which cassava and sweet potato can be commercialised and its trade and utilisation increased.

The major constraints to processing reported has been lack of knowledge and lack of proper processing technologies. Fostering technological advances therefore in form of means and ways by which households could domestically process the roots would shed breakthroughs towards significant increases in consumption of sweet potato and cassava.

There are a number of industries that are using cassava as a raw material. However, little cassava penetrates the industry despite the fact that demand for industrial use is increasing. For instance, the total quantity of cassava currently used for industrial processes and export translates to 0.60% of the total cassava produced in Malawi. The bulk of cassava produced is either processed at household level or sold on the fresh



market for home consumption. The fresh market expansion is acting as a constraint to industrial processing due to the high operational costs involved in processing relative to prices of cassava and sweet potato on the fresh market. This means that in areas where cassava is largely grown for the fresh market, unless the industrial processors are prepared to offer competitive prices, industrial processing of cassava in these areas will remain negligible. However in areas where farmers traditionally grow cassava for both fresh and as staple, it has been noticed that the fresh market is less dynamic and that the possibility of linking the farmers with industrial processors is higher. However, linkages between farmers and industrial processors are very weak. If farmers were linked to processors through contract farming for example, this would ensure a steady market for the processors and a steady supply of the raw materials of a defined quality.

### **Marketing channels and price determination**

There are various players in the cassava/sweet potato marketing chain ranging from producers, traders (wholesalers/middlemen, retailers), transporters to consumers. Cassava or sweet potato product moves in the same order; from producers to traders and to consumers with transporters facilitating this movement. It is through this channel that price transmission takes place. It has been found out from this study that pricing of cassava and sweet potato is very subjective and with a certain level of bargaining for both quantities involved and price. Several prices are fixed on the product as it changes hands amongst different players in the food chain and at each level a mark-up price is charged. No clear standards are set but the most important ones are size of tubers, tuber grade, farm gate price, and to a lesser extent, variety, freshness and colour of tubers. Though this is the case, it has been indicated that the middleman has the biggest voice on issues of price. The middleman would prefer to have the largest volumes of produce possible at the lowest possible price when they are buying cassava from the farmers. In most cases farmers have been reported to be price takers. It has been found out that all other players in the marketing chain do not have much bargaining power compared to the middleman. Organizing all players in the marketing channel into associations with legal power would be the only way to regulate the business and fight against scrupulous behavior of some players who would like to obtain supernormal profits from the business.

Regarding price seasonality, players in the cassava and sweet potato supply chain felt that highest prices for cassava or sweet potato exist at the beginning and towards the end of the season, while lowest prices are in the middle of the season which is consistent with price behavior for agricultural products.

The major suppliers of cassava to consumers are the retailers. However, the major players in procuring the product from farmers are the middlemen and most of them are men. Transporters facilitated the movement of produce from producers to consumers. While head-loads, bicycles and oxcarts are the common means of transport for short distances, lorries, trucks and buses were mostly used for long distance haulage. Transportation cost incurred by the trader has a bearing on the final price of the product.

### **Market information**

There is no formal supply of market information to traders. No government agency reported to provide market information for cassava and sweet potato. Traders have been relying on "social networks" i.e. friends, relatives and fellow businessmen as the

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major sources of market information, but also on personal observations. It is clear therefore that amongst the services that need to be developed with the aim of enhancing marketing efficiency of roots and tubers is that of information collection and dissemination.

#### **Production costs and margins**

Although data was not available from other countries, it has been observed that cassava and sweet potato have much lower production costs compared to crops like maize which require more expensive inputs like fertiliser. It has also been observed that farmers who sold their produce directly to consumers obtained highest gross margins whilst those using intermediaries obtained the lowest. However there were no significant differences in gross margins obtained between those farmers selling fresh products and those selling processed products. In addition, since gross margin is a function of yield, price of produce and costs of production, highest gross margins have been realised where the prices were better off and the cost of labour was lowest.

## **1.0 Introduction and background**

Maize is the leading food crop in most Southern African countries including Malawi, Tanzania and Zambia. In Malawi, maize occupies 70% of the total cultivated land while in Zambia maize accounts for 70% of cereals area (Howard and Mungoma, 1997). In Tanzania, maize is more geographically widely grown than other crops. In these three countries, the major source of calories is maize. For instance, in Malawi, two-thirds of food calories consumed daily come from maize (Smale and Heisey, 1997) while in Zambia maize provides 70% of total calories. In Tanzania, maize is also the main source of calories providing 62% of total calories. Other preferred staples such as rice only contributes 8%.

However, over the last decade, maize production has been on the decline in all the three countries. Persistent drought, effects of structural adjustments which have led to removal of fertilizer subsidies hence leading to the majority of households failing to access improved technologies such as inorganic fertilizers and hybrid maize, and other factors, explain the decline in maize production in these countries. Considering the challenges of meeting food needs on the basis of maize, most governments have hence been promoting crop diversification. Progressively, there has been promotion of other food crops such as cassava and sweet potatoes.

Cassava and sweetpotato are now important food crops in the SADC countries, in terms of area planted and contribution to food requirements. Malawi, Tanzania and Zambia are the main countries in the region where expansion of cassava for production has been very significant. For instance in Zambia, cassava occupied 3.1% of total arable land in 2001, which is estimated at 5.3 million ha from 2.1% in 1991 (FAO estimates). The corresponding figures for sweetpotato are 3,800 ha (0.072%) and 3,600 ha (0.068) respectively. In Malawi, area planted to cassava increased from 63,965 ha in 1991 to 201703 ha in 2001 while that of sweet potato increased from 19886 ha in 1991 to 190947 ha 2001 (FEWS estimates).

It is estimated that 30% of both Zambian (estimated at 10 million) and Malawian (estimated at 11 million) population depends on Cassava as the major staple food. The advantages of cassava and sweetpotato are well documented: tolerance to drought, capacity to provide yields in agro-ecologies and seasons where other crops would fail, low requirements for external inputs like fertilisers, flexibility in planting and harvesting, convenient in-ground storability, low demands on soil nutrients, and reduction in soil and wind erosion. The crops also require less moisture compared to other staples like maize. Although the roots of cassava in particular are perishable in fresh form, they can be dried and used in the preparation of a variety of processed foods, and can also be used as animal feed and as a source of industrial starch and other products. Cassava yields (particularly in terms of calories per unit area per unit time) are high surpassing those of maize, rice, sorghum and wheat. In terms of dry matter yield per hectare, cassava is at the top of 10 important tropical crops. Although cash crop production has tended to be dominated by cotton, tobacco, coffee, tea and others, cassava and sweetpotato are slowly gaining importance as cash crops in some of these countries especially Malawi and Zambia. Farmers do not only grow these crops for household consumption but also as sources of income.

Despite the large number of advantages cassava and sweetpotato have over other crops such as maize, in Southern Africa, these crops have long been regarded as low value, low status (poor man's crop), highly perishable commodity with only minor supporting roles to play in the process of agricultural development (Minde, Ewell and

Teri, 1999). As such, relative to cash crops and grains, particularly maize, they have received little research attention. However, since 1986, the ESARRN and SARRNET networks have assisted in enhancing research on the two crops in the region. SARRNET phase I put emphasis on changing this false image and perception of cassava as well as sweetpotato in the region by carrying out baseline studies to provide base line data on the role of these crops in the food systems in SADC countries. But SARRNET also assisted throughout the region in promoting these crops through seed multiplication activities that enabled a lot of farmers to access the planting materials. Over the years, both hectarage and production levels of these crops have significantly increased. Cassava for example is now contributing 25-60% of national food balance sheet in some SARRNET countries.

Although cassava and sweetpotato have become important crops in most SADC countries such as Malawi, Zambia and Tanzania, information is lacking on the supply and household demand for fresh and processed products from these crops. It has, therefore, been difficult to develop reliable strategies that address issues on post-harvest utilisation and commercialisation of cassava and sweetpotato in the three countries.

This research was aimed at conducting a market survey in order to document the demand for raw cassava and sweetpotato and their processed products in households and the industry. This sub-sector analysis of the marketing dynamics of cassava and sweetpotato was carried out in selected areas in Malawi, Tanzania, and Zambia. The study was done over a period of two years (2000-2001) in three major phases. The first phase involved comprehensive literature reviews in the individual countries, the second phase involved qualitative assessments of various players in the marketing chain using a number of qualitative tools. The last phase was a quantitative study which used a standard questionnaire in the three countries. Each study team in the three countries used standard study tools to allow for comparison of information across the three countries. Data was collected at farm, rural market, wholesaler, transporter, retailer and at industrial processor levels. This survey covered all marketing aspects including marketing opportunities for processed products. This study also addressed the demand and supply of fresh and processed products year-round and price sensitivity. It is believed that the results from the study and the lessons learned would be used to design strategies of how to better organise farmers in the production and commercialisation of the two crops to their benefit.

This report therefore presents a summary synthesis of a three-phased sub-sector analysis study on marketing of cassava and sweet potato which was concurrently conducted in the three countries: Tanzania, Malawi and Zambia.

### **1.1 Objectives of the study**

The main objective of the study was to understand the structure and performance of cassava and sweet potato markets in Malawi, Zambia and Tanzania. Specifically, the study had the following objectives:

- i) To understand the dynamics of cassava and sweet potato markets by characterising the producers, the rural market wholesalers, transporters and retailers, focussing also on seasonal variations of product demand and supply determining in turn seasonal price
- ii) To find out the current levels of household processing of cassava and sweet potato whether for own consumption or for the market; including

- determination of the proportion of production that is marketed and assess the technologies used in processing the raw materials
- iii) To understand the trends of production, consumption and prices on the cassava and sweet potato markets
  - iv) To assess consumer perception and preferences of the different forms of cassava and sweet potato sold on the market relative to their end-use. In line with this, assess whether there is any substitution of other products for these new products from cassava and sweet potato
  - v) To study the current linkages between farmers and industrial processors of cassava (e.g. contract farming, etc.) and assess mutual benefits from these arrangements;
  - vi) To study the different marketing channels for cassava and sweet potato and determine the marketing margins and market efficiency;
  - vii) To study opportunities for and constraints to the development of regional trade for processed cassava products, and;
  - viii) To study the factors that determine the adoption of cassava and sweet potato in the predominantly maize-based farming systems.

### **Key Hypotheses**

*The underlying hypothesis of the study was that a clear understanding of the marketing aspects and dynamics of the two crops would help both researchers and policy makers to adopt appropriate strategies in the promotion of cassava and sweet potato in Southern Africa.*

Specifically, the study tested the following hypotheses

1. Because of emerging market opportunities, cassava and sweet potato production has progressively gone up in areas that were not traditional producers of the crops
2. Cassava and sweet potato have progressively become cash crops in areas where they have primarily been grown as subsistence crops
3. There has been substitution of other products for cassava and sweet potato products for both household consumption and industrial utilisation
4. The cassava and sweet potato markets are not efficient
5. Unless farmers realise their economic importance, cassava and sweet potato will remain marginal crops within their cropping systems.

### **1.2 Methodology**

The study adopted a sub-sector analysis approach. A sub-sector analysis approach aims at understanding a particular sector in relation to other sectors or indeed in relation to the whole economy. In this regard, the study gave an overview of the economies of the three countries to assess the current role that cassava plays before examining the dynamics of the market. Information focussed on the following main areas: major production zones and production trends, production systems, research developments on the two crops, role of cassava and sweet potato in the food system, price analysis, the market organisational system and infrastructure, marketing channels, credit and extension information, and government policies affecting the roots and tubers sub-sector.

### 1.2.1 Study description

- **Malawi**

The study was carried out in all the three regions of Malawi. The study targeted three sites for each crop, one in each region. This is because large-scale sweet potato and cassava production does not necessarily take place in one area.

The major sample sites were: Zomba (Malosa and Namwera) and Mulanje (Mulanje south EPA) districts in the southern region; Dedza(Thiwi-Lifidzi RDP) and Lilongwe (Bunda-Mitundu and Nathenje areas) districts in the Central region and finally Nkhata Bay(Chintheche EPA) and Mzimba districts in the Northern region.

Zomba, Lilongwe, and Mzimba districts were selected as some of the sweet potato producing areas while Mulanje, Dedza and Nkhatabay as some of cassava producing areas.

Besides farm level data, information was also collected from traders/middlemen, transporters and retailers of the two products. For this data, several markets were targeted. In the South, Zomba main market and Malosa/Namwera turn-off market were targeted. In central region, Chimbiya, Mitundu, Kawale and Lilongwe main markets were targeted. In the North, Nkhata bay, Mzuzu and Mzimba boma markets were targeted.

#### *Qualitative Phase*

The qualitative phase aimed at qualitatively assessing the dynamics of cassava sub-sector. A participatory approach was adopted involving both group and individual interviews. A checklist was developed covering a number of issues categorized under various players in the marketing chain: producers, middlemen/wholesalers, transporters, retailers, household consumers and industrial processors.

Five research assistants were recruited; each one of them was assigned a specific type of agent to interview. However, producers were interviewed by groups of two research assistants. This means that one research assistant was assigned to interview the same type of agent on the product chain. Because of the reluctance of the industrial processors to give out information about their business, a deliberate attempt was made to use a research assistant from the Ministry of agriculture who went alone to all the industries under study. At the end of the survey, each research assistant was asked to summarize the findings.

To measure the quantities of fresh cassava entering into the City of Lilongwe, two separate enumerators were employed.

The qualitative study was only done in the Central and Southern regions of Malawi due to time limitations and covered only the major production and consumption areas which were Nathenje, Bunda in Lilongwe district and Chimbiya in Dedza district as major production sites and Lilongwe main market, kawale and area 25 markets as major consumption areas. In the Southern region, Blantyre main market, Kamba, Ndirande and Limbe markets were visited as major consumption areas while Malosa in Zomba district and Mulanje as major production sites. In addition, several food processing and textile companies such as David Whitehead and Sons, Rab processors, Transglobe, Grain and Milling, Chibuku breweries and Universal Industries were visited to assess the potential role that the two crops could play in these industries.

#### *Quantitative Phase*

The survey was done in all the three regions of Malawi (North, Center and South) covering both production and consumption areas. Data was collected using structured

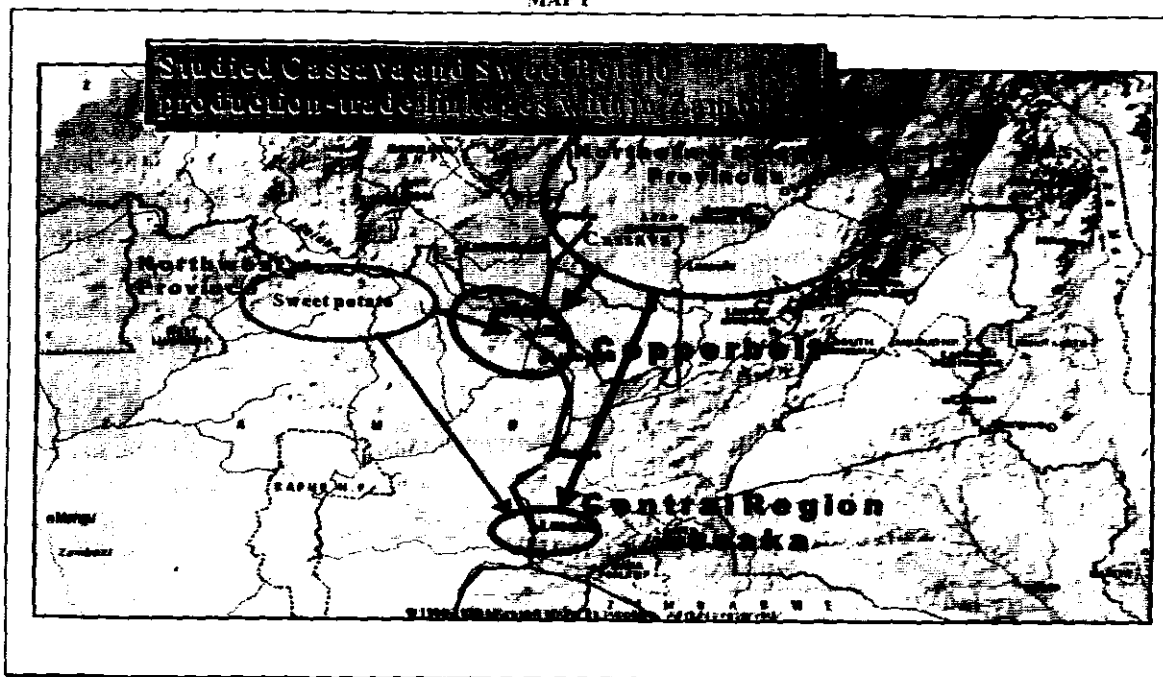
### *Quantitative Phase*

The survey was done in all the three regions of Malawi (North, Center and South) covering both production and consumption areas. Data was collected using structured questionnaires. A total number of 40 consumers, 123 producers and 60 traders were interviewed under sweet potato while for cassava; a total number of 120 producers, 60 traders and 120 consumers were interviewed.

#### € **Zambia**

The study was carried in four major sites namely; Mansa (the main producing area for cassava); Solwezi (the main producing area for Sweet potato); Kitwe (the main copperbelt market for both cassava and sweet potato), and; Lusaka (the major market for the country's agricultural products). The choice of study sites was deliberate (Map 1). Mansa (Luapula province), Kitwe (Copperbelt province), and Lusaka (Lusaka province) were selected for the cassava part of the study.

MAP 1



Luapula province is one of the major cassava producing provinces in the country. Mansa as the provincial capital has well developed cassava markets both within and outside the district (particularly the Copperbelt). Kitwe being the biggest, closest town to Mansa on the copperbelt is naturally the largest market for cassava from the Luapula province.

The significance of Kitwe as a major cassava market is further underlined by the relatively large population resident in the town who originally come from at least three major cassava producing areas, namely; Luapula, North-western and Northern provinces. All these three provinces are closer to Kitwe than they are to Lusaka. This category of the Kitwe population would therefore traditionally be cassava consumers. Lusaka is the single largest market of almost all products by virtue of it having the largest population as the biggest city.

For the sweet potato part of the study, Solwezi (North-Western province) along with the other two sites mentioned above (Kitwe and Lusaka) were selected. North-

expect to find a lot of sweet potato from North-Western province in Kitwe. The reasons for the choice of Lusaka as a study site with regard to the sweet potato component of the qualitative market study are similar to those given above in the case of cassava.

### **Qualitative Phase**

A qualitative assessment of various players in the marketing chain was undertaken. Group and individual discussions were carried out using a checklist which had a number of issues categorized under the following key sections: producers, middlemen, transporters, markets (rural and urban), consumers and industry. General observations on what was being obtained were also made.

Both parts of the survey (i.e. cassava and sweet potato) had each six researchers, two in each of the three study sites. An attempt was made to interview as many players as possible in the marketing chain. At least 60 per site were talked to with respect to sweet potato and at least 40 in case of cassava. Every effort was made to ensure that a representative number of each of the key players in the marketing chain (i.e. producers, middlemen, transporters, marketers, consumers and the industry) was interviewed.

Before the commencement of the data collection exercise, a debriefing session was held with the researches aimed at explaining clearly the checklist and all the key issues relating to the study. Effective supervision of researchers was maintained during the whole data collection exercise. Each researcher was required to write down any major issues of interest noted during the exercise. A wrap-up session was held with each researcher during which period an elaborate report was given. Data was then analyzed and summed up into one report which focuses at both crops.

### **Quantitative Phase**

The survey involved the administration of 920 questionnaires, with 471 for cassava and 449 for sweet potato. The questionnaire target for both was 450. **Table 1** gives details.

**Table 1: Sampling Details and Sites**

District /Province	Sample Size – Cassava							
	Producer		Trader		Consumer		Total	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Lusaka/Lusaka	0	0	60	60	80	80	140	140
Mansa/Luapula	100	120	30	30	40	41	170	191
Kitwe/Cop./belt	0	0	60	60	80	80	140	140
Solwezi/N.W.Prov	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>100</b>	<b>120</b>	<b>150</b>	<b>150</b>	<b>200</b>	<b>201</b>	<b>450</b>	<b>471</b>
District/ Province	Sample Size – Sweet Potato							
	Producer		Trader		Consumer		Total	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Lusaka/Lusaka	0	0	60	60	80	80	140	140
Mansa/Luapula	0	0	0	0	0	0	0	0
Kitwe/Cop./belt	0	0	60	56	80	80	140	136
Solwezi/N.W.Prov	100	103	30	30	40	40	170	173
<b>TOTAL</b>	<b>100</b>	<b>103</b>	<b>150</b>	<b>146</b>	<b>200</b>	<b>200</b>	<b>450</b>	<b>449</b>

### **• Tanzania**

It was observed that cassava is mainly grown in regions around Lake Victoria and the Southern Coast. Production of sweet potato is mainly in the Lake Victoria regions and in the Southern Region of Ruvuma. Besides these major production areas, the



northern coastal regions i.e. Dar es Salaam, Coast and Tanga, and central regions of Morogoro and Dodoma are increasingly becoming important producers and sources of cassava and sweet potatoes for urban consumers. The central-east marketing corridor was therefore selected as a representative marketing channel to study how production areas (up country villages and districts of Dodoma and Morogoro regions) are linked with consumption centres such as Morogoro, Dodoma district and regional towns and the Dar-es-Salaam region, including its 4 city districts. The aim has been to delineate the flow of commodities from production sites through various marketing chains, village to village, village to district headquarters and village to regional headquarters and Dar-es-Salaam.

Selection of regions for this study aimed at capturing the catchments (production) areas that supply cassava and sweet potatoes to Dar es Salaam, the largest urban centre in Tanzania. Along the market channel there are several intermediary urban markets such as Dodoma, Morogoro, Kibaha and Bagamoyo. - See Map 2.

### ***Sampling Procedure and Sample Size***

Four regions are included in the study and from each region 2 districts have been surveyed. From each district 2 villages were selected. Criteria used in selecting villages were to include the most important cassava and sweet potato producing villages in the district. After villages had been identified, important market outlets for cassava and sweet potatoes from the villages were also identified and traced.

During the main survey, structured interviews, using pre-tested questionnaires were administered for producers, traders, transporters and consumers in the 4 regions.

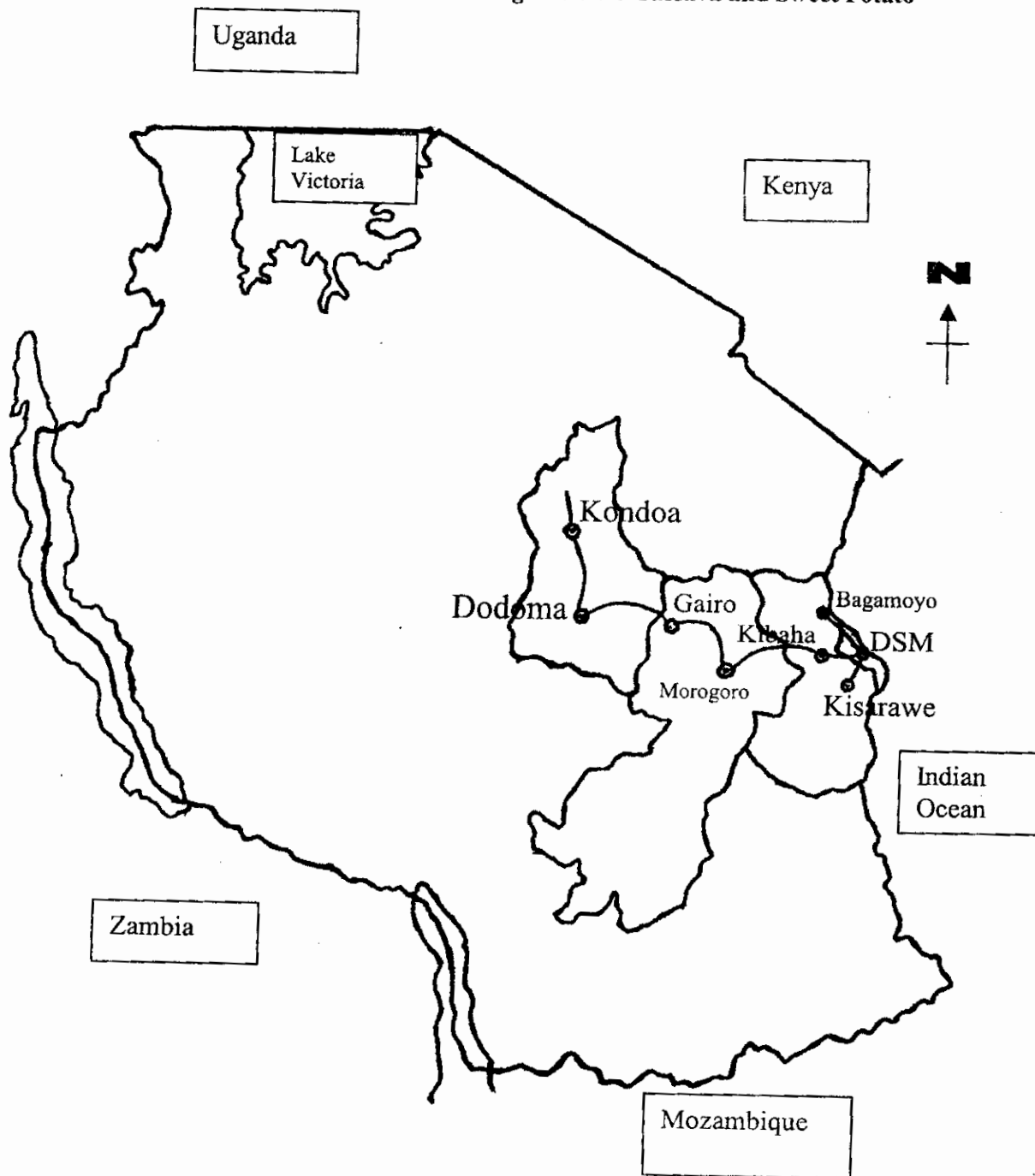
A total of 147 sweet potatoes and cassava farmers were interviewed during the main cropping season of July-August 2001. A multi-stage sampling technique was applied to form a sample from four regions namely, Dar es Salaam, Coast, Morogoro and Dodoma. From each region at least 2 districts were selected for inclusion into the sample and from each district 2 villages were selected.

Interviews were also held with a total of 88 traders, 47 dealing with sweet potato and 41 trading cassava. The majority of traders were interviewed in the further inland study region of Dodoma, 38 and 31 percent of the interviewees for the two crops respectively. Logically the inland areas are the catchments, where produce is obtained at relatively lower prices and transported to major demand areas.

In addition, 13 transporters were interviewed with the aim of getting information regarding the nature of the business. These had no single established base along the marketing chain neither at production sites nor points of sale, so they had to be searched for when they were in the process of transporting traders' produces. Eight came from Dar-es-salaam and 5 from Morogoro.

Lastly, a total of 229 respondents were interviewed for purposes of seeking information regarding the characteristics of sweet potato consumers, their locations, whether they also grow the crop, their well-being rank and other socio-economic characteristics including their tribal origins and whether this had a link to their consumption patterns. Sources of either sweet potato or cassava and the preferred attributes of the produce were also of interest.

Map 2: Selected Production Areas and Marketing chain for Cassava and Sweet Potato



## **2.0 A brief overview of the Zambia, Tanzania and Malawi economies.**

### **2.1 Zambia**

Zambia is a country with a population of just over 10.2 million (2000 population census estimates) with a population growth rate of 2.9%. The country's economy has been heavily dependent on mineral (copper) mining, although the dominance of copper over the years has been on a steady decline. The share of copper in GDP averaged 10% between 1990 and 2001. Mineral based exports still dominate foreign earnings even though this has reduced to about 70%, from 93% in 1965. Regarding foreign trade, Zambia's earnings from goods and services in nominal terms have dropped from US\$1,625 million in 1980 to US\$1,016 million in 2001. This is a decline of 37.5% with a substantial decrease recorded when reflected in real terms. Imports of goods and services have fallen less drastically, declining by 22.8% from US\$1,986 million in 1980 to US\$1,534 million in 2001. Extensive trade reforms embarked have been counteracted by high production costs in the country resulting in manufacturing industry being uncompetitive.

There has been a decline in social and economic trends evidenced through deepening of poverty with some social groups that had been relatively secure becoming vulnerable to poverty and hunger. For instance, in 1998, 82% of the population lived on an equivalent of \$1 a day while nearly 60% of the population suffered from food insecurity. The evidence of malnutrition in the 1990s has been overwhelming. Food insecurity based on the consumption expenditure relative to the cost of minimum food basket in most parts of the country shows that in 1996, at least 77% of the rural and 39% of the urban households were classified as severely food insecure, representing a picture similar to the situation in 1991/92 (the year of the worst drought in living memory). To redress the declining social and economic trends, the government adopted a Poverty Reduction Strategy Paper with the goal of reducing poverty to 50% by the end of 2004. Agriculture is to play the key role in poverty reduction.

The agriculture sector has highest potential in Zambia. The agricultural GDP grew by 50%, from US\$ 2,455 million in 1991 to 3,706 million in 2000. However, in a number of years there has been a fluctuation in agricultural GDP growth rate due to recurring droughts in the same period. Cash crop production for smallholder farmers have tended to be dominated by cotton. Others, on a much-reduced level, include tobacco, groundnuts, maize, cassava and sweetpotato. Agricultural exports have performed well since the early 1990s, rising from a total value of US\$ 23, 466 to US\$ 106,026 respectively, an increase of more than 350%. However, maize production, which is Zambia's staple food, declined from 1,128,670 MT in 1989/90 to 801,877 MT in 2000/01, a decline of close to 30%. In the same period, there was a dramatic increase in the production of small grains (sorghum and millets) due to their greater tolerance to drought as well as less input requirements. Coupled with the crop diversification policy by the government, there has been a reduction of the share of maize's total annual cultivated hectareage. The biggest relative gain in the area cultivated has been with small grains and tubers (millet, sorghum, cassava and sweet potato). The combined share increased from 20.8% in 1990/91 to 36.9% in 1999/00.

### **2.2 Tanzania**

Tanzania's population is estimated at 33.9 million with the majority living in rural areas. Unlike Zambia, Tanzania's economy have been experiencing positive macroeconomic developments. The economy grew by 5.6% in 2001 compared to

4.9% in 2000. The agriculture sector grew by 5.5% in 2001 compared to 3.4% in 2000. The other sectors in the economy performed variably. The mining sector's growth declined from 13.9% in 2000 to 13.5% in 2001, where lower levels of extraction of diamonds and gemstone were the causes. There was an increase in growth of the manufacturing sector, from 4.8% in 2000 to 5% in 2001. Completion of the privatisation of former parastatal manufacturing industries is behind this growth. The manufacturing sector now contributes 8.3% of the GDP. Regarding foreign trade, Tanzania had a favourable balance of payment of US\$ 55 million in 2001 compared to a deficit of US\$ 35.3 million in 2000. Cash crop production is dominated by coffee, cotton, cashew and to a lesser extent tea and tobacco. Coffee contributes 17% of Tanzanians foreign exchange earnings compared to cotton (14%), cashew (10%), tea (6%) and tobacco (2%).

Unlike Zambia, Tanzania is to a large extent self sufficient in food (93% self-sufficiency ratio for the year 2000/01). However, there are both official and unofficial exports and imports of food across the borders. The country imports food to the tune of 2-4% of her requirements per year. Maize is the main source of calories providing 62% of total calories. Rice the other preferred staple contributes 8%. The rest of calorific intake comes from cassava (13%) sorghum (8%), root crops and bananas. The total domestic food production, based on final crop production forecasts for 199/2000, is 7.32 million tonnes. Of the total production, cereal production is 3.37 million tonnes, while non-cereals production is 3.95 million tonnes. The total national maize production for the year 1999/2000 was estimated at 2.01 million tones. Compared to requirements, a shortfall of about 301, 512 tonnes of food (cereal equivalent) is estimated. This is made up of maize alone having cross-substituted maize shortage for surplus non-cereals. Preferred cereals marginally fulfil food requirements and hence sweet potato and cassava have an important role to play.

### **2.3 Malawi**

Malawi's population is estimated at 11 million with a growth rate of 3.2% per year. Just like Zambia, there has been a decline in social and economic trends evidenced through deepening of poverty. The Poverty Profile in Malawi (1998), prepared by the National Economic Council indicates that 65.3% of the Malawian population were living in poverty in 1998. The incidence of poverty was higher in rural areas: 66.5% of the rural population compared to 54.9% of the urban population lived in poverty. Food insecurity and evidence of malnutrition has been increasing in the 1990s. To address issues of poverty and food insecurity, the government launched a poverty alleviation programme in 1994. Agriculture is to play the key role in poverty reduction. The agricultural sector is the backbone of Malawi's economy. It employs over 80% of the economically active population, and accounts for about 33% of the total GDP. The sector also contributes significantly to foreign exchange earnings. Through supply and demand linkages with the non-agricultural sector, the growth of this sector stimulates that of the country's overall economy. Cassava and sweet potato contributes about 6.8% and 0.4% to the total GDP.

The main cash crops are tobacco, sugar and tea. Maize is the main food crop and occupies 70% of the cultivated land. Of late cassava and sweetpotato have gained importance as food crops following the drought years of 1991/92 and 1993/94 seasons when maize production was reduced by almost half (MOALD, 1994). It is estimated that in 1998, these two crops represented, in maize equivalents, 35% of total food production.

### **3.0 The place of cassava and sweet potato in the economy**

Considering the challenges of meeting food needs on the basis of maize discussed in the previous sections, cassava and sweetpotato have increasingly become important food crops in Malawi, Zambia and Tanzania. There has been an increase in the production as well as consumption of these crops in these three countries. For instance, cassava and sweet potato accounted for 20% of the total food consumption requirement for Zambia in the 1998/99 consumption year. Furthermore, cassava is a staple food for more than 30% of the Zambian and Malawian populations (estimated at 10 and 11 million respectively). In Malawi, cassava represented, in maize equivalents, 35% of the total food production. Cassava is now contributing 25-60% of national food balance sheet in some SARRNET countries.

When consumers were asked to rank the main food crops, in Tanzania cassava was ranked third after maize and rice. Similarly in Malawi and Zambia cassava ranks second or third after maize and rice depending on the region. In Malawi cassava ranks first along the lakeshore areas of NkhataBay, Nkhotakota, Karonga and Rumphu where maize is sometimes ranked third after cassava and rice. Similarly cassava ranks first in the Northern, Luapula, Northwestern and Western provinces of Zambia. Cassava is also an alternative crop to maize such that during unfavourable climatic conditions, farmers substitute cassava for maize. Sweet potato however is considered less a staple since cassava can be processed into flour to make nsima/nshima/ugali. Sweet potato can also be prepared into various dishes but it is still not perceived as a staple.

#### **3.1 Production trends**

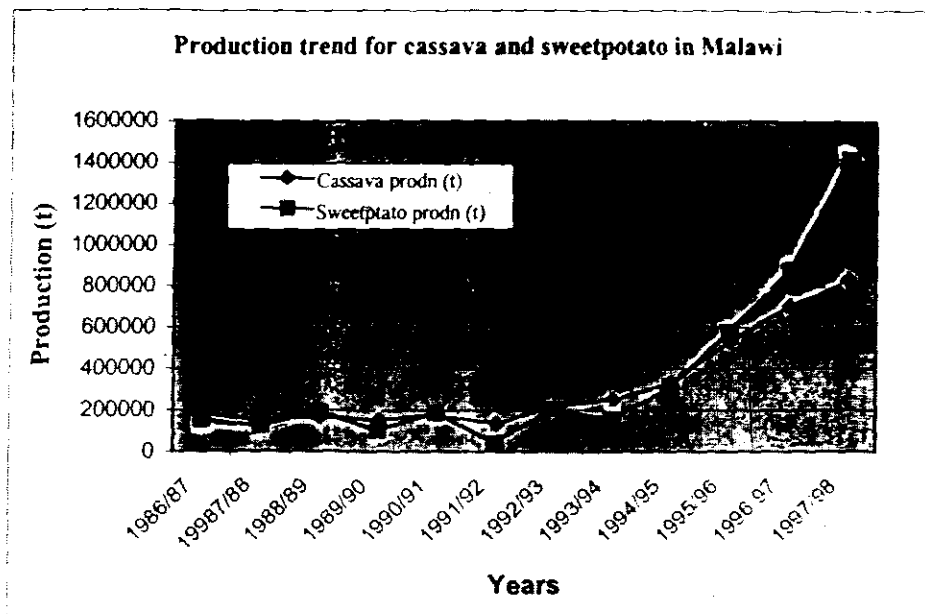
Over the last decade, the region has experienced a very rapid increase in the production of cassava and sweetpotato. Progressively, cassava and sweetpotato have become important food as well as cash crops for a large number of households. There have been substantial increases in land allocated to the crops as well as improvements in productivity. However, among the three countries under study, the increase has mainly been significant in Malawi and Zambia while production in Tanzania has almost been stable (see figure 2). Hence cassava has become the major root crop in these countries accounting for more than 60% of the land allocated to roots and tubers.

For instance, in Malawi both land allocated to cassava and the yield have tremendously increased between 1989/90 and 1999/2000 seasons (Figure 1). On average, production has been growing at a rate of around 30% per year. During the 10-year period, yield levels have improved from an average of about 2.0 MT per hectare to about 7.0 metric tonnes per hectare (appendix 1). A comparative analysis of sweetpotato and cassava with the major food crops such as maize and rice shows that while the cereal production has mainly declined, cassava and sweetpotato production has been on the increase. The increase in yield of sweetpotato and cassava could be attributed to increased adoption of modern cultivars but also because of better husbandry practices such as weeding, given the importance of the crop to the majority of farmers in the country now. It can also 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 these crops for cash. The effort by the Government of Malawi (GOM) in collaboration with IITA/SARRNET and other collaborators in promoting this crop through a program of accelerated multiplication and distribution of improved planting material has also contributed significantly to

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this positive change. Furthermore, the majority of smallholder farmers in Malawi just like the other countries are facing major problems in managing the declining soil fertility for such crops as maize. This is due to the high prices of inorganic fertilisers which have come about after the removal of subsidies, exacerbated by the fact that the majority of them are cash constrained and do not have access to any formal credit facility. This has in a way compelled farmers to grow more of cassava and sweetpotato, which do not require a lot of external inputs such as inorganic fertilisers. This explanation also stands for the other countries but most particularly for Zambia.

**Figure 1. Production trend for cassava and sweet potato (1987-1998)**

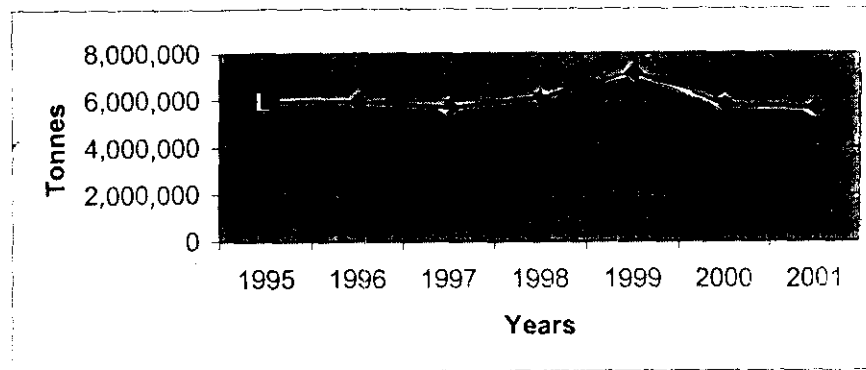


Source: Annual Crop Estimates. Ministry of Agriculture and Irrigation, Lilongwe, Malawi.

In Zambia, FAO estimates show that production of cassava increased from 682,000 mt in 1991 to 950,000 mt in 2001 representing a 40% increase. The total agricultural land in Zambia is approximately 35 million hectares out of which 5.3 million ha (15%) is the total arable land. Cassava production area was 200,000 ha in 1993 (3.8% of arable land). This rose to an estimated 400,000 ha (7.6% of arable land) in 1995/96. Since it is only recently that cassava production has gained importance in Zambia, there has been no systematic collection of time series data that would have assisted us in assessing the trend of cassava production like in the other two countries. However, the estimates show a rising trend.

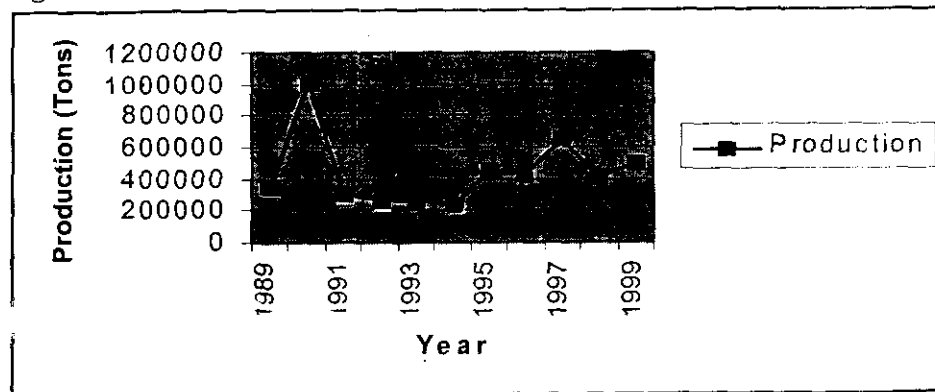
On the other hand, in the past 10 years cassava and sweet potato production in Tanzania averaged 6,000,000 and 436,000 tons respectively per annum. For cassava this amount shows that the crop is fairing very well in comparison with other staples such as maize (2.44 million tons). In addition, the production trend for cassava during the same period has been simply stable with no apparent increasing trend (Figure 2). Unlike cassava, sweet potato production has been increasing in the last 10 years. However, annual variation in production is much higher for Sweetpotato than for cassava (figure 3). Estimated productivity of both crops suggests that there is room for improvement. The estimated average yield has been 10.5 tonnes per ha while the maximum yield under appropriate conditions with improved varieties is 35 tonnes per ha. Total area under cassava has not increased much in the past decade though it fluctuated from year to year. However, nearly one-third of the total 4.5 agricultural holdings in Tanzania are planted with cassava. This trend could partially be explained by the fact that the country has a larger food basket than the other two countries. For instance, the consumption of bananas (plantain) is not wide spread in Malawi and Zambia, hence cassava plays a much more important role than in Tanzania where they have more alternative food crops.

**Figure 2: Production Trend for Cassava in Tanzania**



Source: FAO statistics Database, 2000

**Figure 3: Production Trend for Sweetpotato in Tanzania**



Source: FAO statistics Database, 2000

### 3.2 Research and Development

Cassava and sweet potato have received very little attention in the past in terms of research. Basically, these crops have long been regarded as low value crops; highly perishable commodities with only minor supporting roles to play in the process of agricultural development. It is of late that the image of cassava and sweetpotato is changing in most economies. However, some significant research work has been done in these countries especially on the supply side and popularisation of improved varieties and agronomic practices. For instance, in Zambia, serious research work started in 1987 by the Root and Tuber Improvement Programme (RTIP) through a funding from the Swedish International Development Authority (SIDA) that commenced that year to RTIP. The RTIP over the past years has done significant work in popularising the production of improved cassava varieties among smallholder farmers. Although no specific adoption surveys have been undertaken, there is evidence that recommended cassava varieties: Bangwaculu, Nalumino and Kapumba have been widely adopted by farmers. The yields of these varieties are more than three times the average yield of traditional varieties estimated at 6 tones per hectare.

Similarly, in Tanzania, most of the research done on these crops has been on the supply side, that is, agronomic aspects to increase productivity and production. Less effort was devoted to understand the demand side such as harvesting processes to improve product quality and socio-economic studies including marketing. Only a handful of economic studies included evaluating the economic impact of diseases



such as cassava mosaic and streak diseases have been conducted. Recently, studies to address the demand side, especially in post harvest processes and marketing, have been initiated. The staffs of the Ministry of Agriculture and Food Security provide extension service for cassava and Sweetpotato. However, the quality of the extension service is not uniform throughout the 20 regions because of differences in crop priority and existence of agricultural projects in some regions that do not cater for the whole country. But, in general R&D has had a strong bias towards traditional food and export cash crops.

In Malawi the ESARRN and SARRNET networks have assisted in enhancing research on the two crops. Several improved varieties of cassava and sweet potato have been developed and these are being promoted among smallholder farmers. IITA/SARRNET in collaboration with the Government of Malawi (GOM) and other collaborators embarked on a program of accelerated multiplication and distribution of improved planting material. In addition to these, research on processing of cassava and sweet potato is actively being conducted.

### **3.3 Cassava and sweet potato Marketing chain**

Both cassava and sweet potato markets display a very characteristic flow of the product from producers to the consumers. Several agents have been identified to be playing a role at various stages of the product chain: producers, middlemen /wholesalers or rural assemblers, retailers, transporters, and consumers. It is through this channel that price transmission takes place, which in a way influences what producers should get at the beginning of the chain and what consumers finally pay for the end products.

Each country of study came up with a specific marketing chain summarising the various agents that play a role in the cassava and sweetpotato market and how these are linked. For instance, figure 4 presents the marketing chain for cassava and sweet potato in Tanzania. Cassava and sweetpotato trade is just emerging in Tanzania and these crops are mainly marketed by small traders. In the rural market, retailers either vendors or those managing stalls at the local market buy produce directly from farmers and these are termed as rural food vendors and rural market retailers in the figure. They manage relatively smaller volumes e.g. 50 to 100Kgs per trip. On the other hand, a rural trader is one who buys from farmers and moves the produce to significant distances but within the rural areas, e.g. the district or regional markets. They manage relatively larger volumes, e.g. 1 to 100 bags (weighing 50 to 100kgs each) and sell to upcountry town's retailers. Urban trader is the one that travels significant distances to upcountry production areas. They transport relatively larger volumes of produce ranging from 25 to 600 bags, each weighing 100kgs. They mainly sell to ultimate urban retailers through a broker or commission agent. They apparently don't have direct contact with the urban retailers, vendors or hawkers.

Figure 4: Marketing Chain for Sweetpotato and Cassava in Tanzania

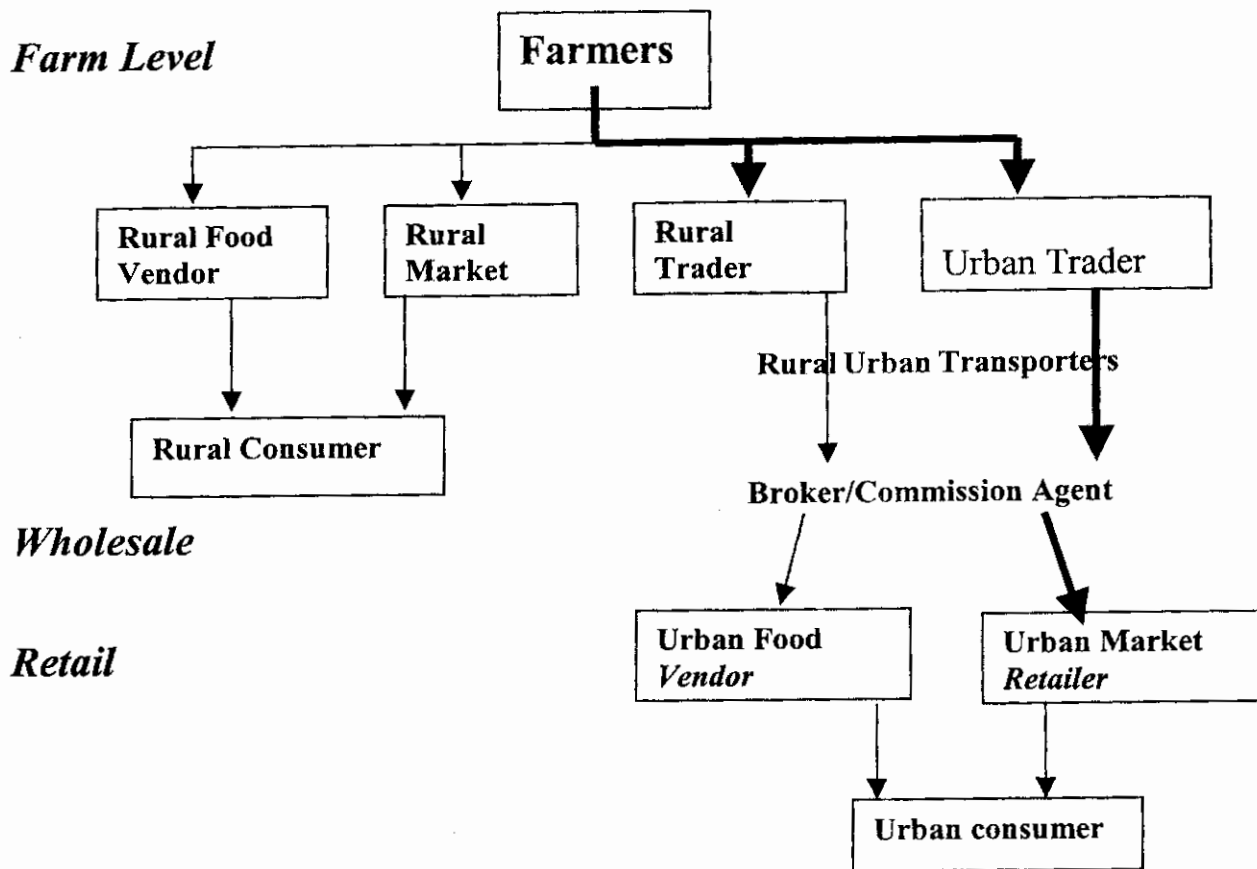


Figure 5. Marketing chain for cassava and sweetpotato in Zambia

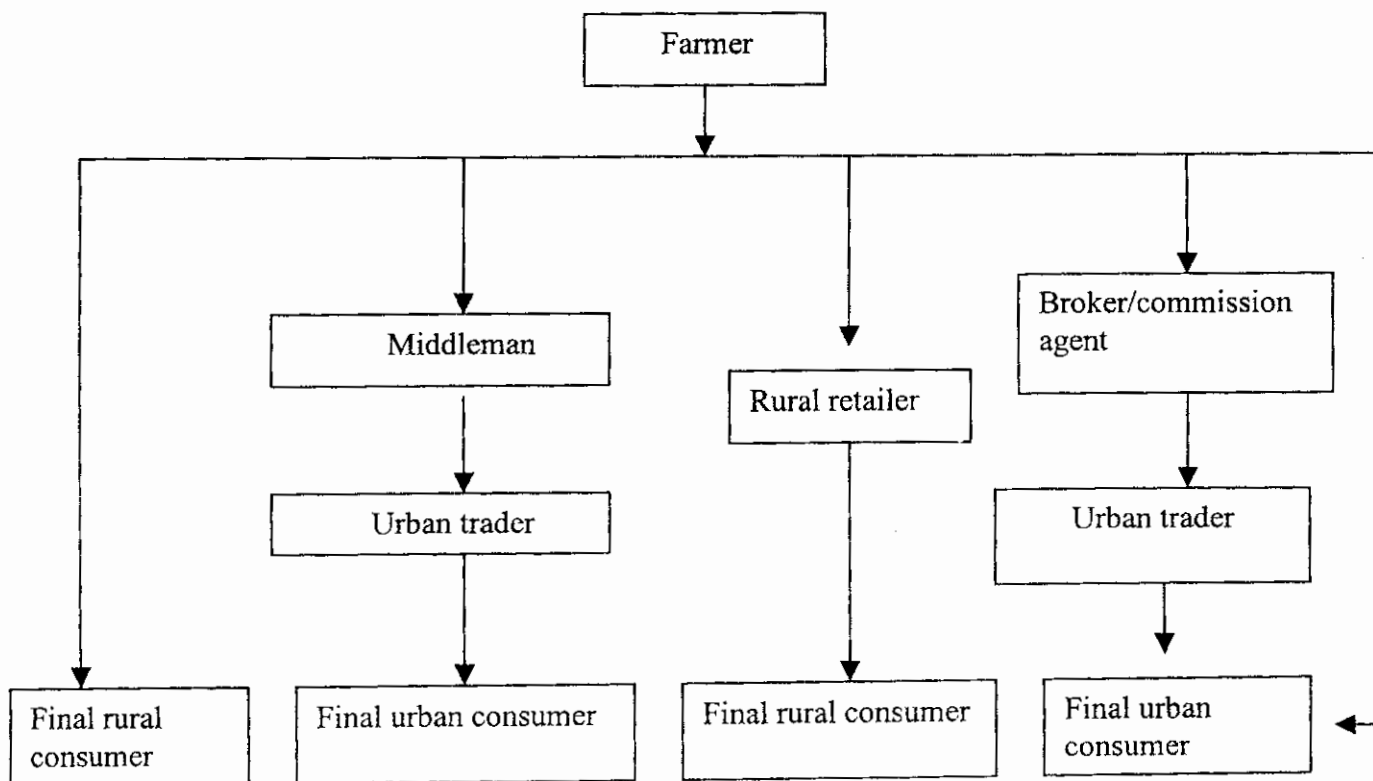
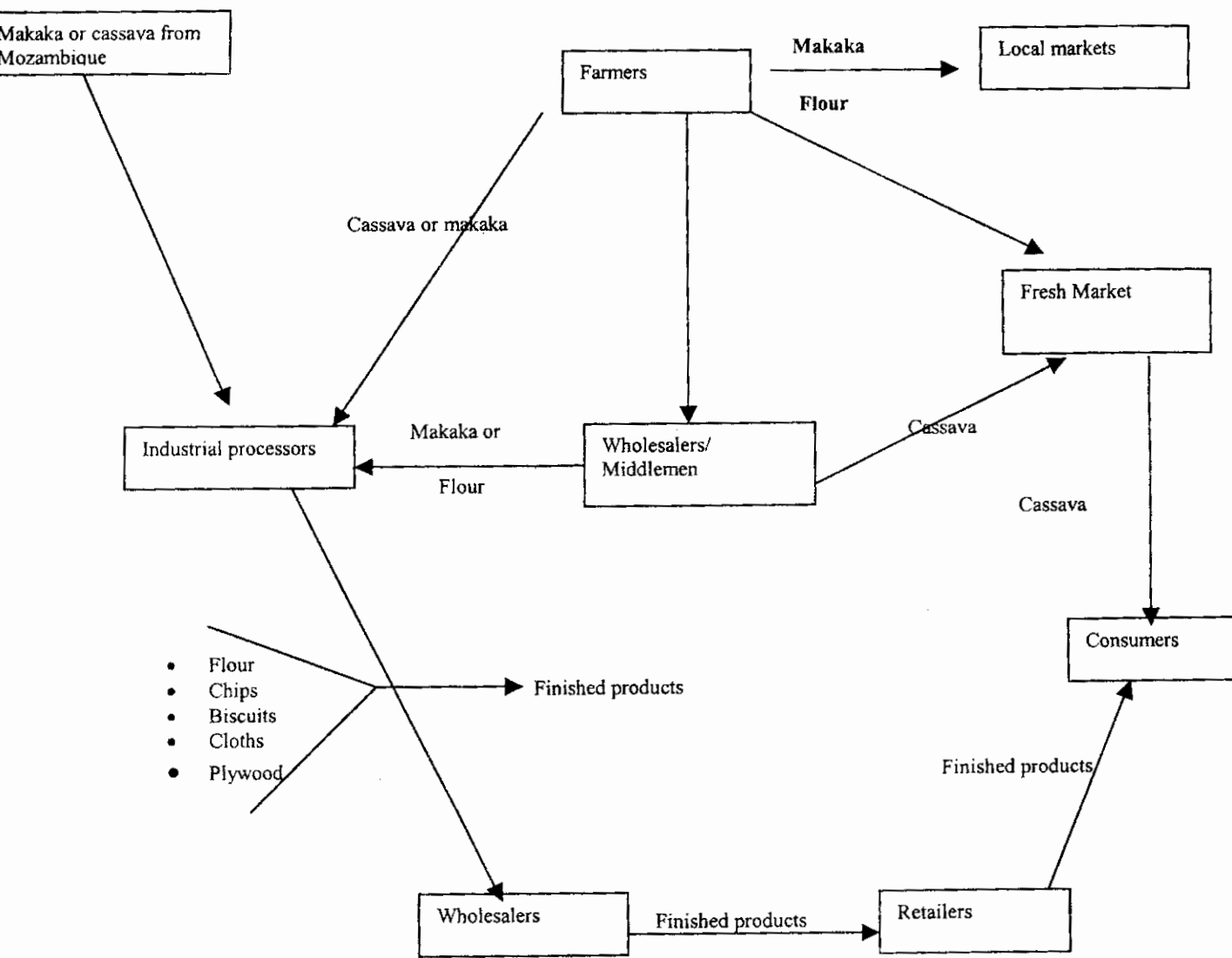


Figure 5 presents cassava and sweetpotato marketing chain in Zambia. For cassava two distinctive channels are observed and these are for fresh cassava and processed cassava. It is reported that market for fresh cassava is basically rural (most of it is sold within the areas of production). In terms of physical distance, the channel for fresh cassava is short and this is largely attributed to its short shelf life. For this reason, urban markets are unattractive due to long distances involved from areas of production. The first channel is where the farmer sells directly to the final rural consumer and the second is where the rural trader buys fresh cassava from the producer and sells to the final consumer. The rural traders are mostly women in the markets or on the roadside. The quantities bought are just enough to be sold within a day or so to avoid deterioration. Unlike fresh cassava, three marketing channels are described for processed cassava. The first is where the farmer processes the product and sells it directly to the rural consumer. The second is where the farmer sells directly to the urban consumer. The third is where middlemanw/holesaler buys in bulk from different farmers and sells to retailers who sell to the urban consumer. The processed cassava products include cassava chips and flour.

Unlike cassava, sweetpotato is sold mostly in fresh form. The marketing channel is similar to that of cassava where by the producer sells directly to either rural consumer or urban consumer. The other channel is where the intermediaries are used which could be the brokers/commission agents and the middlemen who sell to the urban consumer.

Figure 6 below summarises the various agents that play a role of the cassava market in Malawi. However, most of these players are common to both cassava and sweetpotato and the product channel is almost similar to that described under Zambia. However, unlike in Zambia where no industrial processing is reported, in Malawi farmers or middlemen sell cassava or makaka (dried cassava) or cassava flour to industrial processors.

**Figure 6. Marketing chain for Cassava and sweetpotato in Malawi**



## 4.0 Profile of Cassava and Sweet potato Supply Chain Actors

### 4.1 Profile of consumers

#### 4.1.1 Socio-economic status of consumers

In all the three countries under study, it was observed that both cassava and sweetpotato are predominantly low and middle-income earners' foods (Tables 1 and 2). This phenomenon is equally true for both urban and rural dwellers. Higher consumption of cassava and sweetpotato has been observed amongst the middle and low-income groups of the population. A very small proportion of consumers are a high-income earner. Considering that cassava and sweetpotato are both relatively cheaper than cereals, and are available during drier years, they inevitably constitute an important energy source for the low-income households. The mind-set of any intervener therefore, intending to enhance consumption of cassava and sweetpotato ought to articulate (a) how to attract non-consuming low-income earners to include cassava and Sweetpotato in the diet and (b) raise the quality of produce and promote it to appeal to high-income earners.

**Table 1. Cassava consumer income categories**

Household type	Percentage		
	Malawi	Tanzania	Zambia
Low income	64.3	35.4	62.6
Middle income	25.4	65.3	28.4
High income	10.3	3.5	9.0

**Table 2. Sweet potato consumer income categories**

Household type	Percentage		
	Malawi	Tanzania	Zambia
Low income	62.5	36.3	52.5
Middle income	25.4	54.0	37.5
High income	15.0	8.9	10.0

#### 4.1.2 Substitutes of cassava and sweetpotato

As opposed to what one would have expected, in Malawi, cassava is a direct substitute of sweetpotato, bread, and sometimes Irish potatoes and not maize. This is an indication that income level and not changes in taste of consumers is the main determinant of the shift in cassava demand. Maize prices are higher than cassava between the months of January and May because at this time most households do not have their own stocks of maize hence market demand for maize is high. The cassava season ends in February, but cassava is found on the market throughout the year. Prices of cassava are relatively low up to July. This is because at this time cassava is competing with sweet potato, which is at its peak season during this time of the year. If cassava were directly competing with maize, its prices would not have been that high during months when maize prices are lower and its supply is high. Maize and cassava are compliments rather than direct substitutes.

Similarly, in Tanzania, sweet potato and cassava were reported to be substitutes for each other. Other foodstuffs mentioned to be substitutes of sweet potatoes were bread.

“chapatti”, buns, rice, bananas and “tambi”. Further down the list with less significance were beans, Irish potatoes and maize/beans mix. An important thing to note is that besides cassava, the closest substitutes (bread, chapatti, and buns) are all foods prepared from wheat, and apparently require substantial processing and complex cooking methods. Cassava substitutes mentioned by respondents were sweetpotato, rice, maize, Irish potatoes and further below wheat products. A contrasting feature between substitutes for sweetpotato and cassava is that sweetpotato substitutes are mainly snacks or breakfast items, commonly companions of tea or porridge. The latter, cassava, seem to be substituted by main meal foods. Interestingly the major reason why a consumer would switch to the substitute is simply taste and unavailability of produce in the market. One could hypothesise that because Sweetpotato is more seasonally available, whenever they are available, cassava consumers would switch to sweetpotato, and particularly so for breakfast. Note that, for this purpose, it is the sweet taste that appeals more to the consumers. Taste, i.e. sweetness accounts for 63% (in the case of sweetpotato) and 75% (cassava) as reasons why the consumer would switch to the substitute.

In Zambia, cassava was a good substitute for sweetpotato (34.9%), Irish potato (25.5%), and bread (11.4%). However sweetpotato was a substitute for a lot more foodstuffs compared to cassava. These included bread (63.6%), Irish potato (9.8%), cassava (9.2%), Rice (6%), fruits (4.3%), Nshima and pumpkins (7.1%).

Inn general, we see that cassava and sweet potato are substitutes for each other. In addition, consumers substitute cassava and sweet potato for bread, buns, Irish potatoes and others, all of which are mainly breakfast items.

#### **4.1.3 Forms of cassava and sweet potato utilisation**

In places where cassava is the main staple food, its consumption is done throughout the year mainly as *Nsima/Nshima/ Ugali*. However, cassava is eaten in different forms such as boiled cassava, raw cassava, dried chips (makaka), roasted, *futali*(mashed, stiff porridge form mixed with groundnut flour) and flour. Sweet potato is mainly eaten as boiled sweet potato, “futali”, fried/roasted and raw (Table 3). Boiled cassava or sweetpotato was the most popular form of consumption reported in all the three countries. This is where fresh cassava/sweet potato are peeled and boiled. Futali was also a common form of sweetpotato/cassava consumption in both Malawi and Tanzania. Frying fresh sweet potato or cassava chips was another alternative meal preparation preferred for breakfast or snack, which was mentioned in all the three countries. Raw cassava consumption was eaten as a snack and most commonly in Malawi than in the other countries. Fewer respondents from other countries as opposed to Malawi mentioned chewing of raw tubers and preparation of porridge from cassava flour as other ways of cassava consumption. It was also indicated especially in Tanzania that many households do mix maize meal with cassava flour to enhance taste and acceptability. It is therefore discernable that boiled cassava/sweet potato remains the major form by which people consume cassava/sweetpotato.

Cassava/sweetpotato is not normally eaten alone. There are a number of compliments, the commonest being tea, and to a lesser extent *thobwa* (sweet beer), beans, peas and eggs. This is a clear indication that cassava/sweetpotato is a substitute of bread and other foodstuffs that go together with tea. A high percentage of respondents in all the three countries indicated that they consume boiled cassava/sweetpotato and this is mainly for breakfast and is eaten together with tea.

In general, most consumers did not have any unique recipes they knew of or used when preparing cassava or sweet potato for consumption in all the three countries. The few who had some recipes mentioned the usual traditional methods of preparation, an indication that there was very little innovation. This shows that there is also room for improving consumption of cassava/sweet potato through development of various recipes to enhance acceptability, remove monotony and broaden the use to which the produce can be put.

**Table 3. Mode of cassava consumption in Malawi, Zambia and Tanzania in percentage**

Forms of cassava	Percentage of consumers using the form		
	Malawi	Tanzania	Zambia
Boiled	88.9	95.8	81.8
Futali/Mseto	5.8	37.2	-
Chips (chips dume)	8.9	30.3	-
Ugali/Nsima/Nshima	3.0	24.2	18.9
Raw	49.6	11.3	28.9
Porridge	-	7.0	-
Other forms	-	1.8	-

#### 4.1.4 Sources of cassava and sweetpotato consumed

The major sources of cassava and sweetpotato consumed by rural and urban households are the retailers. In all the three countries, retailers ranked highest as the major source of cassava and sweetpotato. The retailers are mostly found in the urban markets, trading centres and along the roads. Though to a lesser extent, some consumers indicated they obtain their sweetpotato and cassava directly from producers, or from wholesalers.

#### 4.1.5 Varieties of cassava and sweetpotato preferred by consumers

There are a lot more varieties of cassava and sweetpotato mentioned in specific countries that are preferred by consumers (Table 4). However, the attributes that consumers prefer in these varieties are almost similar in all the three countries. For cassava, consumers indicated they prefer varieties that have good taste, cooks faster, and have high dry matter content. For sweetpotato, good taste, low fiber content and high dry matter content, were the preferred attributes. Tables 5 and 6 presents how cassava and sweet potato attributes were rated in each country. It can also be observed that in Tanzania as well as Zambia, size of the tuber also mattered most as one of the attributes that consumers look for in cassava and sweetpotato. However this was more pronounced in sweetpotato than in cassava. The popularity of preferred varieties varied from region to region within a country. It was also observed especially in Malawi that where consumption of cassava in fresh form is very common, consumers prefer smaller to medium size tubers rather than big tubers, which they feel are high in water content, hence not tasty. In general, in Malawi, sweeter varieties were preferred for the fresh market and bitter varieties when cassava is to be processed into flour for "nsima"

**Table 4. Names of cassava and sweetpotato preferred varieties in specific countries**

Country	Cassava varieties	Sweetpotato varieties
Zambia	Mwakamoya, Manyokola, Bangweulu	Chingovwa, Kapiri
Tanzania	Kibangameno, Kigoma, Edible part white, Cheusi/Kaniki, Local variety	Yellow, White, Gairo, and Red
Malawi	Manyokola, Dedza/White	-

**Table 5. Attributes in the preferred varieties of cassava**

Attribute	Percentage of consumers preferring a particular attribute		
	Malawi	Zambia	Tanzania
Big roots	-	✓	33.8
Low fibre content	-	✓	49.9
Sweetness/taste	66.9	-	48.6
High dry matter content	27.3	14.9	55.4
Good storability	-	-	13.9
Color of skin	-	-	3.5
Easy to cook	52.3	-	-

*Responses not mutually exclusive*

**Table 6. Attributes in the preferred varieties of sweetpotato**

Attribute	Percentage of consumers preferring a particular attribute		
	Malawi	Zambia	Tanzania
Big roots	-	✓	43.4
Low fibre content	-	✓	35.5
Sweetness/taste	-	✓	76.3
High dry matter content	-	✓	57.6
Good storability	-	-	-
Color of skin	-	✓	9.8
Easy to cook	-	-	-

#### 4.1.6. Domestic processing and storage

Considering that cassava and sweet potatoes are both perishable and seasonal crops, it is worth assessing the extent to which consumers try to preserve or process the products. First, an attempt to store or process a crop produce would emanate from some constraint experienced by the consumer. In this view, consumers cited seasonal supply and poor quality produce as the major problems they encounter in acquisition and consumption of the two crops. In an attempt to address the problem of seasonal supply, one would expect that domestic processing and storage would be potential



strategies. However it was observed that very few consumers store either cassava or sweet potato in all the three countries. In both cases less than half of the consumers did so. This means that the majority of consumers buy sweet potato and cassava for fresh produce consumption. However, those consumers who attempted storing indicated loss of quality (rotting of roots and loss of taste) as the major problem with storage. This is quite understandable because the methods used to store were very rudimentary such as sacks and dug out pits.

Since storage of fresh cassava/sweet potato produce seems to be a challenge, processing before storage would therefore seem inevitable. However it was also found out that very few consumers attempted processing in both cases less than 50%. Relatively, there were more consumers who reported processing cassava than sweet potato. However, the kind of processing was simple mainly boiling or processing to cassava chips by drying, which can later be pounded into flour. The major reasons for not processing were lack of technology and time consuming. It was reported that peeling and slicing of cassava/sweet potato requires some time. But, it is evident that processing of cassava/sweet potato enables consumers to diversify the form in which the produce can be consumed and it is a factor that may increase the crops utilisation and demand. It is therefore imperative to foster technological advances in form of means and ways by which households could domestically process the roots, as this may shed light and breakthroughs towards significant increases in consumption of sweet potato and cassava.

#### **4.1.7 Factors explaining the trend in Demand for fresh cassava and sweetpotato**

The rise in the demand for cassava/sweet potato will be explained through a series of assumptions. This means that some of these factors require further investigations in order to make conclusive remarks. The factors to explain this trend will be derived from the general macro-economic environment over the last decade but also through the various forms in which cassava and sweet potato are consumed. We shall also try to demonstrate that it is the fresh market that is driving the production of cassava rather than industrial demand. It should also be noted that sweet potato currently has very limited industrial use in the three countries as compared to cassava. Hence, the explanation of the trend in its demand is mainly dependent on what has happened at household level.

##### ***Household demand***

Although the work of SARINET has helped to expand the production of cassava and sweet potato in the region, from the results of these studies, it could be concluded that cassava and sweet potato remain 'poor man's' crops. This comes from the fact that in both rural and urban areas in all the three countries, the major consumers of the two products are low and middle-income households. Although some high-income households also consume cassava and sweet potato, but proportionately, it is mainly those with lower incomes who consume more. What one would say is that probably the size of these income categories within these countries is increasing due to economic hardships, hence the rising demand for such crops as cassava and sweetpotato, which is a substitute for more luxurious food products as wheat bread.

The Poverty Profile in Malawi (1998), prepared by the National Economic Council indicates that using the four regional poverty lines and the individual welfare measure of daily per capita consumption levels, the poverty head count estimates show that 65.3% percent of the Malawian population were living in poverty in 1998. The

incidence of poverty was higher in rural areas: 66.5% of the rural population and 54.9% of the urban lived in poverty. Furthermore, it is reported through this document that the degree of inequality in consumption as indicated by the Gini Coefficients is higher in the urban population than in the rural areas. The richest 20% of the population in the rural areas count for 44% of the total consumption, where as in the cities, the richest 20% account for 58% of the total consumption. A comparison of these poverty lines and earlier ones (although not conclusive) indicate that the poverty situation is worsening. This means that the number of poor people is actually increasing. This in a way then would explain why more households would be substituting more expensive foodstuffs (wheat bread) for cheaper food products (cassava and sweetpotato). The same analysis would be done for the majority of countries in the region where one of the major short-term impacts of structural adjustment programmes has been the multiplication of the number of 'New Poor People'. In the majority of these countries, the growth in household income has lagged behind the growth rate of inflation thereby eroding the real incomes of households.

## **4.2 Profile of producers**

### **4.2.1 Socio-economic status of producers**

The three studies concurrently carried out in Malawi, Tanzania and Zambia revealed very similar socio-economic characteristics of the farmers. In Malawi it was found out that the majority of the cassava producers interviewed were in the age category of between 26-65 years. Very few producers were above the age category of 65 years. The majority of these producers were male headed (86%), whose major occupation was farming. Their average family size was 6 people. This was within the national average of 6-7 people per household. Off-farm activities mentioned were mainly carpentry, grocery shops, and tailoring. Regarding literacy level, the majority (45%) had primary education. Although cases of intercropping exist, the majority of cassava/sweetpotato producers grew them as mono-crops to maximize yield. Very few producers reported practicing mixed or intercropping systems.

Similarly, in Tanzania, the respondents were heads of households and the majority were males compared to females. About 98.6% of the households interviewed were male-headed compared to 1.4% who were female headed. It was observed during the survey that female participate more in sweet potato production than in cassava. It is common knowledge in East African rural economies that crops inclined towards domestic consumption happen to be the woman's domain. This is observable in our case where historically sweetpotato were for domestic consumption. Apparently, this feature is changing because the majority of women growing sweetpotato reckon to do so for commercial purposes.

There is not much difference among sweetpotato and cassava farmers in terms of literacy levels and off-farm employment, although sweetpotato farmers are slightly better educated and more diversified in off-farm employment. The majority of farmers (69%) had reached primary school while about 24.3% were illiterate. Off-farm activities were similar to Malawi and equally less important than farming. However unlike Malawi, a higher percentage of farmers (16% sweetpotato and 17% cassava) reported of practicing intercropping as well as mixed cropping (12% sweetpotato and 31% cassava). The common intercrops for cassava and sweetpotato are maize, legumes, cashew and coconut trees. Nevertheless, the majority of farmers were

planting cassava and sweetpotato as mono crops and there is more mono cropping of sweetpotato than cassava.

In Zambia, men and women producers were almost equal (59 men and 61 women). Their ages ranged from as young as 14 to over 65 years. The most common number of people per household was 7-8 (25.8%). Their literacy level was mostly primary school (70%) with 5.8% not having been to school at all. The low literacy levels have implications in terms of marketing of cassava because such people can be vulnerable to exploitation by their counterparts from the cities that may come to purchase cassava from them in the villages. Their capacity to absorb and to use new marketing strategies may also be limited. For the majority of these people (73%), farming was their mainstay in life. The few who were engaged in other non-farming activities were typically involved in running a grocery (24%), marketeering (21%), carpentry (15%), crafts/selling charcoal/salon (15%) and all others (24%). Similar to Tanzania, mainly three cropping patterns were practiced for both sweetpotato and cassava. These were mono cropping (20%), inter-cropping (26%), and mixed cropping (36%). Unlike cassava where mixed cropping was commonly practiced, sweetpotato producers preferred to use mono cropping almost exclusively (77%).

Use of either mono cropping or intercropping was mainly depended on ease of management and availability of land. The majority of farmers preferred mono cropping for ease of management. Those farmers practicing intercropping or mixed cropping did so largely for labour saving.

#### **4.2.2 Source of planting material**

In Zambia, farmers indicated that the major source of planting material was from own garden (own cuttings) (55% cassava producers and 50% sweetpotato producers). A few of cassava producers got cuttings through buying (4.2%), gifts (10.8%) and research station (21.7%). Similarly in Tanzania, the major source of planting material was from own production (own cuttings) (71% cassava producers and 67% sweetpotato producers). A few bought (31% sweetpotato and 10.8% cassava), gift (8.2% sweetpotato and 10.8% cassava), and relatives (4.1% sweet potato and 23% cassava).

In both countries, Zambia and Tanzania, farmers indicated that cassava and sweetpotato planting materials were readily available (79% for sweetpotato, and 90% for cassava in Tanzania; 64% for cassava and almost 100% for sweetpotato in Zambia) and most of it was viable/of good quality. However in Tanzania, a higher percentage of sweet potato farmers compared to cassava farmers think planting material is scarce and this also reflected in the fact that a higher percentage of sweetpotato farmers bought planting material compared to cassava farmers. This observation strengthens the hypothesis that sweetpotato production is currently more market oriented than cassava production.

#### **4.2.3 Reasons for growing cassava and sweetpotato**

The question that we would like to answer in this section is, "What is driving the expansion of cassava and sweet potato production in the region, most specifically in the three countries under study.

In the previous sections, we have tried to link the expansion of production of the two crops with the persistent drought and high prices of inorganic fertilizers which have driven the majority of farmers to incorporate cassava and sweetpotato in their cropping systems. Much as these factors are valid in explaining cassava and

sweetpotato production trends in the region, the studies carried out in the three countries further revealed that it is the existence of urban markets that is the major driving force behind this “boom”. On the contrary though, cassava production in Tanzania is mainly for food for the households although they market a proportion of the produce. This in a way justifies the slow growth of cassava production in Tanzania. But proportionally, more sweetpotato farmers produce primarily for the market than cassava farmers. In addition, more than half of the cassava and sweetpotato farmers indicated they grew these crops for other reasons such as crop diversification to reduce risk from crop failure, fallow crop, minimization of production cost of other crops by intercropping e.t.c. However, in Malawi and Zambia, cassava production has expanded in both traditionally cassava growing areas as well as in new areas because of the rising demand in the urban markets. Similar trends have been observed in the production of sweet potato. In Malawi, the major reasons producers gave for choosing to grow sweetpotato were source of food (8.1%) income (13%), both food and cash (55%) and the fact that sweetpotato do not require much fertilizer input (15.4%) which the majority of them cannot afford these days. It is noticed that majority (47%) grow cassava mainly for cash, while as up to 34% of farmers grew cassava for both cash and food. If we combine the two figures, it can be concluded that about two thirds of the farmers grow cassava for the market. Actually, 75% of the farmers marketed their part of cassava that they grew. This large percentage of farmers who grew cassava for the market can be supported by the large amount of fresh cassava that is transported into town each day.

In Malawi (Lilongwe), an exercise of quantifying fresh cassava that enters the Lilongwe city markets was carried out in 2000-2001 marketing season and then repeated during the 2001-2002 marketing season. The study revealed that on average, about 40 metric tones of fresh cassava enter Lilongwe city markets per day during the peak period (October –December) of the marketing season. Table 7 below gives a summary of the data for one week. A comparison of average figures for the same period during the two seasons showed that figures for 2001-2002 marketing season were higher showing an expansion of production and hence supply.

A similar exercise was carried out during the second week of April 2001 to quantify the amount of sweetpotato entering Lilongwe city markets through the 6-miles roadblock on MI-Road. This is the beginning of the peak period for sweet potato in most parts of Malawi. It was found out that on average about 30 metric tones of sweet potato entered Lilongwe city markets per day. Although this is the main route for most agricultural produce into Lilongwe city markets, we could still say that the total amount of sweetpotato as well as cassava entering Lilongwe city markets is a lot more than this<sup>1</sup>

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<sup>1</sup> The population of Lilongwe city is about half a million people only. This means that the per capita consumption of sweetpotato and cassava in the city is very high.

**Table 7. Number of Loads and Total Quantities of Fresh Cassava Transported by Each Mode of Transport per Day into Lilongwe City Markets**

Day	Mode of transport	Number of loads	Quantity (Kg)	Totals
1	Bicycles	256	17225	44,725
	Vehicles	15	27500	
2	Bicycles	284	19280	42,030
	Vehicles	14	22750	
3	Bicycles	174	11875	43,975
	Vehicles	16	32100	
4	Bicycles	187	14005	44,405
	Vehicles	14	30400	
5	Bicycles	231	18035	45,935
	Vehicles	12	27900	
6	Bicycles	202	14830	43,730
	Vehicles	13	28900	
7	Bicycles	122	9865	43,685
	Vehicles	15	34000	
<b>Total</b>	<b>Bicycles</b>	<b>1456</b>	<b>104935</b>	<b>308,485</b>
	<b>Vehicles</b>	<b>99</b>	<b>203550</b>	

Major buyers of this commodity are mainly cassava retailers from the urban markets, middlemen and individual consumers and institutions. The amount of cassava sold varies with area. In Nkhata Bay (Northern region) and Mulanje (Southern region) where cassava is a staple crop, between 40-60% of cassava produced is sold. In Chimbiya (Central region) where maize is a staple crop, about 90% of cassava is sold. The same proportions of sweet potato produced are sold. In the Central region where cassava is mainly grown for the fresh market, the husband mainly made marketing decisions. While in Mulanje and Nkhata Bay where cassava is a staple, the decisions are mainly made jointly (about 64% of the respondents) by the husband and wife.

In Tanzania, the two crops are mainly grown for food and most decisions regarding crop production and marketing are made jointly by the husband and wife. In most households, the decisions on the type of crops and acreage to grow under each are made jointly by wives and husbands. However, more women are involved in making decisions regarding sweet potatoes production than cassava. Also it was noted that where there is intercropping and sweetpotato is not the primary crop, women (wives) were freer to plant sweetpotato and make other decisions regarding the crop.

The Zambian picture as already indicated is similar to that of Malawi. For the majority of households (86.7%), cassava was grown for sale with both the husband and wife often actively participating in production decisions. Just like in Malawi, sweet potato was mainly grown for the market. In fact, 71.8% of respondents indicated that they produced sweet potato for sale.

#### 4.2.4 Cassava and sweet potato marketing decisions

Slightly more sweet potato than cassava farmers sell part of their produce to the market in Tanzania. The decision for sale was reported to be made by both husband

and wives. Traders and households/individuals are the most important outlets for produce sold by farmers. However the number of farmers who sell their produce to traders is higher for sweetpotato than cassava. In most cases transaction is done in the farm (80% households for both crops) and usually it is the responsibility of the buyer to harvest the produce, so they normally buy stands of either sweetpotato or cassava. This is done to ensure that the buyers have the provision for on-farm storage where the produce is less perishable relative to post harvest storage.

The Zambian situation was no different from Tanzania. The majority of households grew cassava and sweetpotato for sale with both the husband and wife often actively participating in the marketing decisions. However, just as in the case of deciding the type of crop to grow, more husbands (15%) were independently involved in making marketing decisions than wives (2%). Consumers were the single most common buyers of cassava (39%) followed by a combination of both consumers and middlemen (20%) and middlemen (15%). The bulk of respondents only got involved in selling cassava in the past 10 years. This could be a reflection of increasing importance of cassava as a staple in the country in the face of reoccurring droughts in the period under consideration. Regarding sweetpotato, producers sold their produce to retailers (41%), middlemen/retailers (20%). However, the majority of them (91%) acted as retailers themselves especially in 1998/99 season.

#### **4.2.5 Problems in the production of cassava and sweet potato**

Problems faced in the production of cassava and sweetpotato were almost similar in Tanzania and Zambia. For cassava: low prices, land shortage, poor roads, labour demand, lack of capital/credit facilities, lack of markets, inadequate knowledge on processing, high pest and disease incidence. In addition to these problems, sweet potato farmers also indicated the problem of lack of planting material especially in Tanzania.

#### **4.2.6 Pricing and price seasonality**

Just as it happens with other players in the marketing chain, size of tubers is the most important criteria in setting prices of sweetpotato and cassava among producers. On a secondary measure, colour, freshness and grade of the roots also played a role in determining the prices. While most sweetpotato farmers sell their produce within a short period of time after maturity (6months) cassava is marketed over an extended period of time, up to 18 months. Most sweetpotato farmers mentioned early maturity as a reason why they sold their produce within 6 months. For those who sold later (both cassava and sweetpotato) "timing of high price periods" was an important factor under consideration.

In all the countries farmers felt that the highest prices exist at the beginning and towards the end of the harvest season while lowest prices are in the middle of the season. These responses are consistent with the expected price behavior for agricultural products.

#### **4.2.7 Cassava and sweet potato transportation**

Similar to all countries, the common means of transporting cassava and sweet potato among producers were bicycles, oxcarts, portage and hired vehicles. It should be born in mind that some producers also acted as retailers or wholesalers.

#### 4.2.8 Cassava varieties preferred among producers

In Tanzania, farmers gave many local names of the preferred varieties. However characteristics of the preferred cassava varieties are sweetness, storability, high yielding, tolerance to diseases and early maturing. In case of sweet potato, preferred varieties are mentioned to be sweet, starchy, high yielding, storable and fast cooking. In Zambia the most preferred cassava varieties were those with early maturing aspects and high flour content. In this case, the varieties mentioned were Katobamputa and Bangweulu and it was also indicated that traders also preferred these varieties. With regard to sweet potato, the most preferred variety was Chingovwa because of its good taste (77%) and low fiber content (10%). Similar characteristics mentioned in these two countries were also mentioned in Malawi determining the preferred varieties, which included early maturing, high yielding potential, good taste, resistant to pest and disease.

#### 4.2.9 Storage, processing and grading by producers

In Malawi, 60% of the farmers stated that they store cassava and sweet potato once harvested. Various methods were employed such as storing cassava in the soil (late harvesting), and storage in own house to prevent thieves and damage by wild animals. The maximum storage period was between 94 days to 127 days. However farmers indicated incurring losses during storage and handling of the produce which ranged from 25% to 41%.

In Tanzania, about 34.2% sweetpotato farmers and 37.8% cassava farmers stored their produce before sale. More cassava than sweetpotato farmers store their produce in the farm, which is a reflection of their relative perishability in post harvest storage. The responses as to whether price is increasing or decreasing after storage are very low partly due to low proportion of farmers storing their produce, lack of sufficient knowledge on price trends, and lack of farm records.

In Zambia, about 73% and 7% of cassava and sweetpotato farmers stored their produce. Those storing cassava stored it largely in chips form for future consumption as well as resale at a later stage. Most farmers storing cassava stored in own houses with a few storing in the soil. Farmers storing sweetpotato store it in the soil, own house and dugout pits. Lack of storage among sweet potato farmers is an indication that the high perishability of the product requires quick disposal in the market before it gets bad.

As expected, most farmers in Tanzania and Zambia indicated receiving poor prices after storage probably due to loss of quality. However 50% of farmers in Malawi indicated they got better prices after storage. This could be attributed to the reduction in supply of these two crops after the storage period.

Those farmers who did not store their produce indicated need for immediate cash, lack of proper storage facility, high perishability, not appreciating the need for storage as the most limiting factors to storage of cassava and sweetpotato.

**Grading:** In all countries under study, a greater proportion of farmers reported that they grade their produce to obtain better prices. Grading which involves sorting of tubers into groups with similar characteristics was usually based on size of roots, colour, and degree of root damage. Taste and variety are the additional criteria used in grading. However, producers do not grade their produce before selling because of the way the price is set at the farm gate, i.e, selling a truck-load or selling non-lifted

cassava where the size of the tubers is still unknown. One would therefore expect farmers to get a better price for their produce if grading starts at the farm.

**Processing:** More than 70% of the farmers processed cassava at household level in the three countries under study. Home processing involves peeling the tubers, slicing, soaking/fermenting drying and also pounding into flour. Chips were common products of processing, which were made from a process of peeling, soaking and then cutting the tubers into small strips. Chips store better than flour and easily go up to 4 months. In general, more cassava than sweet potato farmers processed their produce. Those farmers who did not do any processing indicated that they did so because most customers demanded fresh products, lack of proper technology and lack of knowledge on processing as the major reasons.

#### **4.2.10 Processing and price premium**

Cassava processing into various types of products for the market is not a common practice on the cassava food chain. However the most common product is cassava dried chips which are then processed into flour. This is common in areas where cassava is a staple food. Almost no processing of cassava at household-farm level exists in areas where the crop is grown mainly for the fresh market.

The most commonly cited processing technology was pounding and sieving into flour. Peeling and soaking in (preferably) running water to 'neutralise' the bitter taste often precedes this process. Chips, the most common product of processing are made from a process of peeling, slicing, soaking/fermenting and then cutting the tubers into small strips. The strips would then be sun dried in readiness for storage. The cassava treated in this manner can stay up to 4 months before going bad and needs only a little cooking before consumption. Some people would even eat these cooked and sun dried chips without cooking them again. A normal traditional motor or hammer mill can be used to process these cassava chips into flour.

Cassava is a very unusual product with regards to value adding processes. What happens is that as the fresh cassava is processed into cassava chips, it loses values instead of appreciating. For example, in the Southern Region (Mulanje) of Malawi and in North (Nkhata Bay) where the making of cassava chips is common, the price of fresh cassava is about MK12.00 per kg (about 16 cents at MK74.00 =US\$) while a kilogramme of dried chips is between MK2.00-MK5.00 (between 3 and 6 cents per kg). May be it would also be interesting to compare the price of a kilogram of fresh cassava and a kilogram of flour. Although the price of flour may seem to be more attractive, but the incorporation of all the processing costs may show that even in this process, there is no added value.

Taking into account the fact that one needs labour, and more cassava to produce a kilogramme of cassava chips, no rational farmer would engage him/herself in the business of making cassava chips for the market. It is more lucrative to grow cassava for the fresh market than selling the chips. Similarly, the industry is interested in buying cassava chips or cassava flour from the farmers. Unless the prices of these products are higher than those on the fresh market, it will be very difficult to stimulate and sustain higher levels of production by linking the producers to the industry. In areas like Lilongwe where the producers produce cassava solely for the fresh market (since cassava is not a staple here), it would be difficult for farmers to process cassava chips for the market.



However in areas where cassava is a staple and that the fresh market is not as vibrant, there is room to expand production because cassava chips are made from bitter cassava and the fresh market needs sweet varieties, hence there would be no competition between the two types of varieties. Furthermore, since the fresh market is relatively small in these areas, farmers would find a reason to go into growing of bitter varieties for the production of cassava chips if there are ready markets, that is if they are linked to potential buyers.

**Training and extension:** Very few farmers (about 4% in each country) in the three countries reported having undergone any training in cassava or sweetpotato production. Similarly, very few were aware of the existence of extension services for cassava and sweetpotato. Membership to credit associations was also very low. However, willingness of farmers to join the associations is very high so as to increase price, bargaining power and to easily access markets and acquire inputs.

#### **4.2.11 Production costs and margins for sweetpotato and cassava**

Tables 8 and 9 summarises the production costs and margins for cassava and sweet potato producers in Tanzania. Gross margins for each farmer were calculated as the difference between revenue per hectare and total variable costs. Family labor was also priced using the equivalent market value.

In general, results indicate high variability in price, costs and yields. Coastal regions of Dar es Salaam and Coast have relatively higher producer prices, explained by high demand derived from large urban markets close-by. The labor cost in these areas is also high due to high opportunity cost for labor. However, production costs of both cassava and sweet potato are much lower in the Central regions than in the Coast because labor cost in the central regions of Morogoro and Dodoma are relatively lower. One would therefore expect that the lower production costs coupled with higher yields for cassava and sweetpotato in the Central regions (compared with coastal regions) will result into higher producer income margins per acre in these areas. However, access to markets seems to favor Morogoro and Dar es Salaam more (highest gross margins) in spite of their high production cost. Morogoro region seems to strike the best balance between yields, price and production cost.

**Table 8: Yields, Production Costs and Margins for Sweetpotato**

Region		Yields (bags/acre)	Price (TSh./bag )	Revenue	Plough1	Ridgec1	Nursecl	Plantc1	Weedc1	Totalc1	G/Margin
Dar	Mean	16.6	<b>8,375.0</b>	139812.5	17750.0	19583.3	1900.0	7187.5	9000.0	47,975.0	<b>91,837.5</b>
	StD	8.2	2,150.5	81920.2	9794.3	12587.3	1555.6	1998.8	4320.4	26,182.1	85,579.6
Coast	Mean	14.7	<b>5,038.0</b>	75866.6	9865.3	13730.7	1900.0	4980.7	9909.0	37,326.9	<b>23,950.0</b>
	StD	9.7	1,621.8	59280.1	9155.9	9859.2	1140.1	4405.6	3923.7	19,623.9	61,007.4
Morogoro	Mean	19.3	<b>3,244.4</b>	56827.7	10666.6	17500.0		3250.0	6700.0	23,633.3	<b>44,055.0</b>
	StD	8.5	2,210.1	29689.5	1154.7	9983.3		1500.0	2600.0	12,283.5	27,557.5
Dodoma	Mean	15.6	<b>3,742.1</b>	51093.7	13444.4	6871.4		7722.2	1950.0	20,533.3	<b>30,057.8</b>
	StD	15.0	1,778.6	47922.5	18206.1	4690.3		9324.4	900.0	17,423.5	47,162.5
Total	Mean	16.6	<b>4,580.3</b>	72255.5	11989.1	13781.3	1900.0	5734.0	8529.7	33,509.6	<b>38,487.6</b>
	StD	10.7	2,449.6	58877.6	11381.0	10053.3	1126.9	5331.2	4371.6	21,318.5	56,398.3

Source: Survey (2001)

**Table 9: Yields, Production Costs and Margins for Cassava**

Region		Yields (bags/acre)	Price (Sh./bag)	Revenue	Plough1	Nursecl	Plantc1	Weedc1	Totalc1	G/Margin
Dar	Mean	43.8	<b>3,000.0</b>	112,500.0	11,500.0	10,000.0	9,500.0	9,250.0	34,000.0	<b>22,250.0</b>
	StD	27.9	707.1	87,702.1	4,803.2	.0	2,563.4	2,434.8	8,084.3	81,068.7
Coast	Mean	28.1	<b>3,962.5</b>	110,828.1	19,347.8	4,700.0	9,180.9	14,456.5	44,230.4	<b>52,141.8</b>
	StD	22.4	2,218.7	84,512.2	15,347.0	5,498.4	3,932.8	11,769.4	26,647.3	90,085.4
Morogoro	Mean	23.4	<b>3,505.2</b>	83,263.1	19,666.6			6,166.6	19,375.0	<b>79,184.2</b>
	StD	12.1	2,582.7	73,881.0	8,962.8			2,753.7	14,407.0	72,841.2
Dodoma	Mean	26.3	<b>1,636.8</b>	36,318.1	6,076.9		3,500.0	4,807.6	11,107.1	<b>16,266.6</b>
	StD	46.3	1,296.2	47,002.2	3,904.3		1,000.0	2,868.9	6,811.1	40,888.7
Total	Mean	27.6	<b>3,047.5</b>	86,075.2	14,361.7	5,923.0	8,569.6	10,372.3	31,067.3	<b>48,088.6</b>
	StD	26.6	2,232.0	77,891.2	12,598.1	5,298.7	3,856.5	9,385.7	23,928.5	77,332.0

Source: Survey (2001)

In Zambia, a similar analysis was conducted and it was observed that cassava and sweetpotato have much lower production costs than crops like maize, which require more expensive inputs like chemical fertiliser. Farmers who sold their sweetpotato obtained gross profit margins ranging from 26% to 47% depending on whether he uses middlemen or sells directly. But farmers who sold directly to final consumers obtained the highest gross margin (47%) whilst those who used marketing intermediaries obtained much lower margins. The middleman put a mark-up of between 4.4% and 12% for fresh sweetpotato. On the other hand a cassava producer who sold fresh cassava roots to the local consumer obtained a gross profit margin of 88% whilst processed cassava (chips) had a gross profit margin of 88.6%. The marketing intermediaries' mark-up ranged from 4.4% to 19% for processed products. This depended on whether they were acting as wholesalers or retailers.

### 4.3 Profile of cassava and sweet potato transporters

In all the countries covered by the study, transport was one of the major components of market and the most costly component. Transport was important in moving the commodity from production areas to the market, mainly to urban markets. In Malawi and Zambia, head-loads, bicycles and ox-carts were the common means of transport for shorter distance haulage. For long distances, public transport (buses), small lorries (2-3 tonnes) to large lorries of more than 5 tonnes/trucks were commonly used. In Tanzania, trucks, pick-up vehicles and buses were the common means of transport. In Malawi, cassava and sweetpotato are off-loaded at centrally agreed upon centres where retailers assemble to buy the produce from the transporters/wholesalers/middlemen. When cassava and sweetpotato are transported

by bicycle, the load ranges between 50 and 90kg while that by lorries ranged from 2 to 10 tonnes per load. In Tanzania, the produce transported is mainly packed in sacks and often over filled because transport cost is set per bag. The minimum size of bags packed that is transported was 50kg to a maximum of 300kgs.

The major clients of the transporters are wholesalers, who buy and sell in bulk. Some of the transporters were also middlemen or even retailers. The majority of transporters were engaged in transporting other agricultural commodities (including maize, beans, groundnuts and cassava) apart from sweetpotato, depending on the season. However, in Malawi (Lilongwe), 75% of the transporters involved in cassava transportation at the time of the interview, had cassava and sweetpotato as their major commodities throughout the year. This is possible because cassava and sweetpotato seasons more or less alternate each other with negligible breaks in between. The cassava season starts in August/September and runs up to February/March. This then gives way to the sweet potato season for the other months to complete the year.

In Zambia there was another category of transporters who were using trucks to unofficially (i.e without the knowledge of the truck owner) ferry goods to urban areas. The latter tended to have lower rates than the official hired transporters and were preferred by middlemen who took advantage of the lower rates to increase their profits.

The standard of measure for the charges differed from one transporter to another. However the most common ones were distance and weight. A number of reasons were given for arriving at a given charge though it appears there were common prices. It was reported in Malawi and Zambia that the transport cost was on the rise following higher costs of fuel, spare parts and bad condition of roads<sup>2</sup>. It can therefore be noted that the common hired transporters (i.e lorries) collude when fixing transport costs. Recently, the transporters (who are also wholesalers sometimes) and middlemen/wholesalers have formed an association in Malawi (Lilongwe), which controls the flow of cassava to the market as a means of maintaining high prices for their produce.

#### **4.4 Profile of cassava and sweet potato traders**

Traditionally cassava and sweetpotato have been grown as subsistence crops. However in the recent years, cassava and sweetpotato trade has become one of the most important livelihoods undertakings for many urban as well as rural agricultural traders in the region. The term trader has been used to refer to all those agents who are involved at any point in the product chain in the transfer of the product from producers to consumers. There is a wide range of these participants from one country to another varying in importance. Transporters are the agents who facilitate this transfer, of course bearing in mind that they sometimes play a dual role of transporter and wholesaler or retailer. As the names suggest, wholesalers are those who buy bulks of produce from farmers, transport them to distant places mainly to village, district and or regional headquarters markets and dispose the produce also in large volumes. Retailers buy either directly from producers or from wholesalers and sell in small volumes ranging from 2 to 20kgs to final consumers. Often times, final retail buyers

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<sup>2</sup>In Malawi, the lorries used to transport cassava are mainly old Land Rovers, which are heavily overloaded such that break-downs are very common. The risk of transport break-downs is normally transferred to the next agent through the high transport costs and hence a high consumer price since transport cost constitutes about 80% of the total variables without considering the buying price.

of produce in volumes of 20kgs would be food vendors selling sweetpotato and cassava amongst other foods in their stalls.

In Malawi, wholesalers and middlemen constitute about 13% of the traders. But sometimes, wholesalers are also retailers. If this is taken into account, they constitute about 47% of the traders. Considering the proportion of retailers among traders, it is observed that they constitute 53% of the traders. However, if the retailer/wholesalers are added to this, they constitute 87% of the traders. These figures have implications on the level of competition in the market. A relatively small number of wholesalers/middlemen is facing a large pool of farmers. Most of these middlemen/wholesalers buy the cassava or sweetpotato straight from the farm. Similarly, in Tanzania, about 20% of the traders interviewed were mainly retailers and wholesalers and in Zambia these constituted 10%. However, the majority were retailers constituting 68% of sweetpotato and 73% of cassava in Tanzania and 80% and 73% of sweetpotato and cassava respectively in Zambia.

In all the three countries men dominated the business. Only a few women engaged in the trade, mainly as retailers, managing stalls of roots and tubers at local markets or selling sweet potatoes on the roadsides. The dominance of men in the business is possibly attributed to the physical strength needed to travel long distances, in remote areas using crude means of transport, which limits women's involvement considering other household chores for which women are responsible. Women were predominantly found at local markets, which was much easier for them since they only had to sell small quantities of the commodity. Among men, the cassava and sweetpotato trade was dominated by young men as the majority of the traders were in the age category of between 25 and 45 years in all the three countries. In terms of education, the educational status of the traders was generally low, the majority (80% in Tanzania and 60% in Zambia) of traders had only primary education.

It should be noted that many traders would consider their business as marketers of root and tubers and hence deal with both sweetpotato and cassava. A significant number also deal with other agricultural produce in addition to dealing with sweetpotato and cassava.

#### **4.4.1 Market information**

Considering the risk involved in perishable agricultural products such as cassava and sweet potato, availability of market information is very crucial for traders to maximise profits and ensure availability of reliable good quality sources of produce and prices. It was surprising however, to note that no government agency reported to provide market information. Sources of information for the traders in Malawi were fellow traders, friends, observation of nearby markets and associations. The same sources of information were also reported in Zambia where more than 50% of the traders got market information from their own observations.

In Tanzania also, very few, or almost none of the traders relied on established media as the source of market information for sweet potato and cassava. Greatest reliance is from "social networks" i.e. friends, relatives and fellow businessmen. This accounted for over 51% for both produce categories. Personal observations, entailing physical visits to the farm areas and also to the market outlets ranked second, accounting for 38 and 36% sweetpotato and cassava respectively. It is clear that amongst services that need to be developed with the aim of enhancing marketing efficiency of roots and tubers is that of information collection and dissemination.

Apparently, not many traders complained about the amount of information and they were rather contented that the information is adequate. This may be accepted considering that the traders are small and operate within markets very well known to them. For example, the factor that determines prices and hence one that can be hedged-on to ensure sufficient margin is mainly the size of the tubers. The larger the tuber, the better a price it can fetch in the retail market. This is for both sweet potato and cassava. However, the other attributes being considered vary mildly between the two crops. Whereas the grade of tubers matters most for sweetpotato, other factors such as being void of fibres and good taste are important for cassava. Traders also have to have a clear knowledge of what the ultimate consumers would desire. In Malawi traders indicated that they prefer the middle sized tubers of cassava because more of the tubers can be transported and that they are easy to price.

#### **4.4.2 Cassava and sweetpotato marketing (supply and demand)**

Fresh cassava and sweetpotato trade has become one of the most booming agricultural trade. As it has been indicated in the production trend, this has been most significant in Malawi and Zambia. The participants on the marketing chain start with the producers to traders (wholesalers/retailers, retailers, middlemen and industrial processors), transporters and final consumers. In Tanzania, Cassava and sweetpotato marketing is generally underdeveloped, managed by small-scale traders, has relatively shorter history compared to the grain marketing.

In Malawi, the majority of traders interviewed in the three regions were operating as retailers. The retailers range from small vendors of a few tubers of cassava per day (sell by the road side or move around with the product in busy working places) to larger retailers who sell cassava in large markets in the city. These retailers often buy cassava from a central delivery point. On the other hand, the wholesalers receive cassava from middlemen who collect and deliver cassava from various producing sites in the countryside. Once at the wholesale market, the various retailers purchase required quantities mainly in bags.

In Tanzania, most traders obtain the produce directly from farmers. Such traders normally establish business relationship with farmers who have commercial orientation in production of either sweetpotato or cassava. It is worth mentioning that historically both crops have mainly served for farmer own consumption. Whereas about 20% of cassava traders obtain produce from their own farms, a relatively smaller proportion does so for sweetpotato. It was also noted that middlemen or other wholesalers are of very low importance as suppliers of produce to traders.

In Zambia, the majority of traders did not reveal where they got their supplies of cassava from may be for fear of competition. However, the major sources of supply for sweetpotato were producers and middlemen/wholesalers.

Traders reported a number of problems they faced from suppliers. These included erratic supply/availability of produce, poor quality produce, unpredictable producer prices which changed from season to season. These were common to all countries. However in Zambia additional problems of poor/expensive transport system, poor technology on processing and storage were also mentioned.

In Malawi, the study has revealed that fresh cassava and sweet potato is dependent on seasonality. Although cassava can be found on the market through out the year, its supply has a seasonal pattern. Over 75%(on average) of traders interviewed indicated that they face seasonal variations in the supply of fresh cassava. This was also true for

cassava buyers/consumers. Their demand for cassava was dependent on seasonal availability of the product. In Tanzania, seasonal and erratic supply is more pronounced as a problem for sweet potato traders (60% pointed it out) whereas poor quality of cassava ranks highest. With regard to cassava the three major reasons (quality, unpredictable prices, scattered small production entities) each accounts for about 30% of the indications of a problem by traders. The nature of problems indicated by traders manifest the predominantly non-commercial nature of the production base for sweetpotato and cassava. Production has continued to be for domestic consumption with small provisions to sell surpluses. In such situation, demands for commercial markets e.g. quality, reliability of supply, do not figure strongly in the minds of the producers.

In order to improve the supply of fresh cassava on the markets, traders suggested that there was need to educate more farmers to grow more cassava to increase supply of cassava and government to invest in road networks and infrastructure to facilitate the transportation of the products on the markets. This suggestion may be applicable to all the three countries since common problems were mentioned.

Traders also faced a lot of problems from the cassava consumers. These were mainly those problems related to too much emphasis on colour, size and freshness as well as demand for lower prices from time to time.

Despite these shortfalls, traders in Malawi and Zambia expressed optimism that they were able to satisfy the local demand of cassava and sweet potato from consumers. In these two countries, it was reported that the domestic demand although was expanding but was satisfied. However, in Tanzania, the traders (68% for sweet potato and 63% for cassava) felt that the market for the two crops is not fully satisfied and that there is room to increase the business. Though not significant, there is some indication that in case of sweetpotato low production and seasonality of supply compounded by low processing and lacking storage facilities limits the ability to satisfy the demand. In general there is room to expand sweetpotato and cassava consumption. This is why there is need for some form of regulation of supply through the formation of trader associations to control supply of the product on the market. Given the fact that the fresh cassava market is very risky because of the perishability of the product, it is important that both producers as well as the traders should be very organised not only to limit losses through quality aspects, but also through prices if supply is too high relative to demand. Since cassava can be stored in the soil for a long time after maturity as compared to sweet potato, regulating supply should be a very easy task.

However, in all the countries, traders stated that external markets were almost non-existent and they were not in apposition to know whether they satisfied external demand for cassava and sweetpotato or not. There were problems with the external demand, which they observed such as the unreliability of the international market information and very few buyers were available to purchase cassava on a large scale.

In general, cassava trade seems to be on the increase in all the three countries despite the fact that production has tended to almost static in Tanzania. This could possibly be because of the increasing importance of cassava for both food security and income source. The economic hardships the majority of rural and urban households are facing have forced them to seek alternative sources of food as well as income. The joint efforts between governments, non-governmental organisations and SARNET have helped to put cassava in the lime light at an opportune time when economies in the

region are looking for alternatives to diversify their food as well as their income baskets.

#### **4.4.3 Storage, Grading/sorting and price premium**

**Storage:** In this study, traders were asked whether they do store sweetpotato and cassava before selling. In Malawi it was found out that a small number of traders particularly those who were buying in bulks were storing some of their cassava for sale later on. The major storage facilities own house, rented house, left in the field and buried in the soil. Others used sacks to store their cassava instead of leaving it in the garden. It should be noted that most of the cassava that is stored is the processed cassava chips. Fresh cassava cannot be stored for more than a week without refrigeration facilities. The storage period for dry cassava chips ranges between 2 to 7 months.

However, about 50% of the traders in Tanzania both for sweetpotato and cassava indicated to be storing and for varied durations. However, these did so not necessarily for purposes of selling them when prices are better, or targeting a particular period when demand is higher, but rather for preservation of unsold produce because it moves out slowly considering that consumers buy such products in small amounts.

In Zambia, more than 70% of the traders stored their cassava or sweetpotato before sale. However cassava was mainly stored in processed form and was mostly stored in rented private store at the market. The cassava was put in sacks and stacked away. The period of storage was from one to seven days with quantities ranging from 1-10 by 50kg bags of chips or flour. For sweetpotato, the storage was strictly before they could find a customer and the period ranged from 1 to 3 days.

Traders reported problems encountered when storing the products which included harvest deterioration. In Tanzania over 50% of sweet potato traders and 60% of cassava traders indicated that the roots would rot in an attempt to store them out of the ground. Other constraint mentioned was high costs of rented facilities.

Traders reported that they got higher prices before storage than afterwards. This was attributed to the loss of quality as a result of long time of storage as well as attack from insect pests, thefts. Others reported that storage was an expensive activity and that cost of storing the products exceeded the price they got from the market.

**Grading:** Unlike storage, which was done by only a few traders, almost all the traders interviewed in Malawi reported that they graded their fresh cassava before selling on the market. Grading was based on root size, colour, and damage. Size was important mainly for fresh cooked and dried chips while colour for dried chips and flour. Similarly in Tanzania, more than 80% of sweetpotato and cassava traders graded their products. The criteria for grading seemed similar for both crops which were: size, quality and smoothness which was more important in sweetpotato than cassava. freshness. In Zambia, grading was mainly done for sweetpotato. About 94% of traders were engaged in grading /sorting sweetpotato. The criteria were the same of size of tubers (56%), size and colour (24%) and size and smoothness (7%).

Contrary to storage, the effort in grading seems rewarding. Traders (about 88%) reported receiving better prices after they had graded their products than when they did not. The reason given was that prices were charged according to the quality and size of the tuber as well as that customers find it more convenient when choosing

graded products so they are willing to pay more than when they are not graded. Therefore grading allows traders to get premium price.

#### **4.4.4 Price determination**

There are several prices that are fixed on the product as it changes hands from the producers to the retailers and to consumers.

The middlemen buy cassava and sweetpotato from the producers and normally the price is fixed per 50-90 kg bag, per load in the vehicle or the prices is set before lifting the tubers that is per size of the plot that is going to be harvested based on the assessment of the size of the roots sampled. This shows that the pricing of cassava is very subjective. In fact, this subjective determination of the price continues up to the retailers. No clear standards are set for the determination of the price. The factors that are considered when determining prices could be taken as guides only, and may vary greatly from one retailer to the next or from one wholesaler to another.

However, the middlemen/ wholesalers normally have an upper hand in terms of fixing the price. Since the producers are not organized coupled with the fact that the number of middlemen or the number of possible outlets of cassava from the farm is limited, farmers accept any price at the end of the transaction. The next price that these middlemen fix is dependent on the buying price from the producers, the cost of lifting the tubers if they did it themselves, the cost of loading, and the transport cost to the point of distribution with a mark-up as profit. Cassava is then sold to retailers in smaller quantities as limited by the capital and the expected length of time to retail the cassava. The retailers then sell the cassava per tuber, in small heaps; sometimes the cassava is either boiled or fried before selling. Generally, besides fetching a better price, boiled cassava takes less time to sell than raw cassava. At each one of these stages, a different price is fixed always with a mark-up as profit.

Between middlemen and retailers, the pricing is also very subjective and also determined by a number of factors. For instance, in Malawi, cassava was either being sold in heaps of fifty to one hundred Malawi Kwacha (0.6-1.3 US\$), or literal counting the tubers or considering tuber size i.e thin tuber sizes are sold at cheaper price compared to those of medium to big tubers. The quality of cassava is another determinant in that fresh cassava-straight from the farm was sold at a higher price than that which had stayed overnight. Cassava that has stayed overnight develops a dark colour which makes the product not attractive to the buyers. In addition to these, variety of cassava also determines the price. For example in both Zambia and Malawi, manyokola variety is on high demand hence it fetches higher prices than the other varieties. This variety cooks fast and has nice flavour and tastes best than the other varieties. In general, size of tubers, farm gate prices, tuber grade, variety and colour of the tubers were the major determinants of price across the different players in cassava and sweetpotato market.

#### **4.4.5 Seasonal price variation**

The cassava marketing season is quite a long one as compared to other agricultural produce. For example in Malawi, the fresh market season starts from August and ends in February. However, during the other months cassava can still be seen on the market. The reason why not much cassava is seen on the market between March and July is because this is the peak marketing period for sweet potato, which is a direct competitor of cassava. Similar trends exist in the other countries with regards to the peak period of cassava on the market. Because of this a certain variation in price is



observed. In addition, seasonal price variations in cassava exists because of differing sources of cassava during specific times of the year. For instance in Malawi, cassava is slightly cheaper at the beginning of the season (between August and October) because supply is high and most of it comes from 20-30 kms away from the City of Lilongwe. This means that transport costs are lower. During the other months cassava is sourced from distant places e.g. Dedza, Kasungu and even Mozambique. This means that middlemen incur higher transport costs hence the cassava becomes expensive. Cassava is sourced from distant places in the other times of the year because it is believed that cassava from other near by places has high water content hence not preferred by consumers. To regulate this price variation, a traders' association has been formed whose main objective is to control the flow of cassava to the market each day.

The level of price on the market also determines the harvesting time of cassava. The majority of producers will harvest large quantities of cassava only when approached by middlemen.

In Tanzania, the majority of farmers were of the opinion that highest prices existed at the beginning and towards the end of the of the harvest season, while lowest prices are in the middle of the season. These responses are consistent with the expected price behaviour for agricultural products. However, slightly more cassava than sweetpotato farmers are less knowledgeable about the seasonal price behaviour, which re-enforces the fact that cassava farmers are less market oriented.

The peak of cassava marketing season in Zambia is usually between the months of March/April and August/September. Prices often soar especially if it is either at the beginning of harvest or at the end of harvest. This period on average lasts between 5-7 months but the real peak is for only 3-4 months. Lowest prices on the other hand were experienced a little at the beginning and middle of harvest (since the market would be flooded with many sellers). This season of low prices would last for about 2-5 months.

## **5.0 Marketing margins**

Marketing is usually seen as a "system" because it comprises several, usually stable interrelated structures that, along with production, distribution, and consumption, underpin the economic process. Marketing studies adopt different view points and approaches. For instance, the functional or marketing functions (physical, economic, and exchange) approach; the organisational or institutional approach (all market participants-producer, trader, transporter, wholesaler, retailer, consumer etc); the commodity sub-systems approach or the sub-sector approach (which combines the previous two approaches); the post harvest approach which analyses all harmful or loss-provoking elements and other causes in the transfer of products, and the mixed systems approach. In the commodity subsystem approach (which we have adopted in this study), the institutional analysis is based on the identification of the major marketing channels. This approach includes the analysis of marketing costs and margins. A marketing margin really measures the share of the final selling price that is captured by a particular agent in the marketing chain.

### **5.1 Marketing Margin Analysis and Assessment of Cassava Market Efficiency**

Market margin analysis using the price spread method is one way of determining how efficient a particular market environment is performing particularly in terms of price. Various marketing cost components and their influence on price were determined.

The price-spread method uses the trader's surplus as a percentage of the total cost to determine how well a particular market is doing in terms of price. If the computed ratio is more than 30% of the total cost without any improvement in the services provided, then the trader is making supernormal profits (Hay and Morris, 1979 as reported by Nakhumwa 2000). The table below provides the findings of the marketing margins for unprocessed cassava traders who were selling in various regional markets.

The analysis will however only be done for Malawi because of inadequate data from the other two countries.

Table 10 Marketing margins for unprocessed cassava (1999/2000)

Cost component	Marketing margin (MK/kg) <sup>3</sup>			Component as a % of ATC		
	South	Centre	North	South	Centre	North
Average farm gate price (AFP) 1999/2000	6.8	10.09	4.22	-	-	-
Average Storage Cost (ASC) 1999/2000	0.648	2.4	1.2	5.87	15.6	14.2
Average Transport Cost <sup>4</sup> (ATRC) 1999/2000	1.49	0.85	1.36	13.5	5.5	16.0
Average Handling Cost (AHC) 1999/2000	2.1	2	1.7	19.0	13.0	20.0
Average Total Cost (ATC) 1999/2000	11.04	15.34	8.48	-	-	-
Average Trader's Surplus (ATS) 1999/2000	0.61	3.16	7.12	5.5	20.6	83.9
Average Selling Price (ASP) 1999/2000	11.65	18.5	15.6	-	-	-

There are a number of conclusions that can be drawn from the findings in Table 10. Transport costs were very significant in influencing the total cost of marketing the product to consumers in Southern (13.5%) and Northern (16.0%) region while storage costs were influential on the cost structure of the traders in the Central (15.6%) and Northern (14.2%) regions. Similarly handling costs were a high component of total marketing costs in the Northern region (20.0%). The higher contribution of transport, storage and handling costs in the stated regions indicates that the final selling price offered to cassava traders was lower than the marketing costs they incurred to transport the commodity from the production areas to final market outlet which in most cases were very far. The reduction of these marketing costs could offer higher profit margins for the traders and hence encourage more entrants into the cassava market.

The average trader's surplus of cassava in the three regions (highest in Northern region-83.9%; Central region-20.6%; Southern region- 5.5%), indicated that the marketing of this commodity by traders is very efficient in the Northern region,

<sup>3</sup> Founded by dividing all marketing cost by 50kg

<sup>4</sup> Derived from assuming the cost of 1 tonne truck of cassava

slightly efficient in the Central region and very inefficient in the Southern region. In fact, traders in the north were getting supernormal profits. This is so because in the case of the Northern region, trader's surplus is above the accepted range of 20-30% while in the Central region, it is within the acceptable range of 20-30% and in the Southern region, it is below the accepted range of 20-30% of total cost in the absence of no value adding services.

## 5.2 Total Gross Marketing Margins (TGMM)

Total Gross Marketing Margin (TGMM)<sup>5</sup>, a measure of the final selling price captured by the agent in the marketing chain was calculated for the two periods 1998/99 and 1999/2000 season. In order to investigate how much of the final consumer price was captured by the cassava traders, TGMM was calculated using the farm gate and selling prices of cassava during these periods (Table 11)

**Table 11 Percentage Total Gross Marketing Margin of the Cassava Traders**

Region	Season	TGMM(%)
South	1998/99	33.2
	1999/2000	32.6
Central	1998/99	7.6
	1999/2000	31.6
North	1998/99	53.8
	1999/2000	62.7

The highest TGMM were observed in 1998/99 season (33.2%) in the Southern region whereas in the Central region, highest TGMM were found in 1999/2000 cropping season. Similarly, higher TGMM were also found in the same period in the northern region. The highest TGMMs in the northern region in the 1999/2000 season implies that this distribution channel was the most profitable to traders compared to the others in the similar period. This is also true for 1998/99 period when the highest TGMMs were found in the same region (53.8%). This agrees with our earlier finding that trader's surplus was highest in this region (83.9%).

## 6.0 Industrial Demand for cassava

It is clear that demand for fresh cassava is growing but it is not yet very clear whether there is any significant potential for cassava production in the region to penetrate the local industry. The uncertainty mainly lies in two factors. These are the existence of a larger number of competing products and the fact that the fresh market seems to be a much more lucrative option for the producers than selling dried cassava chips for the production of flour which is used in the industry for example.

In all the three countries, there are several industries, ranging from pharmaceuticals, animal feed production, alcohol, wood industries, biscuit and chips manufacturing, paper manufacturing, textile industries that in various quantities are using cassava as a raw material. However, as it has already been said, if we consider the wood industry for example, they have a choice between wheat flour and cassava flour as a binder. Likewise, for textile industry, where they use starch from wheat or maize grain or

<sup>5</sup> TGMM =  $\frac{\text{Consumer price} - \text{Farmer's price}}{\text{consumer price}} \times 100$

indeed starch from cassava but imported from other major cassava producing countries where the production of starch started longtime ago.

What we would like to do in this section is to examine the current status in terms of demand for various cassava products for use in the industry but also assess the competitiveness of locally produced products versus imported ones by considering prices of similar products from other countries. This assessment would actually assist policy makers in the design of appropriate strategies in the promotion of cassava production in the region.

### **6.1 Current status of industrial use of cassava products**

As it has already been indicated, in all the three countries, several industries are using cassava products. The cassava products are mainly cassava-dried chips, cassava flour, cassava starch, biscuits and chips (crisps). The cassava flour is however sold for both household consumption as well as industrial use. Table 12 below shows reported quantities of various cassava products that are currently used in Malawi and the potential demand for fresh as well as cassava products. Some cassava products are exported to overseas markets. For example, Mr. Hussen Mahommed of Chinakanaka Company exports an average of 1,00MT of cassava chips annually. The total quantity of cassava currently used for industrial uses and export translates to 0.60% of the total cassava produced in Malawi. The bulk of cassava produced is either processed at household level or sold on the fresh market for home consumption.

Table 12 Current status of the industrial use of cassava products in Malawi

Company	Product used	Current demand		Potential demand	
		Quantity used per annum (MT)	Quantities in fresh wt (MT)	Quantities of cassava products	Quantities of cassava in fresh wt (MT)
Packaging industries Malawi Ltd	Corn Starch	250	-	250	1250
David Whitehead & Sons	Cassava Flour	432	1440	1000	5000
Universal Industries	Cassava Flour	240	800	240	800
International Timbers Ltd	Wheat flour	60	-	60	200
Nzeru Radio	Corn starch	75	-	75	250
RAIPLY	Cassava flour	360	1200	400	1330
Press Bakeries	Wheat flour	9100	-	1820	6060
Mapanga furniture	Cassava flour	120	400	120	400
Chibuku Products	Corn flour	225	-	225	750
Rab Processors	Cassava flour	200	660	200	660
Bakemans	Cassava flour	160	530	160	530
Export-Rab Processors	Cassava chips	4000	11400	> 4000	>11400
Export-Transglobe	Cassava chips	-	-	670	2230
Export-Mohammed	Cassava chips	1000	2800	1000	2800
<b>Total</b>		<b>16222</b>	<b>19230</b>	<b>10220</b>	<b>33660</b>

Other than the industries mentioned above, there are several other potential users of cassava. These are the animal feed manufacturers who can use both the leaves and the roots, Grain and Milling for the production of flour and other millers, pharmaceutical companies, the chemical companies, paper industries, the hotel industry, food and the beverage industry.

### **6.2 Problems encountered by the Industry**

Similar figures as those from Malawi could be obtained from other two countries. However such organized data was not available. Despite the fact that demand for

industrial use of fresh cassava and its products is growing, several problems were reported from all the three countries.

- Generally the industries are faced with lack of reliable suppliers of the commodity as a major constraint. This mainly comes from the fact that the bulk of the producers only produce small quantities of cassava besides the fact that they are not organized. This affects planning of the operations in the industries.
- Pricing of the commodity is another problem encountered at all stages right from the producer to the consumer. The farmers, the middlemen and the industries have difficulties in determining the right price for the commodity. There is need to work out the cost of production of cassava and at which price it can be sold profitably or simply to the benefit of both parties.
- Almost all companies visited reported poor quality of cassava flour from the local farmers as a hindrance to using larger quantities of cassava. Besides the poor quality of cassava products, it was reported sometimes traders mix cassava flour with maize flour, which affects the quality required for the industry.
- The competition between the fresh market and the industrial demand for cassava is another major problem facing the industry. The fresh market is a very lucrative market for the producers. For example the price of fresh cassava in Malawi is about MK15 (20 cents) per kilogram on average while the average price of cassava chips, which is sold at about 20 cents per kilogram as well. It is therefore a big challenge to the industries to attract farmers to sell cassava chips or flour to them. The labour involved to process the cassava into chips or flour coupled with the unattractive prices limits the amount of cassava that could be grown for this purpose.

### **6.3 Potential for Industrial Utilisation of Cassava Products and Export**

Malawi like the majority of Sub-Saharan African countries is seeking avenues to diversify its economic base through the development and active promotion of industry clusters such as cotton, soybean, cassava etc. The cassava industry has the potential for income generation and job creation in rural areas (Nyirenda, 2001). Hence, it would support the Government's Poverty Alleviation Programme. Moreover, cassava related industries including starches, alcohol, pharmaceuticals, livestock feed, etc, would offer more opportunities for adding value. Although the market of cassava has been very turbulent, the Africa Growth Opportunity Act provides a window for the region to expand its cassava exports into the American market.

The greater challenge lies in how the stakeholders can re-organise the cassava industry to deliver to the US market cassava pellets at US\$80 per tonne and starch at US\$220 per tonne (These are the competitive prices). It would appear that when it comes to developing new international market opportunities cassava producing countries have to be considered *market takers* not *market makers*. At the same time any country that wants to enter into international markets should have a soundly based national market for cassava. The consumption of cassava products such as dried root, chips and pellets by the compound feed stuff industry could be further developed and sustained in the region.

For local industry to grow however, the major challenge is to have competitive prices for the cassava products. These prices have to be competitive when compared with other products from wheat, maize or imported cassava products. The table below tries to compile prices for the various products to assess the opportunity for our local industry to use more of locally produced products and hence stimulate more cassava production in the region.

**Table 13 Prices of various products for Comparison**

Starch					
Wheat grain	230 Tsh/kg	0.25 US\$/kg	Chips	80US\$MT cif Rotterdam 55 US\$MT transport cost	Tanzania
Maize Flour					
Wheat Flour					
Mod. Corn Starch					
Wheat flour					
Maize flour	MK30.00- MK40.00/kg				Malawi
Wheat flour	US\$400MT		Cassava flour	US\$187.50	Malawi.

## **7.0 Conclusions and Recommendations**

### **7.1 Conclusions**

#### ***Trends of production and consumption***

It is clear from this study that there has been a rapid increase in production as well as consumption of cassava and sweet potato in the region. Cassava and sweet potato have become important food and cash crops for a large number of households. Not only has production increased in the traditionally producing areas, but production has also extended to other areas where it is grown mainly as a cash crop. More important to note therefore is the expansion of cassava production as a cash crop. It can be concluded that the expansion of cassava and sweet potato production and supply on the market is demand driven and this demand is higher on the fresh market than for industrial use as noted from the fact that sweet potato has currently limited use in the industry in the three countries. It is true that persistent drought in the region and problems in soil fertility management have forced farmers to diversify out of maize. However, the major determinant of the 'boom' in cassava production is the manifested demand for fresh cassava from the urban centers. This increase in demand could be explained by rising levels of poverty in both rural and urban households, especially in Malawi and Zambia. As a result most households are looking for cheaper foodstuffs to replace what have become luxurious foods. This is why cassava has become a direct substitute of bread and not maize and when sweet potato is in season, it is sweet potato that takes the place of bread in the majority of households. What shows that cassava is not necessarily replacing maize as a staple is because cassava is mainly taken with tea at breakfast. It has been found out that the major form in which cassava or sweetpotato is consumed is fresh boiled roots, which are mainly taken at breakfast together with tea. This substitution of bread for cassava or sweet potato is taking place mainly within low or middle-income households, an indication that the relative prices between the two factors and the income constraint are the major determinants of this trend. Hence cassava largely remains a 'poor man's crop' but with a better image.

It has also been found out that consumers preferred sweet varieties of cassava and sweet potato with high dry matter content and low fiber content and those which cook faster. This indicates that consumers buy cassava and sweet potato mainly for fresh produce consumption. It was also learnt that very few consumers either store or process cassava or sweet potato despite citing the problem of seasonal supply of the produce on the market. Although cassava and sweet potato are mainly bought for fresh produce consumption, most consumers did not have any unique recipes they knew of or used when preparing cassava or sweet potato for consumption. The few who had some recipes mentioned the usual traditional methods of preparation, an indication that there was very little innovation. This shows that there is also room for improving consumption of cassava/sweet potato through development of various recipes to enhance acceptability, remove monotony and broaden the use

#### ***Level of domestic processing and linkage between producers and industrial processors***

It has been found out through this study that the level of domestic processing is not all that significant in the cassava supply chain. The simple processing reported amongst consumers and traders was mainly peeling and boiling cassava/sweetpotato or frying. Amongst producers, processing involved peeling, slicing and drying (makaka) or



soaking/fermenting and drying into cassava chips or pounding into flour, including boiling. This is common in areas where cassava is a staple food. However, cassava/sweet potato processing into various types of products for the market is not a common practice on the cassava food chain. Almost no processing of cassava at household-farm level exists in areas where the crop is grown mainly for the fresh market. Thus processing at domestic level has mainly been for storage purposes due to seasonal supply and perishability of the products but also to diversify the form in which the produce can be consumed. However, it has been found out that there are limited recipes in which cassava or sweet potato is prepared at household level. This means that there is significant room for exploring various ways and means to process cassava and sweet potato and this could be another avenue through which cassava and sweet potato can be commercialised and its trade and utilisation increased. The major constraints to processing reported has been lack of knowledge and lack of proper processing technologies. Fostering technological advances therefore in form of means and ways by which households could domestically process the roots would shed breakthroughs towards significant increases in consumption of sweet potato and cassava.

It has also been learnt through this study that there are a number of industries that are using cassava as a raw material. However, little cassava penetrates the industry despite the fact that demand for industrial use is increasing. For instance, the total quantity of cassava currently used for industrial processes and export translates to 0.60% of the total cassava produced in Malawi. The bulk of cassava produced is either processed at household level or sold on the fresh market for home consumption. In fact fresh market expansion is a constraint to industrial processing. Given the high operational costs involved in the processing of cassava and the already relatively high prices on the fresh market, production for the industry is therefore a big challenge unless the industry is willing to offer competitive prices. It has been found out that it is more lucrative to grow cassava for fresh market than selling processed products of cassava. This means that in areas where cassava is largely grown for the fresh market, unless the industrial processors are prepared to offer competitive prices, industrial processing of cassava in these areas will remain negligible. However in areas where farmers traditionally grow cassava for both fresh and as staple, it has been noticed that the fresh market is less dynamic and that the possibility of linking the farmers with industrial processors is higher. However, linkages between farmers and industrial processors are very weak. If farmers were linked to processors through contract farming for example, this would ensure a steady market for the processors and a steady supply of the raw materials of a defined quality.

On the other hand, contract farming can only succeed where farmers themselves are organized. Only in very few cases were farmers organized. For example, in Malawi, it is only farmers around RAIPLY and some farmers in Mulanje who have been organized into associations through NASFAM.

#### ***Marketing channels and price determination***

There are various players in the cassava/sweet potato marketing chain ranging from producers, traders (wholesalers/middlemen, retailers), transporters to consumers. Cassava or sweet potato product moves in the same order; from producers to traders and to consumers with transporters facilitating this movement. It is through this channel that price transmission takes place. It has been found out from this study that pricing of cassava and sweet potato is very subjective and with a certain level of

bargaining for both quantities involved and price. Several prices are fixed on the product as it changes hands amongst different players in the food chain and at each level a mark-up price is charged. No clear standards are set but the most important ones are size of tubers, tuber grade, farm gate price, and to a lesser extent, variety, freshness and colour of tubers. Though this is the case, it has been indicated that the middleman has the biggest voice on issues of price. The middleman would prefer to have the largest volumes of produce possible at the lowest possible price when they are buying cassava from the farmers. The next price that these middlemen fix is dependent on the buying price from farmers, cost of lifting/loading and transportation cost with a mark-up as profit. In most cases farmers have been reported to be price takers. Therefore, it is only through associations or through the development of cooperatives that farmers could have a bigger bargaining power. It has been found out that all other players in the marketing chain do not have much bargaining power compared to the middleman. Organizing all groups in the marketing channel into associations with legal power would be the only way to fight against scrupulous behavior of the middlemen who would like to obtain supernormal profits from their business. It has been found out that it is mainly middlemen, who would often also operate retail selling of the same produce, that buy cassava/sweet potato from farmers and sell the produce in the urban centers.

It has also been found out that cassava market exists almost through out the season while sweet potato is seasonal. However, both cassava and sweet potato prices seem to be supply driven than demand driven. As is the case with other agricultural products, highest prices of cassava and sweet potato are obtained at the beginning of the season when supply is low and prices are lowest in the middle of the season when supply is at its peak and they began to pick up again towards the end of the season. It was found out that traders or farmers do not necessarily take advantage of this price behavior because cassava and sweet potato produce is highly perishable such that it cannot be stored for long in its fresh form.

It has also been revealed through this study that grading at all levels improved the price at which the product was sold within the product chain. Grading was mainly done according to size of the roots and degree of root damage.

### ***Production costs and margins***

Although data was not available from other countries, it has been observed that cassava and sweet potato have much lower production costs compared to crops like maize, which require more expensive inputs like fertiliser. It has also been observed that farmers who sold their produce directly to consumers obtained highest gross margins whilst those using intermediaries obtained the lowest. However there were no significant differences in gross margins obtained between those farmers selling fresh products and those selling processed products. In addition, since gross margin is a function of yield, price of produce and costs of production, highest gross margins have been realised where the prices were better off and the cost of labour was lowest.

### ***Market information***

It has been found out that there is no formal supply of market information to traders. No government agency reported to provide market information for cassava and sweet potato. Traders have been relying on "social networks" i.e. friends, relatives and fellow businessmen as the major sources of market information, but also on personal observations. It is clear therefore that amongst the services that need to be developed with the aim of enhancing marketing efficiency of roots and tubers is that of

information collection and dissemination. However, not many traders complained about the amount of information and they were rather contented that the information is adequate. This may be accepted considering that the traders are small and operate within markets very well known to them.

### ***Marketing margins and marketing efficiency***

It has been found out that there isn't sufficient data on which to draw conclusions regarding whether the current cassava and sweet potato market is efficient or not in the three countries. Based on the available information, it is difficult to make inferences for other countries.

## **7.2 Recommendations**

There are several lessons that have been learnt through this study on cassava and sweet potato marketing in Malawi, Tanzania and Zambia. However, we shall concentrate on the major issues that require a re-examination of the strategies if cassava/sweet potato production is to play a major role in poverty alleviation and industrial development in the region.

- It is evident that it is a big challenge for the industry to attract producers away from the fresh market where prices are higher and no major processing costs are incurred. Since the fresh market mainly needs sweet varieties and that the industry can use both sweet and bitter varieties, it could be recommended that both of these markets should be promoted in parallel in such a way that there is no competition between them. In areas where farmers are growing cassava mainly for fresh market, they should be left to pursue this path. Farmers should be provided with the sweet varieties with characteristics that are expressed by consumers. On the other hand, in areas where there is potential for both the fresh and market and the industry, both bitter and sweet varieties should be promoted and farmers will have a choice. But for farmers to be attracted to the bitter varieties targeting the industry, these bitter varieties should have a higher root yield. The high yield will therefore compensate the lower prices that are offered by the industrial processors. Furthermore, if producers are linked to an ensured market, which might not be as easy on the fresh market, they will be induced to grow more for this niche market.
- Through collaborative efforts by SARRNET and organizations such as NASFAM, there should be lobbying campaigns to link farmers to industrial processors through a contract farming approach. This would firstly ensure a steady market for the producers that would induce more production. But secondly, since there will be a certain relationship developed between the two groups, farmers will be committed to offer a steady supply but the processors will also be in a better position to define the standards required which the producers have to satisfy.
- Given the unequal powers that are manifested through the interaction between the different players on the market, it is only through organizing the various interest groups can a fair game be ensured. Therefore, SARRNET should facilitate the formation of farmer organizations that would be in a position to voice out their concerns in the way the middlemen operate for example. In short, there is a need to develop cooperative type of organizations at each level of the product chain so that each interest group can speak with the same voice

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about its grievances than each individual trying to do so alone where success may not be ensured.

- It has also been revealed through this study that grading at all levels (although difficult at farm gate because of the pricing system) improves the price since the farmers are more willing to pay a higher price when the choice process is simplified. Furthermore, it has been learnt that pricing is very subjective. If the various participants on the market were organized, they would be able to define the rules of the game and operate as one. Therefore, issues like grades and standards would be easier to determine in organized market. Hence farmers would know the level of price in advance if they know the grade of their produce. A system should therefore be developed to assist participants on the cassava market to define the grades and standards of the produce.
- The supply of timely and reliable information is key to the success of any agribusiness. It has been learnt through this study that the main source of information about the market is mainly the participants themselves on the product chain. It is recommended that a deliberate Marketing Information System (MIS) for cassava should be established which can ensure that operators on the market make more rational marketing decisions. This would ultimately lead to a more efficient market where each agent benefits.

## Appendices

### Appendix 1

Table 14 Cassava and Sweet potato area and production in Malawi

Year	Cassava			Sweet potato		
	Area (ha)	Production (t)	Yield (t/ha)	Area (ha)	Production (t)	Yield (t/ha)
1986/87	64875	169403	2.611	28977	129195	4.459
1987/88	61780	134785	2.182	28517	101974	3.576
1988/89	72823	154762	2.125	43823	177424	4.049
1989/90	61506	144760	2.354	29839	94911	3.181
1990/91	71619	167818	2.342	48384	176999	3.658
1991/92	63965	128827	2.014	19886	43074	2.166
1992/93	75050	216005	2.878	36846	210572	5.715
1993/94	72149	250066	3.466	37151	165322	4.450
1994/95	94651	328524	3.471	60701	317705	5.234
1995/96	116523	534549	4.587	68804	596469	8.669
1996/97	108478	706422	6.512	70908	900485	12.699
1997/98	152876	834775	5.460	138709	1447994	10.592

## Appendix 2.

### Production Cost and Margins calculated in Zambia.

#### Sweet potatoes

In general, the production of sweet potatoes does not require chemical fertilizers. This eliminates a major input cost elements and significantly brings down the total production costs. The other input cost element - that of planting material - is quite insignificant. This is because in areas where the crop is traditionally grown, farmers rarely incur planting material costs because they either produce the planting material themselves (from previous year crop) or friends and relatives give them.

The production cost element of sweet potato is therefore largely labour. The average cost of labour per 25kg bag of sweet potato is USD 0.09<sup>6</sup>. With the farm gate price for a 25kg bag at USD 1.2 and 10% additional costs (packaging etc.) - bringing the cost to USD 0.21, the farmer's gross margin is USD 0.99, representing 83 % profit on sales.

#### *Sweet potato distributive costs and margins*

Sometimes the farmer takes on some distributive role and sales outside the farm gate. In that case, he incurs additional costs. The major distributive cost is transportation. The cost of transporting a 25kg bag over a distance of 10km is about USD 0.04. Thus if a farmer in North Western Province decides to sale his produce in Lusaka (about 500km) he spends USD 2.00 per 25kg bag. If he sales his product at USD4.20 per 25kg in Lusaka, he makes a gross margin of USD 1.99. This is 47% gross profit on sales. The selling price of USD4.2 per 25kg is the retail price to the final consumer. In this case the farmer will be using the direct channel (producer to final consumer with no marketing intermediaries). When the farmer sales to middlemen, the average price is typically USD3.00. His gross profit margin will be USD 0.79. This is 26% gross profit on sales.

Middlemen buy in bulk and sale in smaller quantities to retailers. The average wholesale price for a 25kg bag is USD 3.80. Thus a wholesaler (middleman) will have a mark-up<sup>7</sup> of 27%. The trader buys a 25kg bag from the wholesaler at USD3.8 and sell at the retail price of USD 4.20. Thus his mark-up<sup>2</sup> is 10.5%.

**Table 47: Sweet Potato Producer Cost and Margin**

	Cost (USD/25kg)		Selling Price (USD/25kg)	Margin (USD/25kg)	% Margin
Producer/Farmer	Labour	0.09	1.20 (farm gate, no transport cost)	1.99	47.4
	Other	0.12			
	Transport (500km)	2.00			
	Total	2.21			

<sup>6</sup> Calculated from the following figures: the cost of labour per ha is USD 48. The average yield of sweet potatoes is 13,000kg per ha.

<sup>7</sup> The mark-up is profit expressed as a percentage of purchase price.

**Table 15: Sweet Potato Middleman Margin**

	Cost (USD/25kg)	Selling Price (USD/25kg)	Margin (USD/25kg)	% Mark-up
Middleman	3.00	3.38	0.8	26.7

**Table 16: Sweet Potato Retailer Margin**

	Cost (USD/25kg)	Selling Price (USD/25kg)	Margin (USD/25kg)	Mark-up
Retailer	3.38	4.20	0.4	10.5
Consumer	4.20			

These are the typical average seasonal margins. It must be noted that within a given marketing season, losses are not uncommon. These occur during periods of oversupply. In general, however, growing and marketing sweet potato is a profitable enterprise.

### Cassava

The production cost structure of cassava is similar to that of sweet potato. Just like sweet potato, cassava is grown without the use of fertilizers. This eliminates the cost of fertilizer from the total production cost. In the study, some farmers bought planting materials but the majority used their own cuttings. The cost of cuttings required to produce a 50kg bag of fresh cassava is about USD 0.01<sup>8</sup>. The cost of labour needed to produce a 50kg bag of fresh cassava is USD 0.12<sup>9</sup>. The cost of producing a 50kg bag of fresh cassava is therefore as follows:

Labour (USD):	0.12
Cuttings (USD):	0.01
Other (USD):	0.32
Total (USD):	0.45

Fresh cassava is mostly sold to final consumers within the area of production. At an average farm gate price of USD 3.95 per 50kg bag, the producer margin is as follows:

**Table 17: Fresh Cassava Producer Margin**

Farm gate selling price	Total costs	Profit Margin	Profit Margin as % of sales
USD 3.95	USD 0.45	USD 3.50	88.6

What this shows is that the farmer who sales his fresh cassava locally can achieve an incredible profit margin of 88%.

The cost of transporting a 50kg bag of fresh cassava over a distance of 10km is approximately USD0.08. This cost element will determine the selling price of fresh

<sup>8</sup> Assuming that a 50kg-volume bag of cuttings can plant an area of 300m<sup>2</sup> and costs USD 0.14

<sup>9</sup> Calculated from the following figures: the cost of labour per ha is USD 48. The average yield of sweet potatoes is 20,000kg per ha.

cassava when it is sold outside the farm gate. In the survey, the average selling price away from the farm gate was USD4.10, with a high of USD 10.30.

Processed cassava attracts a much more higher price than fresh cassava. The average farm gate price of chips was USD 4.38 whilst that of flour was USD 4.47. Farmers incur minimal processing costs (which they could not estimate accurately in the survey perhaps because they do the work domestically using own labour and equipment). If processing costs are estimated at 10% of production cost, the margins are as follows:

Table 18: Cassava Chip Producer Margin

Farm gate selling price (chips)	Total costs	Profit Margin	Profit Margin as % of sales
USD 4.38	USD 0.50	USD 3.88	88.6

A middleman who buys a 50kg bag of fresh tubers at USD 3.95<sup>10</sup> and then sales it to a retailer at USD 4.50 achieves a mark-up of about 12%. The typical retail price of a 50kg bag of fresh cassava is USD 4.70 (it can be as high as USD14.00). Thus the retailer puts a mark-up of USD 4.4%.

When a middleman buys chips at USD 4.38 and sales it at USD5.00, his mark-up is 14.2%. The retailer's mark-up is 19% and sales the chips to the final consumer at USD 5.95 per 50kg bag.

When it comes to flour, the middleman buys a 50kg bag at USD5.51 and sales it to a trader at USD6.09. His mark-up is 10.5%. When the trader sales the same bag at USD 6.60, his mark-up is 8.3%.

This analysis shows that for marketing intermediaries – particularly retailers - it is less lucrative dealing in fresh cassava.

<sup>10</sup> Please note that actual cost will depend on the distance from the point of production. This cost has been shown to be USD0.08 per 50kg bag per 10 km.