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Southern African Root Crops Research Network

(SARRNET)

Applying a Sub-sector Analysis Approach to Studying the Marketing of Cassava and Sweetpotato in Southern Africa: The Case Of Malawi

Main Survey Report

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Acronyms

EPA	Extension Planning Area
ESARRN	Eastern and Southern Africa Root Crops Research Network
FEWS	Farming Early Warning System
GDP	Gross Domestic product
GOM	Government of Malawi
IITA	International Institute of Tropical Agriculture
MPRS	Malawi Poverty Reduction Strategy Paper
NASFAM	National Smallholder Farmers Association of Malawi
OPC	Office of President and Cabinet
SADC	Southern African Development Committee

Executive summary

This report is a synthesis of a three-phased sub-sector analysis study on marketing of cassava and sweetpotato conducted in Malawi over a period of two years; 2001-2002. The study was regional in coverage involving two other countries, Tanzania and Zambia. The three phases encompassed literature review, qualitative study and quantitative study. The study was conducted in all the three regions of Malawi covering major cassava and sweetpotato production and marketing sites.

The general objective of the study was to understand the structure and performance of cassava and sweetpotato markets in Malawi. Cassava and sweetpotato are now important crops in Malawi in terms of area planted and their contribution to food requirements. The crops are now receiving greater attention in Malawi because of their tolerant to drought and their ability to do well in variable environments without much input requirement. However, 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.

It has been found out from the study that both production and consumption of cassava and sweetpotato have increased in the recent years. Cassava and sweetpotato production has expanded even in non-traditional growing areas. In these, the major reason for expansion in production has been increase in demand on the fresh market. For a higher percentage of farmers, food and cash were the major reasons for growing cassava and sweet potato. In non-traditional cassava growing areas, 99% of the farmers sold their cassava. Cassava and sweetpotato have therefore become important cash crops for the majority of farmers.

Cassava and sweet potato are consumed in different ways but the most common form of consumption is fresh boiled roots, as a snack. The major complement is tea during breakfast. This is why cassava and sweetpotato have been found to be substitutes for bread and other foodstuffs normally taken during breakfast.

The varieties of cassava and sweetpotato preferred are those with good taste, high dry matter content and low fiber content and takes less time to cook all of which imply that these crops are mainly consumed in their fresh form, without major processing.

The level of domestic processing is not all that significant except in areas where cassava is a staple food. Processing at domestic level is done mainly to change the form in which the product is consumed and to increase shelf life, although it has also been found out that there are limited recipes in which cassava and sweetpotato are consumed. Producers and traders mainly target the fresh cassava market other than the processing industries. The major reason for this is the differences in price of fresh and processed cassava products. It was found out that the prices obtained at the fresh market are lucrative than those obtained from industrial processors considering that processing requires time and labour, hence no incentive to sell processed products. The linkage between industrial processors and producers is also very weak and in most areas, it is non-existent.

There are various players in the cassava/sweetpotato marketing chain ranging from producers, traders, transporters to consumers. However it has been found out that the pricing of cassava and sweetpotato is very subjective and the middleman has an upper hand in determining the price at the next level of trade as the product changes hands.

It is believed that formation of associations at different levels of the supply chain would assist in regulating the price of cassava and sweetpotato.

Although market information is very important in any business for the players to make informed decisions, it has been found out that players in the cassava and sweetpotato marketing chain mainly rely on "social networks" and personal observations for information.

While traders were optimistic that they satisfy the domestic market, they indicated ignorance of external market for cassava and sweetpotato. It was learnt that regional/external trade could only develop if more industries are involved in processing cassava into other forms so that it competes well on the international market.

1.0 Introduction and Background

This report is a synthesis of a three-phased cassava and sweet potato marketing study conducted in Malawi over a period of two years; 2001-2002. The three phases comprised of literature review, qualitative assessment and quantitative study. The study was regional in coverage involving two other countries, Tanzania and Zambia.

1.1 Objectives of the study:

1. To carry out comprehensive literature reviews to understand current production trends of cassava and sweet potato as well as identify information gaps before collecting field level data.
2. To understand the dynamics of the cassava and sweetpotato markets by characterising the producers, the rural market wholesalers, transporters and the retailers. This also considered seasonal variations of product demand and supply determination in respect to seasonal price variations.
3. To assess consumer perception and preferences of the different forms of cassava and sweetpotato 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 sweetpotato
4. To study the current linkages between farmers and industrial processors of cassava (e.g. contract farming etc) and assess mutual benefits from these arrangements.
5. To study the different marketing channels for cassava and sweetpotato and determine the marketing margins and market efficiency.
6. To study opportunities for and constraints to the development of regional trade for processed cassava products.
7. To study the factors that determine the adoption of cassava and sweetpotato in the predominantly maize-based farming systems.

Key hypothesis

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 economy to assess the current role that cassava and sweet potato play 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

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.

In the Southern Region, the study was done in Zomba district for sweet potato and Mulanje for cassava. This was specifically in Malosa and Namwera areas for sweet potato and Mulanje South EPA for cassava. All these are important cassava and sweet potato growing areas in Malawi

In Central Region, the study was carried out in Dedza district (Thiwi-Lifidzi RDP), mainly around Chimbiya area which is a cassava growing area. For sweet potato, data was collected around Bunda-Mitundu area which is the main production area of the crop. And finally in the north, the study was conducted in Nkhata bay (Chintheche EPA) for cassava and Mzimba district for sweet potato (Map 1). 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, data was collected from Zomba main market, and Malosa/Namwera turn-off market. In the central region, there were several active markets. These were Chimbiya market, Mitundu, Kawale and the Lilongwe central market. In the north, data was collected from Nkhata bay market, Mzuzu market and Mzimba boma market. Consumers around these major market outlets were also interviewed to get their views on various aspects of production, utilisation and market trend of the product. This information was supplemented by information from the Ministry of Agriculture and Irrigation more particularly from the Department of Agricultural Research and Technical Services. This type of information supplemented the field level data and literature review to better understand the roots and tubers sub-sector.

In addition, information was also collected from the major food processing companies and the textile industry to assess the potential role that these crops could play in these industries. In line with this, assessment of the regional markets was carried out for the processed products of cassava.

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.

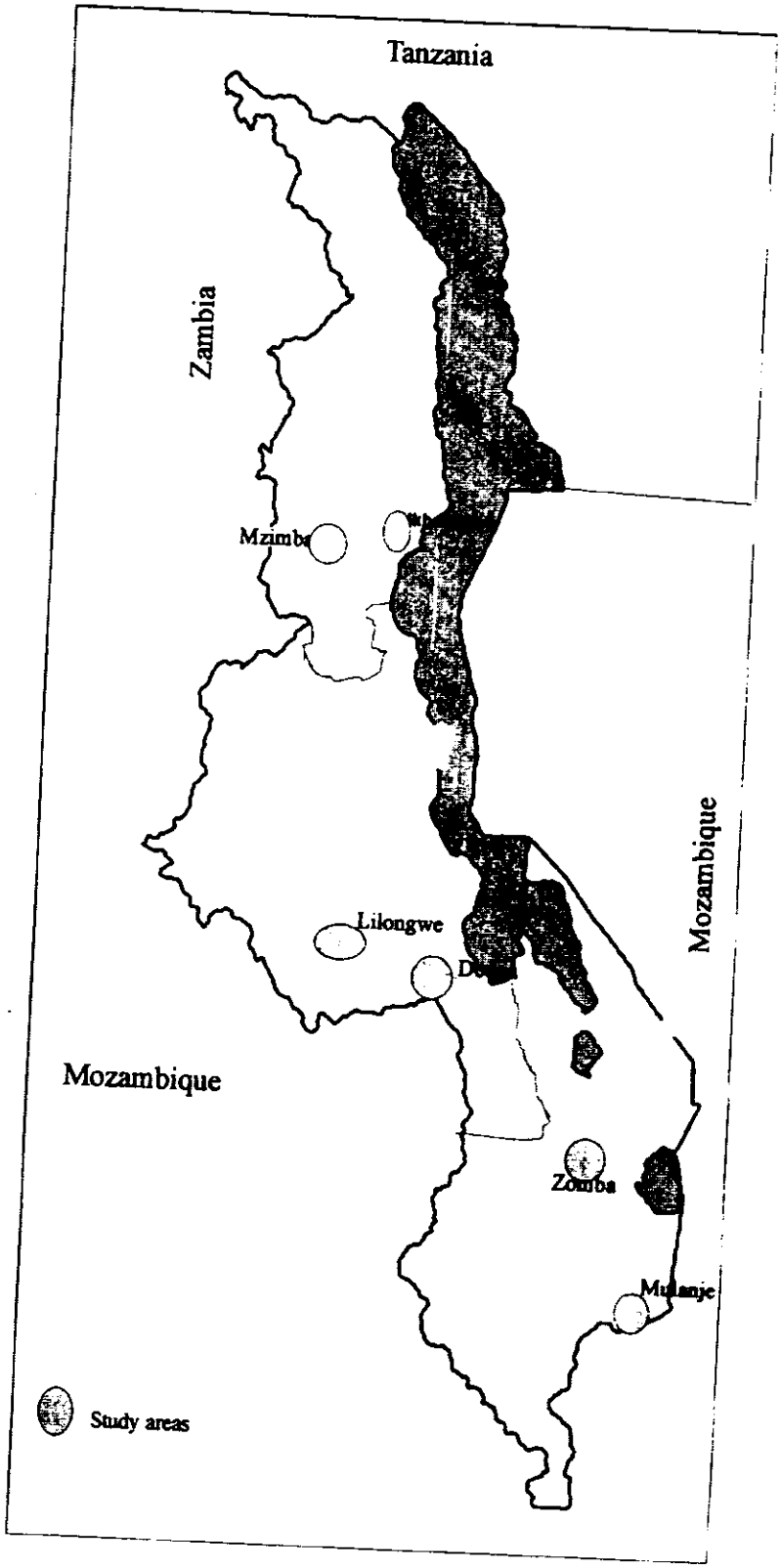
To measure the quantities of fresh cassava entering into the City of Lilongwe, two separate enumerators were employed.

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 were visited 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 questionnaires. A total number of 160 consumers, 160 traders and 360 producers were interviewed.

Map 1. Study areas for cassava and sweet potato sub-sector studies



2.0 Economic and Social Trends

2.1 The economy

Malawi is a land-locked country in Southern Africa, sharing a common border with Tanzania in the North and Northeast, Zambia in the West and Mozambique in the East, South and South West. It has a total land area of 11.8 million ha, of which 9.4 million ha is land and 2.4 million ha is water (Saka et al, 1995). Malawi ranks among the World's least developed countries. The economy is predominantly agricultural, with about 90% of the population living in rural areas. Agriculture accounts for 37% of GDP and 85% of export revenues. The economy also depends on substantial inflows of economic assistance from donors.

Malawi has been facing declining social and economic trends evidenced by slow economic growth, high inflation, declining domestic capacity to produce sufficient amounts of goods and services required in the country and deepening of poverty. In addition fiscal imbalances have also recurred and led to high interest rates, domestic debt and interest payments that have negatively affected the economy.

The real GDP growth slowed down from 13.8% in 1995 to 2.0% in 2000 and to 1.5% in 2001, and real per capita GDP decreased from 10.7% to –0.8% over the same period. This is attributed to contraction in the agriculture and manufacturing sectors, which account for a large share of GDP, owing to unfavourable weather conditions, low domestic demand, stiff competition from imported goods and macroeconomic instability. Basically, most sectors of the economy had declining growth rates; for instance, manufacturing sector declined by 14.2% in 2001 over a decline of 3% in 2000, utility sector decreased by 3.5% in 2001 as opposed to an increase of 10.2% in 2000, distribution sector declined by 1.9%, while the agriculture sector marginally increased by 1.1% down from 5.4% in 2000. Although the average annual rate of inflation sharply decreased from 83.3% in 1995 to 29.6% in 2000, inflation remained very high. The average annual inflation grew by 27.2% in 2001, which was the same rate as 29.5% for 2000. The domestic capacity to produce goods and services in the economy deteriorated significantly while poverty remains widespread in the country, with more than half of the population living below poverty line. In order to resolve these problems, the macroeconomic framework for the 2001/2002 fiscal year focussed on the need to attain and maintain macro-economic stability as a prerequisite for growth and a foundation for poverty reduction. To this end, the main objectives of macroeconomic framework were: to increase real GDP growth to 2.3% in 2001 and 7.5% in 2002; and to maintain relative stability in the exchange rate during the fiscal year. In addition, the framework aimed at stimulating and revitalising commerce and industry.

Poverty remains widespread in Malawi in spite of many efforts by Government, NGOs and the civil society to fight against it. The profile of poverty 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 headcount estimates show that 65.3% of the Malawian population were living in poverty in 1998. The incidence of poverty was higher in rural areas where 66.5% of the rural population and 54.9% of the urban population lived in poverty. In order to achieve meaningful poverty reduction, the Government developed the Malawi Poverty Reduction Strategy Paper (MPRS) through a consultative process that will form the basis for all future interventions for addressing poverty. Its overall

goal is to achieve sustainable poverty reduction through empowerment of the poor. The main strategic components of the paper are sustainable pro-poor economic growth, human capital development, improving the quality of life of the most vulnerable and good governance.

2.2 Foreign Trade

Malawi remains a net importer with SADC and a net exporter with EU. In 2000 and 2001, the trade deficit with SADC rose to K12, 265.31 million and K15, 051.8 million respectively. Trade with EU registered a surplus of K1275.02 in 2000 and a surplus of K5,337.5 in 2001. In general, the trade balance was –898.2 million Kwacha in 2001 compared to –3489.0 million Kwacha in 2000.

Agricultural products continued to remain Malawi's major domestic exports in 2001, with tobacco representing about 60% of total exports followed by a 9% contribution of tea and sugar. Other commodities comprised of only 0.2% of total exports in 2001.

Malawi is undertaking major reforms in trade. She entered into the COMESA Free Trade Area (FTA) after abolishing her tariffs and gazetting zero tariff under this regime. Malawi has also been designated as an Africa Growth and Opportunity Act (AGOA) beneficiary on 1st October 2000. The Act offers free access to manufacturing products originating from sub-Saharan countries. Malawi as a least developed country enjoys the benefits under the European Union's "Everything But Arms" (EBA) initiative.

2.3 Population developments

Malawi's population was estimated at about 10.2 million in 2000 with a growth rate of 1.9% per year. These estimates are taking into account the effects of excess mortality due to AIDS. The effect of AIDS has actually resulted into lower life expectancy, higher infant mortality and death rates, and hence lower population growth rates. The average population density was estimated at 83 persons per square kilometre in 1995. The 2000 population estimates are also showing that about 45% of the population is under 15 years of age, 52% are between 15-64 years and 3% are 65 years and over. More persons in the rural areas are economically active as compared to the urban areas. This could be attributed to the fact that more Malawians are based in the rural areas due to agricultural activities taking place in the rural areas. More females are economically active than males which could be due to programme of Women in Development which is empowering women to be economically independent. About 83% of the economically active persons are employed in the agricultural industry while wholesale and retail trade industry employed 6% of the economically active persons.

3.0 Agriculture production

Agriculture is the mainstay of Malawi's economy accounting for 37% of the GDP and 85% of the export revenues. About 90% of the total population resides in the rural areas and derive their livelihood mainly from farming (MG, OPC, 1994). The agricultural sector accounts for 80% of total labour force. In 2001, the agriculture industry employed about 83% of the economically active persons compared to wholesale and retail industry that employed 6%.

Malawi's agricultural economy is characterised by a dual structure consisting of the smallholder sub-sector, which accounts for almost three quarters of marketed output, and the estate sub-sector. These have been distinguished on the basis of legal and institutional rules regulating land tenure, crop production and, marketing arrangements. The estate sub-sector is based on leasehold tenure, while the smallholder sub-sector is based on customary land tenure. The smallholder sub-sector is primarily subsistence oriented and provides the bulk of food production. However, small land holdings, low productivity, high costs of inputs relative to price received for outputs, erratic rainfall and low levels of income in farm employment are among the factors that affect the sector's ability to feed the population and meet human needs.

3.1 Food production

Maize is the staple food crop grown on more than 70% of the cultivated area. Other food crops include rice, cassava, sweetpotato, sorghum and millet. However, maize production has been on the decline in the past decade. Factors contributing to this have been limited access to improved farm inputs, such as fertiliser and seed and prolonged dry spells. For instance, maize production declined from 2.0 million tonnes in 1992/1993 to 1.6 million tonnes in 2001/2002. Table 1 below presents production trend of major crops in Malawi. While most crops experienced a decline in production during the period under consideration, the roots and tubers registered remarkable growth in production. For instance, cassava production increased from 216,005 tonnes in 1993 to 3,464,300 tonnes in 2001/2002 while sweet potato increased from 210,572 tonnes to 2,990,100 tonnes over the same period. The increase in production of cassava and sweetpotato is attributed to Government policy towards crop diversification and promotion of drought tolerant crops. It is estimated that in 1998, these two crops represented, in maize equivalents, 35% of total food production. Table 2 presents the crops contribution to the food balance sheet in 2000/2001. Similarly cassava and sweetpotato's share to GDP has been increasing. Cassava's share to GDP was 6.1% in 2000 and rose to 7.2% in 2001. Sweet potatoes share to GDP was 7.6% in 2000 and rose to 9.5% in 2001.

Table1. Final smallholder crop production estimates for major crops 1993-2002

Crop	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Maize	2,033,967	818,999	1,327,865	1,793,461	1,226,476	1,534,326	2,245,824	2,211,859	1,899,185	1,625,98
Paddy rice	62498	35797	68862	72,629	65,690	68,802	92,859	67,084	93,200	94,445
G/nuts	39005	24653	23922	40,327	68,718	97,228	124,604	116,363	155,200	166,700
Tobacco	26975	15507	35307	68,978	83,567	94,063	84,555	98,614	82,500	85,800
Cotton	46339	17014	25197	82,591	45,122	36,336	50,589	34,907	37,600	40,300
Sorghum	21591	16667	19290	54,710	39,514	41,473	41,401	36,799	36,900	37,800
Millet	15228	9711	13259	20,262	16,424	19,638	20,224	19,508	20,400	20,510
Pulses	84146	77779	99772	183,094	179,226	208,859	233,811	248,243	303,800	298,400
Cassava	216005	250056	328424	534,549	713,556	829,821	895,420	2,757,186	3,362,400	3,464,30
Sweet potatoes	210572	165322	317714	596,469	858,129	1,432,383	1,680,313	1,634,268	2,586,900	2,990,10

Source: Farming Early Warning Systems (FEWS).

Table 2. Food Balance Sheet: 2000-2001

	Maize	Rice	Sorghum	Wheat	Cassava	Sweetpotato	Irish potato	Maize equivalents
A. Net production	2093054	45139	32949	1951	677646	885075	109877	
Gross production	2462417	72805	36610	2168	752940	1966833	169041	
Post-harvest losses (%)	15.0	38.0	10.0	10.0	10.0	55.0	35.0	
B. Stocks	186369	0	0	0	0	0	0	
On-farm stocks (mt)	0	0	0	0	0	0	0	
Official stocks (mt)	19894	0	0	0	0	0	0	
SGR stocks (mt)	166475	0	0	0	0	0	0	
C. Domestic availability	2279423	45139	32949	1951	677646	885075	109877	
D. Kilocalories/kg	3450	3660	3430	3400	3180	1090	750	
E. Domestic availability (ME)	2279423	47887	32758	1923	624613	279632	23886	3290122
F. Total utilisation	23825	2546	1372	126	0	0	2609	2428
Food use								2398489
Seed requirement	23825	2400	1380	128	0	0	12000	
Seed requirement (ME)	23825	2546	1372	126	0	0	2609	30478
SGR Replenishment								
Projected Exports								
Projected exports (ME)								
G. Net import requirement								861, 156
H. Projected commercial imports	0	0	0	0	0	0	0	0
I. Projected	0	0	0	0	0	0	0	0

commercial imports (ME)								
J. Projected food aid imports	0	0	0	0	0	0	0	0
K. Projected food aid imports (ME)	0	0	0	0	0	0	0	0
L. Food Balance								861156

Projected population =10304839
Cassava production in dry weight

3.2 Food security status

Food security in Malawi is synonymous with maize. An Integrated Household Survey conducted by the National Statistics Office in 1997/98 showed that maize contributed about 73% of the total kilocalorie intake in Malawi. However, maize production has been on the decline and for two consecutive years, Malawi has experienced severe food shortages. During the 2000/01 growing season, the country registered a food deficit of 400,000 tonnes due to floods and limited availability of inputs. The food situation worsened again in the 2001/02 growing season due to floods, dry spells in certain parts of the country, lack of inputs and the fact that maize was also eaten green whilst in the field. Consequently, the country has been estimated to experience a maize deficit of about 700,00 tonnes. In February 2002, Malawi was declared a food disaster nation. The situation became critical between the months of January and March when about 78% of farming families (a total of 2.27 million) were without food.

3.3 Cash crop production

The main cash crops are tobacco, tea, sugar, and to a lesser extent are cotton, rice, coffee, g,nuts and pulses. Tobacco is the major export crop accounting for 60.4% of domestic exports. Earnings from tobacco amounted to K17.0 billion in 2001 from K14.7 billion in 2000, while in terms of volume, tobacco exports increased by 2.1% at the same time. The second most important export crops are tea and sugar accounting for 8.3 and 8.2% of domestic exports respectively. Rice, coffee, and pulses made the smallest contribution to the domestic exports of 0.3, 0.9 and 0.2 respectively. Most of these crops are grown by both smallholder and estate farmers.

4.0 Cassava and sweetpotato production, marketing and consumption

Maize is the major food crop for most of Southern African countries. The problem of food security has been for many years analysed in relation to maize. Very little emphasis has been put on promoting other food crops such as cassava, sweet potato and rice in order to diversify the food basket. As a result, for the majority of households, cassava and sweet potato have been used as snacks, while rice has been considered a status food only eaten during festivities or eaten on Sundays for the better-off households. However, because of the high variability in maize production since the mid-1980s due to persistent drought in the region and the effects of structural adjustments as well as problems for the majority of smallholder farmers in accessing credit, it has been necessary to diversify out of maize. Consequently, the promotion of other crops such as cassava and sweet potato has become a necessity.

Cassava and sweet potato are now important food crops in the SADC countries, in terms of area planted and contribution to food requirements. The advantages of cassava and sweet potato are well documented: tolerance to drought, low demands on soil nutrients, capacity of providing reasonable yields in different agro-ecological zones and seasons where other crops would fail, low requirements for external inputs like fertilisers, flexibility in planting and harvesting, convenient in-ground storability, and reduction in soil erosion. Although the roots 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 and sweet potato 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 ten important tropical crops. Sweet potato takes about four months to mature and requires less moisture compared to maize. Two crops of sweet potato can be grown per year if sufficient residual moisture is available.

Despite the large number of advantages cassava and sweet potato 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) crop, highly perishable commodities 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 these two crops in the region. SARRNET Phase 1 put emphasis on changing this false image and perception of these crops in the region by carrying out baseline studies to provide baseline data on the role of cassava and sweet potato in the food systems in the SADC countries. Over the years, both hectarage and production levels of these crops have significantly increased. These crops are now contributing 25-60% of national food balance sheet in some SARRNET countries.

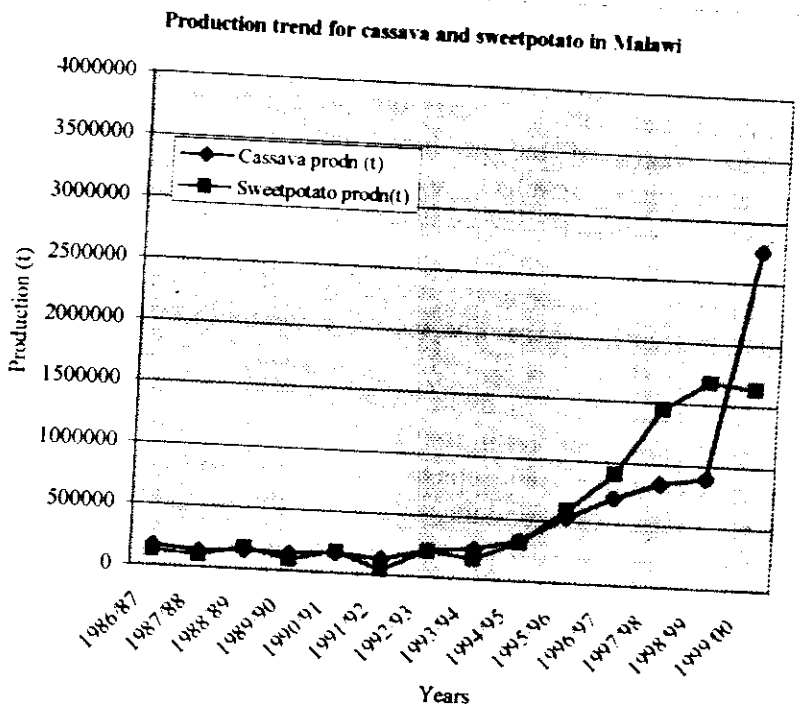
Cassava is a staple food for more than 30% of the Malawian population. When consumers were asked to rank the main food crops, cassava ranked second or third after maize and rice depending on the region. However, cassava ranked first along the lakeshore areas of NkhataBay, Nkhotakota , Karonga and Rumphi where maize is sometimes ranked third after cassava and rice. 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. Sweet potato can also be prepared into various dishes but it is still not perceived as a staple.

4.1 Production trends

Over the last decade, the country 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. Cassava has become the major root crop accounting for more than 60% of the land allocated to roots and tubers. For instance, there has been tremendous increase in both land allocated to cassava and the yield 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 (Apendix1). 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 this positive change. Furthermore, the majority of smallholder farmers in Malawi 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.

Figure 1. Production trend for cassava and sweetpotato (1987-2000)



Data source: Annual Crop Estimates. Ministry of Agriculture and Irrigation. Lilongwe. Malawi.

4.2 Research and Development

Cassava and sweet potato 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 and as such, they faced almost complete neglect from the Government. Research work on cassava and sweetpotato in Malawi is not very old. Noticeably, research activities on cassava began in the late seventies and most of the work done by the Research Department was restricted to agronomy. It is of late that the image of cassava and sweetpotato is changing. Significant research work has been done in the country especially on the supply side, that is development and distribution of improved varieties and agronomic practices. Since 1990's, SARRNET in collaboration with Department of Research and Technical services has been breeding varieties of cassava and sweetpotato for crop diversification to the smallholder farmers. In addition, SARRNET, in collaboration with department of extension in the ministry of agriculture and Irrigation and also in collaboration with NGOs and civil society have seriously been involved in distributing improved varieties of cassava and sweetpotato. As of late, SARRNET is putting in efforts to understand the demand side of research, that is, improving product quality through development and dissemination of processing technologies as well as marketing aspects.

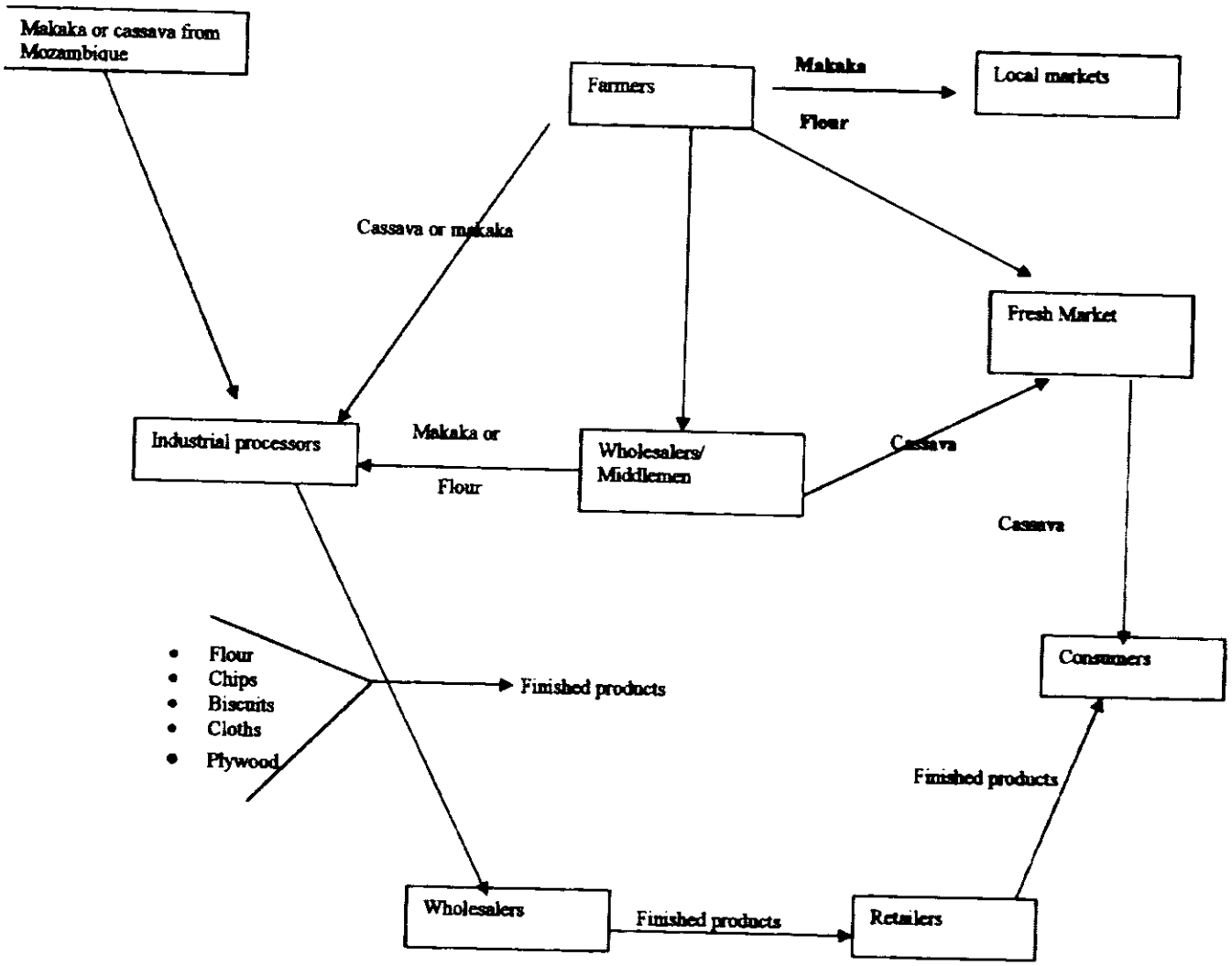
5.0 Profile of cassava and sweetpotato supply chain actors

5.1 Description of the 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. The marketing chain in which these traders are linked is presented in figure 2 below.

Two main marketing channels for cassava are identified. First is the fresh market which takes about 80% of the market share. The second is the industrial utilisation of cassava taking up 20% of share (Benesi et al, 1995, APRU, 1998). In the first channel described, either the middleman procures fresh cassava/sweet potato directly from farmers and supplies it on the fresh market in the urban centres. It was found out that most of these middlemen dwell in the townships of the major cities of the country and travel to rural areas to source the produce. Most of these middlemen act as wholesalers (90%), while only about 10% act as retailers. Or the farmer himself acts as a retailer or wholesaler whereby he harvests his cassava/sweetpotato and sells it himself on the fresh market in the urban centres or rural markets. Farmers or middlemen sell the produce to retailers who sell to consumers.
On the other hand, middlemen also procure processed products from farmers such as cassava chips (makaka) or cassava flour and supply it to the industrial processors. The farmer also supplies processed cassava to the industrial processors on the local markets. The processed products from industries are then channelled through wholesalers to retailers and then to consumers.

Figure 2. Marketing chain for Cassava and sweetpotato in Malawi



5.2 Profile of Consumers

A total of 160 consumers were interviewed in the three regions of Malawi: North, Centre and South. Of these 40 were for sweet potato while 120 were for cassava. Table 3 presents the demographic characteristics of these consumers.

5.2.1 Socio-economic status of consumers

The results in Table 3 show that most consumers (64.4%) were from high-density areas, which are associated with low to middle income class people. The majority of respondents were male-headed (87.5%) with slightly more than half (53.6%) having secondary education, while 15% having attained tertiary education. About 30% had primary education. This shows that both cassava and sweetpotato are predominantly low and middle-income earners' foods. Cassava and sweetpotato are relatively cheaper than other foodstuffs hence they inevitably constitute an important energy source for the low-income households.

Table 3. Demographic characteristics of cassava consumers

Characteristic	Region			Total
	South	Central	North	
Male-headed hhs (%)*	86.8	89.2	88.4	87.5
High density (%)	70.2	70.8	52.1	64.4
Education (Secondary) (%)	54.5	50.0	56.2	53.6
Mean family size	4.9	5.7	5.9	5.5
Married heads (%)	82.6	81.7	85.1	83.7

**Refers to household head*
Note: Reported are the percentages of the majority of respondents

5.2.2.Consumers' sources of sweet potato and cassava

Amongst several sources of cassava and sweet potato for the consumers, retailers ranked highest. About 97.5% of the consumers mentioned retailers as the major sources of cassava and sweet potato while 1.9% indicated wholesalers as other sources. These retailers are mostly found in the urban markets, trading centres and along the roads. They usually buy in bulk either directly from producers or from wholesalers.

5.2.3 Consumer preferred varieties and reasons for choice

A number of varieties were reported by the consumers as being the preferred varieties (Table 4). In general consumers preferred manyokola, Dedza/white, and mbundumali However, regionally, manyokola and Dedza/white were the most preferred varieties in the Central and Southern regions of Malawi while mbundumali was the most preferred variety in the Northern region. This means that these preferences are location specific, which may mean that some of these varieties may not be readily available in the other locations, or they may not be as tasty as they are in the other locations due to differences in soils. Other varieties mentioned had very low preference as their percentage ranged from 1 to 3.

Several attributes which determine preference were mentioned by consumers (Table 5). However the most important were taste (66.9%), easy cooking (52.3), and high dry matter content (27.3%). All these attributes are related to fresh product consumption. In addition to these, it was also learnt through the qualitative assessment that consumers also prefer medium to big sized tubers compared to small for easy cooking as the small tubers get overcooked easily.

Table 4. Varieties preferred by consumers

Variety	% Of farmers preferring the variety by region			Total (%)
	South	Central	North	
Manyokola	49.5	79.0	12.9	48
Dedza/white	56.9	34.0	16.1	36.8
Mbundumali	3.7	5.0	64.5	22.8
Red cover	4.6	-	1.1	2.0
Chithekere	2.8	-	-	1.0
Fernando	2.8	-	-	1.0
Gomani	-	-	9.7	3.0

Table 5. Reasons for Preference of the variety

Reason for preference	Percentage
Very tasty	66
Easy to cook	52.3
High dry matter content	27.3
Good for flour making	1.6
Only variety available	1.0
Nutritious	1.9

5.2.4 Forms of cassava consumption/utilisation

There are various ways reported through which cassava or sweet potatoes are consumed. These included boiled, chips, roasted, raw, "futali", flour and "mandazi" (Table 6). However the most common ways of cassava consumption were boiled cassava (88.9%) and raw cassava (49.6%). It is therefore evident that for best recipe, fresh boiled cassava/sweet potato ought to be sweet, starchy and fast cooking hence the preferred attributes. There are no significant differences in terms of forms of cassava/sweet potato consumption across the regions.

Raw cassava is mainly eaten as a snack. Others roasted the cassava to make it more attractive and soft. Sweet potatoes are also consumed as "futali" where by tubers are peeled and boiled together with groundnut flour. Consumption of processed cassava products such as flour and other products from flour was not prominent

Cassava/sweet potato is not normally eaten alone. There are compliments with which cassava/sweet potato is eaten. The commonest form of these compliments is tea (99.2%), *thobwa* (0.3%), beans and peas (0.3%) and eggs (1.1%). This clearly shows that boiled cassava/sweet potato are mainly consumed during breakfast together with tea.

In addition to these compliments, consumers mentioned a number of home recipes although traditional that they use to consume cassava and sweet potato. These included futali (boiled cassava/sweet potato with groundnut flour), boiled cassava with eggs, boiled cassava with tomato/onion, "makaka", "Zitumbuwa". Based on this, one can easily suggest that there are limited recipes that consumers use in utilising cassava and sweet potato. This means that there is room for improving utilisation of cassava and sweet potato through development of various recipes which will allow consumers to diversify out of the monotony.

Table 6. Forms of cassava consumption & use

Forms of cassava consumption	Percentage of farmers using a particular form			
	South	Central	North	Total
Boiled	83.5	89.1	94.2	88.9
Raw	56.2	46.2	46.3	49.6
Chips	10.7	5.9	9.9	8.9
Roasted	3.3	5.0	1.7	3.3
Futali	9.1	7.6	0.8	5.8
Flour	2.5	1.7	5.0	3.0

**Both count and percentage more than 100 because of multiple responses*

5.2.5 Domestic Processing and Storage

Cassava processing into various products at household level is not a common practice amongst consumers. Very few respondents (34.6%) reported processing cassava as opposed to 65.4% who did not do any processing. The type of processing reported is simple, mainly involving peeling, slicing, soaking, and drying or boiling. Products resulting from this simple processing included flour, makaka, *futali*, and chips. *Futali* is boiled sweet potato/cassava to which roasted groundnut flour has been added. Peeled fresh roots are cut into chunks, washed, and boiled. Just before it is ready, groundnut flour is added and cooked further. Cassava flour is by far the most important product in areas where cassava is a staple food. It is produced through submerged fermentation or from dried cassava chips (*makaka)*. With submerged fermentation, the roots are peeled and soaked in earthenware pots or stationary pond water to soften and ferment. After fermenting, the roots are rinsed with clean water and the lignified fibre removed from the pulp. The pulp is either broken into small pieces or mashed and moulded into small balls with a depression in the centre and sun-dried on mats, racks, or flat rocks. Once dry, these are then pound in a mortar or milled into flour which is used for making n*sima* or brewing beer. Dried chips (*makaka)* are peeled cassava tubers which are left to dry in the sun for some period then eaten while still dry. Fried cassava chips are peeled cassava tubers, which are cut into smaller portions and fried in cooking oil. This is mainly done when Irish potatoes are out of season.

It is evident that this simple processing is simply to increase shelf life or diversify the form in which the product is consumed. These are positive elements and one would therefore imagine that a number of consumers would be processing cassava and sweetpotato. However as noticed, very few consumers did so. Most of them (43.1%) indicated processing of cassava is time consuming while a few (6.9%) indicated processing is expensive and 5.2% indicated they lacked proper processing technologies. In addition to these, the majority of them (44.8%) had other reasons for not processing other than the ones mentioned above (Table 7). This makes sense because the methods of processing employed are usually crude (peeling, slicing, pounding etc) which are usually labour intensive and require some time. Fostering technological advances in the area of processing would therefore be necessary and may enhance utilisation of cassava and sweetpotato.

Similar to processing, it was also observed that few consumers (45%) undertook storage of cassava and sweetpotato. Lack of storage was related to the problems incurred in storage. Most of the consumers indicated the problem of rotting (35.3%),

and loss of taste (56.6%) as the major reasons for not storing or faced with during storage of cassava and sweet potato.

Table 7: Problems faced during processing

PROBLEM	SOUTH		CENTRAL		NORTH		TOTAL	
	Count	%	Count	%	Count	%	Count	%
Time consuming	25	47.2	12	46.2	13	35.1	50	43.1
Expensive to process	2	3.8	4	15.4	2	5.4	8	6.9
Lack of appropriate tech.	1	1.9	2	7.7	3	8.1	6	5.2
Other	25	47.2	8	30.8	19	51.4	52	44.8
Total	53	100.00	26	100.00	37	100.00	116	100.00

5.2.6 Substitutes for cassava and sweet potato

Cassava and sweet potato happen to be substitutes for each other. It was found out that almost all the respondents (99%) had substitute foods. These substitutes included bread, rice, doughnuts, buns, Irish potato, bananas, maize, cakes, and chips. Most of these products are breakfast food stuffs which supports the finding that cassava/sweet potato were mainly consumed as a snack during breakfast. These substitutes were mainly eaten during periods of cassava scarcity, or when the household wants to change its consumption tastes. Many consumers felt that eating cassava daily was not very healthy but needed to change their menu to satisfy their tastes. Others felt that price differences between cassava and other products forced them to opt for the cheaper product between them.

Despite the availability of these competitive / substituting products, many consumers stated that they were still willing to continue buying cassava even in the event that there was an increase in their income. This indicated the satisfaction that consumers derive from this product even though there were better-processed products such as bread, doughnuts and buns. The willingness to continue purchasing cassava even in the event that there was an increase in their income can also be attributed to the fact that most of the consumers think that cassava is cheaper than the other competing products and for a bigger family, households would get more satisfaction from cassava than bread but at a cheaper price.

5.3 Profile of transporters

Transport was one of the major components of the market. Transport was mainly important in moving the commodity from the production areas to the market, mainly to urban markets.

There are several transporters operating in Lilongwe, Zomba, Limbe and Blantyre markets. These are hired by middlemen to transport cassava from rural to urban markets. In each one of these urban centres, there is a real network that has been developed between production zones and the urban markets.

Cassava and sweet potato are off-loaded at centrally agreed upon centres where retailers assemble to buy the produce from the transporters/wholesalers/ middlemen. Both cassava and sweet potato are transported by a wide range of transport systems ranging from head-loads, bicycles, ox-carts, public transport, small lorries, (2-3 tonnes) to large lorries of more than 5 tonnes. Except for the bicycles and head-loads, the cost of hiring a lorry had a big influence on the level of the price charged to the next agent on the product channel. It is not very clear however, how the transport component is taken into consideration by middlemen who transport cassava and sweet potato on bicycles and on the head when setting prices for their produce. However, one would assume that the price of the produce at the farm gate and a mark-up to take care of a profit margin determine the next price when the produce is transported by these two transport systems. When cassava and sweet potato are transported by bicycle, the load ranges between 50 and 90kg while that by lorries ranged from 2 to 10 tonnes per load. However, taking all transport systems together, the most common in Malawi are bicycles and 3-7 tonne lorries.

Some of these transporters were also middlemen or even retailers. The majority of transporters were engaged in transporting other agricultural commodities (including maize, beans, bananas, groundnuts and cassava) apart from sweet potato, depending on the season. However, in Lilongwe 75% of the transporters involved in cassava transportation at the time of the interview, had cassava and sweet potato as their major commodities through out the year. This is possible because cassava and sweet potato 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.

The charge per trip depends wholly on distance and not load.

The major problems faced in transport include frequent breakdowns because most of the lorries used are old and travel in rough roads. Poor road conditions contribute quite a lot to the frequency of breakdowns. Overloading is another problem leading to frequent breakdowns. The clients force the vehicle owners to heavily exceed the weight limit of the vehicles to minimise their own expenditures.

5.4 Profile of traders

5.4.1 Characteristics of the traders

A total number of 160 traders were interviewed, 60 from each South and Central region and 40 from the northern 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. These traders mainly constitute middlemen, wholesalers and retailers. The majority of these traders were married (73%) and male headed (92%). From the qualitative study, it was found out that most of the traders were men. Few females engaged in the trade and mainly as retailers along roadsides and busy markets. In fact, three-quarters of the retailers were females. Men mainly acted as middlemen or wholesalers. The dominance of men in the trade could possibly be because of the physical strength needed to travel long distances to source cassava or sweet potato from points of production to urban centres. This also explains why most women only acted as retailers in the markets managing only small quantities of the commodity and most of them selling boiled cassava or sweet potato.
The education level of traders was modest, with most of them having only attained primary education (Table 8).

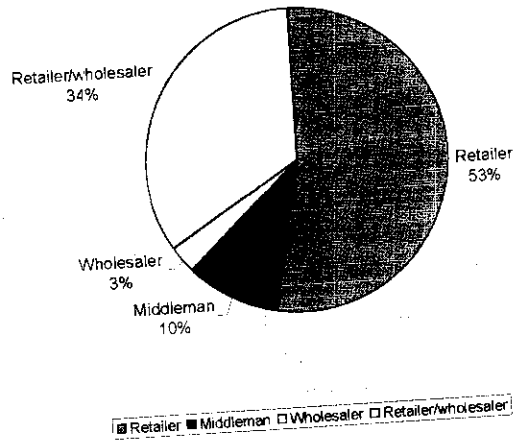
Table 8: Demographic characteristics of traders

Variable	Number	Percentage
Educational status		
None	15	9.375
Std 1-4	24	15
Std 5-8	80	50
Form 1-2	18	11.25
Form 3-4	23	14.375
Marital status		
Single	31	19
Married	117	73
Widowed	1	0.6
Divorced	1	0.6
Household head		
Male	147	92
Female	13	8

5.4.2 Nature of Traders Business

Cassava trade has become one of the booming trades in both rural and urban markets. Many traders were found selling in township markets, along side the major roads such as M1 and rural markets. The majority of the traders interviewed in the three regions were operating as retailers (53%). However a good number of them were operating as both retailers and wholesalers (34%) as shown in figure 3 below.

Figure 3. Business/trader category of respondent



These retailers often buy cassava or sweet potato from either producers or wholesalers/assemblers to resell in the various urban markets, on the road-sides or working premises in small volumes and most of them selling either boiled or raw or fried cassava/sweet potato. The age of retailers ranged from 12 to 42 years. The younger ones were mainly boys and girls sent by mothers to do the trade. The majority of them have been in the business for more than five years and they indicated that they are involved in this business because it requires relatively less capital.

Wholesalers, as the name suggest, are those traders who would buy in bulk from farmers and transport the produce to urban centres and sell in large volumes. The majority of the wholesalers receive their commodity from middlemen who deliver cassava from various producing sites in the countryside. Once at the wholesale market, retailers purchase required quantities in bags. However, wholesalers also act as retailers whereby they buy in bulk and sell as retailers.

Middlemen were found to be mostly middle-aged men within the age range of 25-45 and mainly men. These travel long distances to source cassava/ sweet potato hence need for energetic young men. Most of the middlemen (90%) were found to be selling purely as wholesale with a small percentage (10%) selling at retail. Some producers also acted as middlemen by buying cassava/sweet potatoes from fellow farmers and transporting it to the urban centres.

The period that the traders have been in the cassava trade varied from one region to the other, and so was the average quantity that was handled from season to season. However on average, most traders have been operating in the business for the past five years.

5.4.3 Sources of capital by traders

Most traders indicated they entered cassava or sweet potato trade because it requires relatively less capital which they can afford on their own. This therefore explains why the major source of capital was own savings (76.8%) as opposed to relatives/friends (21%) and credit society (1%) as noted from Table 9. It is interesting to note that credit society did not have any significant role to play in this business despite the fact

that many business-lending institutions have been formed in Malawi through the poverty alleviation programme. One would have expected that these could have been the major sources of capital.

Table 9. Sources of capital by traders

Source of capital	Number	Percentage
Savings and credit society	2	1.2
Relatives or friends	34	21.2
Own savings	123	77
Others	1	0.6

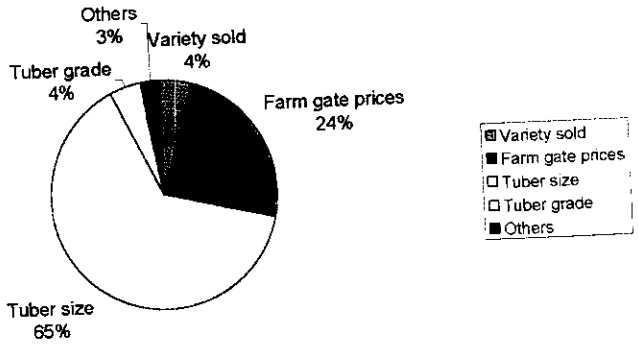
5.4.4 Source of market information and price determination

Market information is very crucial for any profitable business because it highlights availability of good quality products and prices. Table 10 presents information on how traders obtained market information. The majority of traders relied on personal observations (46%) and "social network" that is friends/relatives (38%) and fellow businessmen (13%). Very few traders relied on established media for market information. This implies that the cassava and sweet potato trade is rudimentary, more or less left in the hands of the operators. It is clear therefore that among the things that have to be developed to improve market efficiency is information collection and dissemination. Despite this, traders expressed satisfaction over these sources of information and indicated they assisted them in making marketing decisions. This is quite understood bearing in mind that probably the traders are small and operate in environments very well known to them. In addition factors that determine price hence profits are size of tubers, variety sold and farm gate price, which are spot attributes (Figure 4). The bigger the tuber the higher the price it will attract on the retail market.

Table: Sources of Market information

Source	Number	Percentage
Established media	4	2.5
Friends & relatives	61	38.3
Customers	21	13.2
Observations	73	45.9

Figure 4. Cassava price determination by traders



5.4.5 Storage, Grading and sorting of Cassava and sweet potato

A small number of traders (16%) indicated they store their products before selling and these are particularly those who buy in bulk. These store before they actually sell everything. The major storage facilities were 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.

The few traders who reported storing the products indicated that they got higher prices before storage than afterwards. This was attributed to the loss of quality in storage as well as attack from insect pests. The majority of traders not storing indicated that storage was an expensive activity and that the cost of storing the products exceeded the price they got from the market. In addition to this, traders not storing indicated that cassava and sweet potato are highly perishable products, or they needed cash immediately, and lack of proper storage facilities.

Unlike storage where only a few traders reported doing so, almost all the traders interviewed (93%) reported that they graded their fresh cassava and sweet potato before selling. As can be seen from Table 11 grading was based on tuber size (89%), degree of damage (2.5%), smoothness (4.5%), and sweetness (2.5%). Size was important for fresh cooked and dried chips while colour for dried chips and flour. Grading seemed rewarding as almost 88.5% of the traders reported getting better prices after grading. This makes sense because the grading criteria almost tallies with the pricing criteria. Prices were charged according to quality and size of the tuber, in addition, buyers find it very convenient to buy graded products and are willing to pay more than when the products are not graded.

Table 11. Grading criteria

Grading criteria	Number	Percentage
Size of tubers	138	89
Sweetness	4	2.5
Degree of damage	4	2.5
Smoothness	7	4.5
Others	2	1.2

5.4.6 Sources of cassava and sweet potato

Most traders obtained cassava/sweet potato directly from farmers. However they expressed a lot of problems they face in procuring the produce and these are mostly related to the supply of the produce. As noted from Table12, unpredictable produce price and erratic supply rated high as the most important problems in addition to seasonal supply, poor quality products and scattered small production entities.

Table 12: Problems faced in procuring cassava and sweetpotato

Problem	Number	Percentage
Erratic supply	41	20.6
Seasonal supply	22	11.0
Pockets of production areas	22	11.0
Poor quality products	22	11.0
Unpredictable produce prices	92	46.2

5.4.7 Farm gate, selling prices and marketing costs of cassava

Table 13 summarises the findings on estimated farm gate and selling prices of cassava during 1998/99 and 1999/2000 growing season. During 1998/99, the highest farm gate prices per 50Kg bag of cassava were observed in the Central region (MK504.00) while the lowest in the northern region (MK210.00). Similarly, the highest selling prices (SP) were spotted in the same region. This could be an indication of higher demand for the product. Since most of the cassava is sold to the urban consumers of Lilongwe city, it may not be surprising to observe higher selling and farm gate prices in this location compared to other regions who may be having less populations demanding the product. Highest farm gate and selling prices were also observed in the Central region during the 1999/2000 growing season.

Table 13: Farm gate and selling prices of cassava per 50Kg bag (1998/99, 1999/00)

Description	Year	Farm gate and selling prices (MK)		
		South	Central	North
Farm gate price	1998/99	340.20	504.67	211.10
	1999/2000	382.30	633.00	291.70
Selling price	1998/99	509.40	546.70	457.40
	1999/2000	577.50	925.60	783.30

Major marketing costs incurred by the traders in their business included storage costs, transport costs and handling/grading costs. According to Table 14, storage costs were highest in the Central region compared to the other regions, while transport costs were highest in other regions (North and South). The difference in handling/grading costs was not significant in the three regions. From the Table it can also be noted that transport costs constitute the major costs incurred by traders and hence one would conclude that they are the major determinants of price selling price. In this case therefore one would expect the selling prices to be highest in the Southern region and lowest in the Central region. Interestingly, highest selling prices are observed in the Central region which may imply that the forces of supply and demand play a bigger

role in influencing farm gate and selling prices in addition to costs incurred by the trader.

Table 14: Marketing costs of cassava per 50Kg bag

Marketing cost component (MK)	South	Central	North
Storage cost	32.40	120.00	60.00
Transport cost	1494.00	849.00	1359.26
Handling/grading cost	105.00	100.52	85.00

5.4.8 Market 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). Table 15 below provides the findings of the marketing margins for unprocessed cassava traders were selling in various regional markets.

Table 15: Marketing margins for unprocessed cassava (1999/2000)

Cost component	Marketing margin (MK/kg)[1]			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	1.20	5.87	15.6	14.2
Average Transport Cost[2] (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 ..... 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 highest component of total

[1] *Found by dividing all marketing cost by 50Kg*
[2] *Derived from assuming the cost of 1 tonne truck of cassava*

marketing costs in the Northern region (20.0%). The higher contribution of transport, storage and handling costs in the stated regions indicate 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. Therefore, 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, slightly efficient in the Central region and very inefficient in the Northern region. 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.

5.4.9 Total Gross Marketing Margins (TGMM)

Total Gross Marketing Margin (TGMM)[3], 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 16).

Table 16: Percentage Total Gross Marketing Margin of the Cassava Traders

Region	Season	TGMM %
South	1998/1999	33.2
	1999/2000	32.6
Central	1998/1999	7.6
	1999/2000	31.6
North	1998/1999	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 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 where 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%).

5.4.10 Fresh cassava supply and demand

The results revealed that fresh cassava supply is dependent on seasonality. Over 73.9% of the total respondents 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 (64.3%). In addition to the fact that cassava supply is seasonal, traders reported a number of problems they faced from suppliers which included erratic supply of the

[3] *TGMM = Consumer price - Farmer's price/Consumer price X 100*

commodities from time to time, poor quality of products and unpredictable producer prices which changed from season to season.

In order to improve the supply of fresh cassava on the markets, the 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 network and infrastructure to facilitate the transportation of the products on the markets.

Traders also indicated that they faced a number of problems from cassava consumers. These were mainly 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 expressed optimism that they were able to satisfy the local demand of cassava from consumers. Traders also stated that they were not in a position to know whether they satisfied external demand for cassava 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. However, traders mentioned that domestic and export market potential for cassava is reasonably big with many traders reporting that due to the increase in the price of competitors such as bread, many consumers were preferring cassava to bread for breakfast in both the rural and urban areas. In order to be able to export more cassava, traders suggested that more industries should be involved in processing the product into other forms so that it competes well on the international market.

5.4.11 Trader Association

Formation of trader association is an important strategy in enhancing the marketing of agricultural products. Despite this, many traders have not yet been part of such associations. Only 21.7 % of the respondents in southern region reported existence of trader association and only 13.3% of the respondents were members of an association. Similarly, only 12.5% of the respondents in the northern region indicated being members of an association. The benefits that traders derived from such groupings were many including the ability to market their products easily, easiness of input procurement and increased ability and power to bargain for higher prices from middlemen. Most of the trader associations that were reported operational were run through an elected committee of representatives of the cassava traders. The committee was headed by the chairman who co-ordinated all the activities of the association.

Those who have never been part of trader association indicated that they lacked knowledge on the dynamics and operation of an association, lack of a well established market for cassava as is the case with tobacco and the fact that most of the cassava traders prefer to do business individually so might not sustain a grouping.

5.4.12 Constraints to cassava marketing

Despite the increasing role that cassava is playing in the food security and income diversification of the majority of Malawians, a number of constraints exist at the marketing level. The major ones that traders in all the regions have identified are lack of proper transport facility to transport cassava from point of production to markets, lack of storage facilities for bulk purchasing (wholesaling), lack of markets that are well organised and co-ordinated to provide traders with the signals and information necessary for pricing decisions as well as the lower price customers are paying for

cassava on the market which do not reflect cost of production, transportation and storage.

Traders suggested solutions to these problems. First, an effort should be made by the government to improve the road networks in the country particularly in the rural areas. Second, storage facilities should be made available at a subsidized rate for traders to store more cassava. Third, policies should be put in place to regulate the farm gate prices so that traders can buy at a reasonable price and in turn sell at the same price to consumers. Lastly, government and the private sector should assist farmers and traders to source external markets for their cassava to increase their earnings.

5.5 Profile of producers

5.5.1 Characteristics of producers

A total of 360 cassava and sweet potato farmers were interviewed, 120 farmers from each region: North, Central and Southern. Most of the households interviewed were male headed (86.7%) with an average family size of 6 (Table 17). Most of the producers were in the age category of between 14 and 65 years with only 4% being above 65 years. The average number of people participating in farming activities was 3. This household labour was usually not enough and as such most producers supplemented the labour force with hired labour at an average number of 2 people per season in the North and South and 5 people in the Centre. The additional labour was crucial during peak labour periods such as weeding and harvesting. The cost of hired labour varied from one region to another with highest being in the North where the labour cost was as high as MK3,500 and lowest in the Central region where it was MK1500.

Regarding education and off-farm employment, the majority of farmers (45.3%) attained primary education (std 5-8) and only 13% had attained secondary education. Education plays an important role in technology uptake and application, which in turn affects productivity. It is believed that well educated farmers are more innovative than the non-educated. Despite the fact that cassava production activities are done almost throughout the season especially in places where it is grown as a staple food, cassava farmers reported a number of activities they were engaged in during period of reduced labour for cassava. These included carpentry, grocery business, tailoring, agricultural trading and fish mongering along the lakeshore areas. The total estimated annual income from these IGAs was reported as MK18, 925.00 in northern region, MK5, 380.00 in central region and MK6, 274.00 in southern region.

Table 17: Demographic and socio-economic characteristics of producers

Characteristic of Household	South (n=120)	Central (n=120)	North (n=120)	Total (n=360)
Male-headed hhs*(%)	85	92.5	82.5	86.7
Average family size	6.0	6.0	6.5	6.2
Average number of people participating in farming	3	3	3	3
Mean hired labour	2	5	2	3
Average cost of hiring Labour (MK)	1700	1500	3500	2000
Off-farm employment				
Carpentry (%)	5.0	5.0	3.5	4.5
Grocery (%)	1.7	5.0	0.9	2.5
Tailoring (%)	3.3	-	-	1.1
Others**(%)	33.3	35.0	34.5	34.5
Annual income (MK)	6,274	5,380	18,925	
Education				
Std 1-4 (%)	35.8	25.0	15.0	25.3
Std 5-8(%)	42.5	45.0	48.3	45.3
Secondary (%)	5.0	10.8	24.2	13.3
Tertiary (%)	0.0	0.0	2.5	0.8
None (%)	16.6	19.1	10.0	15.2

**Refers to household head*

***Included agricultural trading, fish mongering and tinsmith*

5.5.2 Production

5.5.2.1 Cropping Patterns

Table18 presents cropping patterns for cassava in the three regions of Malawi. As seen, sole cropping (58.5%) is the major cropping pattern for cassava seconded by intercropping (37%). However, intercropping is the major cropping pattern in the southern region of Malawi (88.3%) while sole cropping is most common in the north (96.6) and centre (71%). This is attributed to land holding sizes. Farmers in the southern region have small land holding sizes compared to farmers in the centre and north and practising intercropping therefore was largely aimed at saving the limited land available (73.4% indicated they practiced intercropping because of land shortage). Intercropping therefore poses to be the most effective way of maximising the little land they have. Farmers practising sole cropping mentioned the need for reducing crop competition as the major reason for choosing the cropping pattern.

Table 18: Cropping patterns

Cropping pattern	Percentage of farmers using a particular cropping pattern							
	South		North		Centre		Total	
	No.	%	No.	%	No.	%	No.	%
Monocropping	10	8.3	115	96.6	84	71.2	209	58.5
Intercropping	106	88.3	1	0.8	26	22.0	133	37.3
Mixed cropping	4	3.3	3	2.5	8	6.8	15	4.2
Total	120	100	119	100	118	100	357	100

5.5.2.2 Crop area and yield

The findings of the survey shows that on average land allocated to cassava was 1.4ha in 1999/2000 season which rose to 1.5ha in 2000/2001 season. The mean corresponding yield was 1162 kgs in 1999/2000, which declined to 883 kgs in 2000/2001 season (Table19). Across the regions, it was observed that less land was allocated to cassava in the northern region compared to the south and central. However yields were higher in the northern region compared to the south and central region. The South had the lowest cassava yield levels of 413kgs per ha. It has been observed that 88% of the farmers in the southern region practiced intercropping which could be the reason why they got lowest yields owing to the fact that plant populations are reduced in an intercrop than a sole crop.

Table 19: Cassava area (acre) and yield (kg) by region in 1999/2000 and 200/2001 season.

Description	Mean area (acres) and yield in (kgs)			
	South	Central	North	Overall
Area (1999/2000)	1.56	1.53	1.27	1.45
Yield (1999/2000)	487	1338	1871	1162
Area (2000/2001)	1.74	1.43	1.27	1.48
Yield (2000/2001)	413	1136	1310	883

5.5.3 Input usage, crop choice and production decisions

The major input reported used were cuttings. About 97% mentioned that cuttings were the major inputs for cassava and sweet potato. The main source of this input was own cuttings (Table 20). A few farmers also obtained the cuttings through buying or given. Those buying indicated they bought from fellow farmer and the larger proportion of farmers buying cuttings was from the central region compared to North and South. This trend is not surprising as cassava and sweet potato are traditional crops and most farmers reported to have been producing cassava and sweet potato for the past 10 years. The least period mentioned of production of cassava and sweet potato was 2 years and the highest was 50 years. Therefore farmers recycle the planting material they obtained at any one time. It is also not surprising to note that 76% of the farmers indicated that planting material were available. Regarding quality of the planting material, 77% of the farmers indicated it was viable.

It has also been found out that the decision on the type of crops to grow is mainly made by the husband or is made jointly (husband and wife). This is particularly true since the majority of households are male-headed households (Table 21).

Table 20: Sources of planting material

Source of planting material	Percentage of farmers	
	1999/2000	2000/2001
Own	67.8	80.4
Bought	16.5	10.0
Given	15.7	8.8
NGO	-	0.8
Total	100	100

Table 21: Decision making on crops to grow

Decision maker	Number	Percentage
Husband	144	40.2
Wife	61	17.0
Both	144	40.2
Other	9	2.5

5.5.4 Reasons for growing cassava and sweet potato

Food and income seems to be the most important reason for growing cassava and sweet potato (Table 22). However, proportionally, food takes precedence over income as the key reason for growing cassava and sweet potato although in other regions of the country especially central region, cash seems to be the most important reason. This is one of the regions where the market for fresh cassava is growing at a faster rate. As seen from Table 23, 99% of farmers in this region indicated they sold their cassava compared to 45% in the North. In general, 74.7% of farmers reported they sell cassava, which is a clear indication, that cassava/sweet potato is grown as a source of income. This large percentage of the farmers who grew cassava for the market is can be supported by the large amount of fresh cassava that is transported into the city of Lilongwe each day. 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 24 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[4]

Table 22: Reasons for growing cassava and sweet potato

Reason	Percentage of farmers reporting the reason			
	South	Central	North	Total
Food	35.0	3.3	56.6	31.7
Income	4.2	18.3	1.6	8.0
Food and cash	56.6	76.6	40.8	58.0
Others	4.2	1.6	0.8	2.2

Table 23: Whether farmers sell some of the cassava produced

Whether farmers sells	Percentage of farmers			
	South	Central	North	Total
Yes	80.0	99.2	45.0	74.7
No	20	0.8	55.0	25.3

Table 24: 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	
Total	**Bicycles**	**1456**	**104935**	**308,485**

Marketing decisions are either dominated by the husband or both husband and wife. More than half of the respondents indicated that marketing decisions are made by both the husband and wife and 33.8% indicated they are made by husbands alone.

Traders and households/individuals are the important outlets for the produce sold by farmers (Table 25). However traders ranked highest (78%) simply implying that much of the produce are marketed. It is also interesting to note that traders constituted 96% of the major outlets of cassava produce in central region which is a clear indication

[4] 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.

that production of cassava in the Central region is purely market oriented. The findings of this study regarding why people grow cassava and the proportion that goes into the market, agrees with what Moyo et.al 1998 found out. He reported that in Nkhata Bay (Northern region) and Mulanje (Southern region) where cassava is a staple crop, very little of it is sold. However, in Chimbiya (Central region) where maize is mainly the staple crop, more than three-quarters of the cassava is sold as people depend on maize rather than cassava.

Table 25: Major buyers of produce

Major buyer	Percentage of farmers			
	South	Central	North	Total
Individuals/ Households	38.9	4.2	29.6	22
Trader	60.0	95.8	70.4	78
Total	100.0	100.0	100.0	100.0

Table 26: Mode of selling cassava

Description	South	Central	North	Total
Sell right in the garden per bag	7.5	67.5	75.9	48.1
Sell according to size of the field and average No. of tubers	3.2	35.0	11.1	18.9
Sell at the market	69.8	4.2	14.8	29.5
Others including home	34.4	2.5	9.2	15.1

**Totals exceed 100% because responses are not mutually exclusive*

The most popular way of selling cassava/sweet potato is per bag and mostly the selling is done in the field (48%). Most of the farmers in Central (67.5%) and Northern (75.9%) region sold per bag right in the gardens while in the Southern region, the most popular way was selling at the market. This implies that farmers in the Southern region were either acting as retailers or middlemen.

5.5.5 Price and price seasonality

Size of tubers and number of tubers per plant/heap seem to be the most important criteria in setting prices for cassava/sweet potato produce. However, variety and grade were the least considered attributes (Table 27).

As noted, the major buyers of cassava from farmers are traders and individuals or household consumers. The traders are mostly middlemen who buy cassava and sweetpotato from producers and normally the price is fixed per 50-90kg bag, per load in the vehicle or per size of plot to be harvested. This shows that the pricing of cassava and sweetpotato is very subjective. In fact this subjective determination of the price continues up to 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 form one wholesaler to the other.

The middlemen/wholesalers normally have an upper hand in terms of fixing the price. Since the producers are not organised 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 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.

The cassava is then sold to retailers who sale to consumers either per tuber, or in small heaps or boiled form or fried. At each one of these stages, a different price is fixed always with a mark-up as profit and no standard measure is used in determining price.

The cassava marketing season is quite long compared to sweetpotato one or other agricultural produce. For 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. Sweet potato season starts from March to July. Because of this a certain variation is observed on the price of cassava and sweetpotato. For other markets such as Lilongwe fresh market, the price variation also depends on the origin of cassava. For example, at the beginning of the season between August and October, cassava is slightly cheaper because supply is high, and in addition, most of it comes from 20-30kms away. As a result middlemen do not incur a lot of transport costs. However as soon as the rains start, cassava is sourced from distant places such as Dedza and as the season progresses, middlemen start getting cassava from Nkhamenya in Kasungu (200km to the North of Lilongwe City) while others go as far as Mozambique. Because of these variations, farmers have also adapted their planting time and the system of harvesting to the market pattern. Farmers indicated that prices are better towards the end of the season than in the middle of the season due to high supply of cassava/sweetpotato on the market.

Table 27: Criteria for setting prices

Criteria	Number	Percent
Size of tuber	92	34.3
Variety/colour of tuber	1	0.3
Number of tubers	95	35.4
Grade of tubers	13	4.9
Others	108	40.2

**Totals exceed 100% because responses are not mutually exclusive*

5.5.6 Harvesting and selling cassava

Cassava harvesting depends on maturity of the crop. Early maturing varieties are harvested as early as 6 months after planting while late maturing varieties are harvested from as late as 15 or more months after planting. Harvesting time is synonymous to selling time. Table 28 presents time/age at which farmers start selling their cassava. As seen most farmers (78%) indicated that they start selling cassava after 9 months. However farmers selling earlier than 9 months indicated early maturity of the variety as the major reason. For those selling later i.e after 9 months, timing of high prices (22%) was an important factor in consideration. Others, late maturity of the variety (15%) was the major factor.

The majority of the farmers (78%) were of the opinion that they get better prices at the end of the harvesting season, while lowest prices were obtained at the middle of the season. The forces of supply and demand play a bigger role in cassava and sweet potato market. Prices get better as supply falls towards the end of the season unlike at the middle of the season when the supply is high.

Table 28: Duration/time age at which farmers sell cassava

Time	Percentage of farmers			
	South	Central	North	Total
Between 4-6 months	3.0	3.4	9.2	4.4
Between 6-9 months	21.6	15.1	14.8	17.4
After 9 months	75.3	81.5	75.9	78.1

5.5.7 Problems encountered in the marketing of cassava

About 87% of the farmers indicated they encounter problems in marketing cassava. They reported varied reason but the most important ones were low prices (53%), lack of market (25%) and long distance to the market (11%) and poor roads. Table 29 provides a summary of problems that farmers reported in the three regions. Low producer price seem to be the most important problem in all the regions. To solve these problems, farmers indicated there would be need to improve on pricing, provision of organised markets and provision of marketing extension as well as improving on road network to improve on accessibility of the produce by the buyers. To mitigate the problem of low prices, farmers indicated they grade (26.8%) or process the produce (25.5%) or harvest at a later date when supply is low. Grading the produce was ranked high in all the regions while processing was mainly reported in the Southern region and harvesting at a later date mainly in the Central region.

Table 29: Problems encountered in marketing cassava

Problem	Percentage of farmers reporting the problem			
	South	Central	North	Total
Long distance to the market	14.6	6.6	13.8	11.2
Low prices	49.0	60.5	46.6	53.4
Lack of market	33.8	17.1	24.1	25.3
Poor roads	1.9	3.3	3.4	2.7
Lack of storage facilities	0	1.3	1.7	0.8
Others	0.6	11.2	10.3	6.5
Total	100.0	100.0	100.0	100.0

5.5.8 Transportation

The common means of transporting cassava among producers included portage, bicycles, public transport, and hired vehicles (Table 30). However, hired vehicle and bicycles were the common means of transport in the Central region while portage was common in the South and North. This depicts how dynamic the marketing environment is in these regions and the distances to the nearest market. In the central region, farmers are market oriented than in the other regions. In addition hiring vehicles or using bicycles shows that the markets are far compared to those places where farmers mainly used portage.

Table 30: Common means of transport

Common means	Percentage of farmers using the means			
	South	Central	North	Total
Hired vehicle	-	22.0	-	5.0
Bicycle	23	32.0	-	17
Public transport (buses etc)	3		11	5.0
Portage	73		79.0	59

Others	1	46.0	10.0	14

5.5.9 Cassava variety preferences among producers

Farmers in all the three regions cultivated a number of varieties (Appendix B) Among these Manyokola, Chithekere, Masangwi and Matubvi were the most popular varieties among the producers in the southern region while Manyokola, Mkhalatsonga were the major varieties preferred in the central region. Mbundumali, Gomani, Psoyoka and Mpuma were some of the cassava varieties that were popular among farmers in the northern region.

Most of these varieties were preferred because of their early maturing characteristics, high yielding potential as well as good taste. Some of these varieties were also very resistant to cassava diseases and pests such as cassava mealybug (CM), cassava green mite (CGM) and cassava mosaic disease (CMD).

Most of the sweet cassava varieties such as Mbundumali, Manyokola and Balaka were also preferred by the buyers due to their taste and high dry matter content. The bitter varieties such as Balaka were only preferred by the farmers whose staple food is cassava.

5.5.10 Farmers perception of cassava and sweetpotato production trend

A higher percentage of farmers (59%) were of the opinion that production of cassava and sweetpotato was increasing. Only 31% indicated that it was decreasing and 9% indicated it is constant. One percent was not sure. These results correspond with what has been reported in literature that production of cassava and sweetpotato has actually been on the increase probably due to enhanced seed multiplication and distribution activities carried out by SARRNET in collaboration with NGOs and NARS. In addition, the Government has made great efforts in promoting cassava and sweet potato for crop diversification and as a drought tolerant crop. Those farmers indicating that production trend was increasing attributed this trend to growing demand for cassava and sweet potato on the market.

5.5.11 Storage of fresh cassava and sweetpotato roots by producers

Fresh cassava and sweet potato roots are highly perishable although sweet potato can be kept for some days before getting bad. Cassava and sweet potato are seasonal crops despite the fact that cassava is available almost throughout the year. Storage of these products is therefore eminent although difficult due to the nature of the products. About 61% of the farmers indicated that they store cassava. However the major form of storage was processed cassava (69%) unlike fresh form. Storage of fresh cassava was common in the central region (88%) while storage of processed cassava was common in the Southern region. As it has been observed, farmers in the central region grow cassava mainly for the fresh market than in the other two regions where cassava is also grown as a staple food in the areas surveyed.

Table 31: Forms of storage

Form of storage	Percentage of farmers storing using a particular form			
	South	Central	North	Total
Fresh form	17.8	88.2	56.3	48.4
Processed form (makaka)	99.0	23.5	33.3	60.8
Others including flour	-	13.2	20.8	8.8

Various storage methods were employed such as storing cassava in the soil (late harvesting) storage in own house to prevent theft and damage by wild animals as well

other means available to farmers. The maximum storage period for cassava was found to be 172 days in both central and northern regions while 94 days in central region. Farmers reported incurring considerable losses during storage, the most important of which was root damage or loss of quality. Farmers especially those using storage as a strategy for 'timing for better prices' indicated that they actually got better prices after storage. However most of the farmers indicated prices were poor after storage due to loss of quality in the product stored.

Farmers not storing cassava cited the need for immediate cash as the major reason and lack of proper storage facilities.

To solve some of the storage problems, farmers indicated the need for storing in the soil than other facilities, but also using actellic dust especially on processed cassava. They also raised the need for training in storage by extension service providers.

5.5.12 Processing and grading of Cassava and sweet potato among producers

Processing

Major processing conducted was for cassava than sweetpotato. About 89% of farmers indicated they process cassava. The processed products included, *Makaka*, flour boiled cassava, chips and fried cakes. Much of the processing involved peeling, drying and pounding or peeling and boiling. Most of the processed products were for home use, for instance, 96% of the farmers indicated they used the processed products at home. Only 20% of the farmers indicated they sell the processed products at the market while 2.9% indicated they sell to industrial processors. Selling of processed products to industrial processors or at the market was mainly reported in the Southern and Northern regions of Malawi.

The few farmers who reported that they do not do processing indicated three major reasons for not doing so. These included customers demand for fresh cassava, lack of proper processing technology and lack of knowledge on processing.

Grading

Grading is one of the important marketing functions that have to be carried out to ensure better quality of a product. A better quality product will always fetch a better price. It is therefore not surprising to find out that more than half of the farmers (52%) were grading their products even though grading seems not attractive based on the way the product is mainly disposed at producer level. The grading criteria were mainly size of the tuber (93.8%) and root damage. As expected, 61% of the farmers grading their produce indicated they get premium prices after grading. Size is important for fresh, cooked and dried chips, colour for dried chips and flour, and damage for fresh and boiled cassava. Other farmers found grading a waste of time since the price after and before grading was usually not different.
Despite this, farmers still reported that they got premium price after grading their product than the other. This was responded by 84.2% of the respondents in the southern region 32.6% of the respondents in the central region and 61.6% in the northern region.

5.5.13 Training, farmers associations and access to credit

Very few farmers (4%) indicated they received training in the production of cassava/ sweet potato. In addition, few farmers (27%) are aware of the existence of extension services regarding cassava and sweet potato. This is not surprising as cassava and

sweetpotato received very little Government attention in the past. It is only in the past ten years that cassava is gaining importance. Regarding access to credit, only 17.6% reported having access to credit. Although only 18.5% reported existence of producer associations for cassava in their area, willingness to join the associations was very high (95%) for the perceived benefits of increasing price, bargaining power and easy access to market.

5.5.14 Constraints and Opportunities for Expanding Cassava Production in Malawi

Farmers identified a number of constraints limiting expansion of cassava and sweet potato. These included poor markets, low farm-gate prices, high incidence of pests and diseases, lack of extension services, lack of improved varieties, and small land holding sizes. Lack of extension services, poor markets, low farm-gate prices were common problems in the three regions, while lack of improved varieties and high disease incidence were major problems in Central and Northern Malawi.

6.0 Industrial demand for cassava

Cassava is becoming one of the important raw materials in the local industries in the country. It is used in the biscuit, plywood and textile industries as well as in bakeries. Several companies were visited during the study, to find out, among other things, the level of demand of raw cassava or its processed products such as starch and flour from cassava. These industries were David Whitehead and sons, Rab Processors, Chibuku brewery, Grain and Milling Company, Trans Globe Produce Export Limited, Universal Industries and Mr.K. Kholomana.

6.1 Current status of industrial use of 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 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 32: 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	Cassava Flour	432	1440	1000	5000

& Sons					
Universal Industries	Cassava Flour	240	800	240	800
International Timbers Ltd	Wheat flour	60	-	60	200
Nzeru Radio	Corn starch	75	-	75	250
RAIPLY	Cassva 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
Total		**16222**	**19230**	**10220**	**33660**

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

Despite the fact that demand for industrial use of fresh cassava and its products is growing, several problems were reported by the industries.

- Lack of reliable suppliers of the commodity. 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 fore 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 33: Prices of various products for Comparison

Starch					
					Tanzania
Wheat grain	230 Tsh/kg	0.25 US$/kg	Chips	80US$MT cif Rotterdam	
				55 US$MT transport cost	

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

Cassava and sweet potato production and consumption trends, and factors determining adoption of these crops in predominantly maize-based farming systems

The decline in maize production, the country main staple food has led to the recognition of other food crops such as cassava and sweetpotato which are drought tolerant and require less inputs. The increase in maize production costs and recurrent drought has forced farmers to diversify out of maize into other crops such as cassava and sweet potato. The country has experienced rapid increase in production as well as consumption of cassava and sweetpotato in the past 10 years. It has been observed that cassava and sweetpotato have become important food and cash crops for a large number of households such that not only has production increased in the traditionally producing areas, but production has also extended to other areas where it is mainly grown for cash. This is in response to the growing demand of these two crops on the fresh market in the urban centers. One of the factors explaining the expansion of the fresh market is the deepening of poverty in both rural and urban areas due to inflation, unemployment e.t.c, as such most households are looking for cheaper foodstuffs to replace what has become luxurious foods. This is why cassava and sweet potato have become direct substitute of bread. This substitution is taking place mainly within low or middle-income households, an indication that the relative prices between the two factors and income constraint are the major determinants of this trend.

It has also been found out that the major form in which cassava or sweetpotato is consumed is fresh boiled roots which are mostly taken during breakfast with tea. This means that except in places where cassava is a staple food, cassava and sweetpotato are mainly taken as a snack. This is why cassava and sweetpotato are substitutes for bread or breakfast foodstuffs.

A number of varieties of cassava and sweetpotato have been mentioned to be preferred by consumers. However, the major attributes that consumers look for in the cassava and sweetpotato varieties are good taste, high dry matter content, low fiber content and takes less time to cook. These preferences support the finding that these products are consumed in their fresh form without major form of processing.

Level of domestic processing and linkage between producers and consumers

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.

Linkages between farmers and industrial processors are very weak. However, if farmers were linked to processors through contract farming for example, this would ensure a steady market for both parties and a steady supply of the raw materials of a defined quality.

Marketing channels, price determination, marketing margins and marketing efficiency

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. Price transmission takes place through this channel. However cassava and sweetpotato pricing is very subjective with a certain level of bargaining for both quantities involved and price. Several prices are fixed as the product 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. The middleman has an upper amongst all the players, fixing the lowest price at farmer level and dearest price at the next sell. It is believed that formation of associations at each supply chain would regulate the pricing of cassava and sweetpotato.

As is the case with agricultural products, cassava and sweet potato prices seem to be supply driven than demand driven. Highest prices of cassava and sweet potato are obtained at the end of the season and they are lowest at middle of the season when supply is high. 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 been found out that marketing of cassava was very efficient in the northern region, slightly efficient in the central region and very inefficient in the northern region.

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.

7.2 Recommendations

- Farmers should be linked to industrial processors through contract farming approach to create a steady market for the producers and a steady supply of products to processors.
- 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.
- Grading at all levels (although difficult at farm gate because of the pricing system) improves the price and it has also been learnt that pricing is very subjective. A system should therefore be developed to assist participants on the cassava market to define the grades and standards of the produce.
- There is a need to develop cooperative type of organizations at each level of the product chain for bargaining power and price regulation.
- Training in Processing.

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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
1998/99	166125	895420	5.4	150120	1680313	11.19
1999/00	183486	2757186	15.02	167718	1634268	9.79