PN-ACW-813

# Southern Africa Root Crops Research Network

# (SARRNET)

## Applying a Sub-Sector Analysis Approach to Studying the Marketing of Cassava and Sweet Potato in Southern Africa: The Case of Zambia

## Main Survey Report

RuralNet Associates Limited

## TABLE OF CONTENTS


LIST OF ACRONYMS ..... 3

ACKNOWLEDGEMENTS ..... 4

EXECUTIVE SUMMARY ..... 5

1.0 INTRODUCTION AND BACKGROUND ..... 13
- 1.1 BACKGROUND ..... 13
- 1.2 METHODOLOGY ..... 14

2.0 ECONOMIC AND SOCIAL TRENDS ..... 17
- 2.1 THE ECONOMY ..... 17
- 2.2 FOREIGN TRADE ..... 18
- 2.3 POPULATION DEVELOPMENTS ..... 19
- 2.4 PRIVATE SECTOR DEVELOPMENTS ..... 19

3.0 AGRICULTURAL PRODUCTION ..... 21
- 3.1 FOOD PRODUCTION ..... 22
- 3.2 FOOD SECURITY STATUS ..... 26
- 3.3 CASH CROP PRODUCTION ..... 28

4.0 CASSAVA AND SWEET POTATO PRODUCTION AND CONSUMPTION ..... 30
- 4.1 BACKGROUND ..... 30
- 4.2 PRODUCTION AND UTILISATION TRENDS ..... 31
- 4.3 RESEARCH AND DEVELOPMENT ..... 33

5.0 PROFILE OF CASSAVA AND SWEETPOTATO SUPPLY CHAIN ACTORS ..... 36
- 5.1 DESCRIPTION OF THE MARKETING CHAINS ..... 36
- 5.2 PROFILE OF CONSUMERS ..... 39
- 5.3 PROFILE OF TRANSPORTERS ..... 46
- 5.4 PROFILE OF TRADERS ..... 47
- 5.5 PROFILE OF PRODUCERS ..... 56
- 5.6 PRODUCTION COST AND MARGINS ..... 69

6.0 CONCLUSIONS AND RECOMMENDATIONS ..... 70

APPENDICES ..... 72
- APPENDIX 1: PRODUCTION COST AND MARGINS ..... 73
- APPENDIX 2: REFERENCES ..... 76

## LIST OF ACRONYMS

| | |
|---|---|
| ACMV | Africa Cassava Mosaic Virus |
| CGM | Cassava Green Mite |
| CMB | Cassava Mealy Bug |
| CMV | Cassava Mosiac Virus |
| COMESA | Common Market for East Africa |
| FAO | Food Agency Organisation |
| GDP | Gross Domestic product |
| HDI | Human Development Index |
| NTEs | Non-traditional Exports |
| PHS | Post Harvest Survey |
| RTIP | Root and Tuber improvements |
| SIDA | Swedish International Development Authority |
| UNDP | United Nations Development Programme |
| ZDHS | Zambia demographic and Health survey |

## ACKNOWLEDGEMENTS

The team would like to sincerely thank all those who provided an input towards the undertaking of this study. We would like to particularly pay special tribute to Dr. Peter Ewell for his invaluable support and contribution rendered throughout the study.

We are sincerely thankful to SARRNET for the opportunity to undertake the study and we acknowledge the support and the encouragement received from the team members of SARRNET.

We are indebted to Davis Chitundu and the entire Root and Tuber team for their commitment and encouragement in providing the necessary material needed to this study. Great appreciation goes to Dr. Simwamba the co-ordinator of Root and Tuber programme for his tremendous support.

We would also like to thank all the team players involved in this study with special thanks to Mr. Alexander Phiri for his commitment; Mr. Nzola Mahungu for his support; Mr. Kolijn Sicco for his involvement and contributions; Rupert Best, for his valuable comments.

Deep appreciation goes to RuralNet staff, particularly Mr. Fison Mujenja and Stuart Nsana for the enthusiasm and contribution made during the study and write up of this report.

# EXECUTIVE SUMMARY

## *INTRODUCTION AND BACKGROUND*

### *Background*

This is a study of the marketing of Cassava and Sweet Potato crops in Zambia undertaken over a span of two years. The Study is regional in coverage, involving two other countries, Malawi and Tanzania. A three phased approach was employed for the study: *Phase I* - Literature review; *Phase II* - Qualitative Assessment, and; *Phase III* - Main Quantitative Study. This report summarises the findings of the three findings.

The following were the key study objectives: (i) To carry out comprehensive literature reviews to understand current production trends of cassava and sweet potato and identify information gaps before collecting field level data; (ii) To understand the dynamics of the cassava and sweet potato markets by characterising the producers, the rural market wholesalers, transporters and the retailers, focusing also on seasonal variations of product demand and supply determining in turn seasonal price variations; (iii) To find out the current levels of household processing of cassava and sweet potato whether for own consumption or for the market; including determination of the proportion of production that is marketed and assess the technologies used in processing the raw materials; (iv) To assess consumer perception and preferences of the different forms of cassava and sweet potato sold on the market relative to their end-use. In line with this, assess whether there is any substitution of other products for these new products from cassava and sweet potato; (v) To study the current linkages between farmers and industrial processors of cassava (e.g. contract farming, etc.) and assess mutual benefits from these arrangements; (vi) To study the different marketing channels for cassava and sweet potato and determine the marketing margins and market efficiency; (vii) To study opportunities for and constraints to the development of regional trade for processed cassava products, and; (viii) To study the factors that determine the adoption of cassava and sweet potato in the predominantly maize-based farming systems.

### *Methodology*

There were four sample sites: Mansa (the main producing area for cassava); Solwezi (the main producing area for Sweet potato); Kitwe (the main copperbelt market for both cassava and sweet potato), and; Lusaka (the major market for the country's agricultural products). A qualitative assessment of various players in the marketing chain using a number of qualitative tools was undertaken. This was after literature review which determined the nature of data available as well as gaps.

The main quantitative survey was carried out, involving the administration of 920 questionnaires; 471 for the cassava part and 449 for sweet potato.

## *MAJOR STUDY FINDINGS*

### *Economic and Social Trends*

Zambia's economy has been heavily dependent on mineral (copper) mining, although the dominance of copper over the years has been on steady decline. Between 1990 and 2001,

the share of copper in GDP averaged 10%. Mineral based exports still dominate foreign earnings even though this has reduced to about 70%, from 93% in 1965.

The country's economic decline over the years is evidenced by a number of indicators. In the 1990s, poverty deepened with some social groups that had been relatively secure becoming vulnerable to poverty and hunger. In 1998, 82% of the population lived on an equivalent of $1 a day while nearly 60% of the population suffered from food insecurity. Although 69% of the population was classified as poor in 1991, the proportion rose to 73% in 1998, an improvement after the 1996 peak of 81%.

The government has made attempts aimed at redressing the decline in social and economic trends. In April 2002, a Poverty Reduction Strategy Paper to run for three years was adopted by Cabinet with the goal to reducing poverty to 50% by the end of 2004. Agriculture is to play the key role in poverty reduction.

### *Foreign Trade*

In nominal terms, Zambia's earnings from goods and services dropped from US$1,625 million in 1980 to US$1,016 million in 2001. This is a decline of 37.5%, with a substantial decrease recorded when reflected in real terms. Imports of goods and services have fallen less drastically, declining by 22.8% from US$1,986 million in 1980 to US$1,534 million in 2001. Extensive trade reforms in the past decade have been embarked upon. However, the high production costs in the country has resulted in manufacturing industry being uncompetitive.

### *Population Developments*

According to the 2000 Census of population and housing estimates, the total population of the country is just over 10.2 million; an increase from the 1990 and 1980 figures of 7.4 million and 5.7 million respectively. Population growth rates were estimated at 2.7% for the 1980-1990 period and showed a marginal increase in the past decade rising up to 2.9%.

### *Private Sector Developments*

There was an acceleration of the country's liberation of the economy in the early 1990s, leading to considerable private sector developments in the agricultural sector as evidenced by the innovative forms of market integration. This is beginning to fill the gap left by the demise of co-operatives and other government sponsored marketing institutions. This has been best achieved through contractual arrangements between producers and the integrating agencies and has been most successful in high value crops.

### *Agricultural Production*

Clearly, agriculture is the sector with the highest potential in the country. At least 60% of the country's labour force depends on the agricultural sector. The agricultural GDP grew by 50%, from USD 2,455 million in 1991, to 3,706 million in 2000. However, in a number of years, there has been a fluctuation in the agricultural GDP growth rate due to recurring droughts in the same period.

Total maize production (Zambia's staple food) declined from 1,128,670 metric tonnes in 1989/90 to 801,877 metric tonnes in 2000/01, a decline of close to 30%. There was a dramatic increase in the production of small grains (sorghum and millets) in the period under review due to their greater drought tolerance as well as less input requirements. Coupled with the crop diversification policy by the government, there has been a reduction of the share of maize's total annual cultivated hectarage. The biggest relative gain in the area cultivated has been with the small grains and tubers (millet, sorghum. cassava and sweet potatoes). The combined share increased from 20.8% in 1990/91 to 36.9% in 1999/00.

The increase in hectarage under cultivation of low input crops (cassava, sweet potato and small grains) has resulted in a reduction in fertiliser use in kg per hectare by small scale farmers, from 98.2 kg in 1991 to 37.5 in 2000, a reduction of 62%.

### *Food Security Status*

The evidence in malnutrition in the 1990s is overwhelming, characterised by a sharp increase in household food insecurity and childhood malnutrition. Food insecurity based on the consumption expenditure relative to the cost of the minimum food basket in most parts of the country shows that in 1996, at least 77% of the rural and 39% of the urban households were classified as severely food insecure, representing a picture similar to the situation in 1991/92 (the year of the worst drought in living memory).

### *Cash Crop Production*

Cash crop production for the smallholders has tended to be dominated by cotton. Others, on a much reduced level, include tobacco, groundnuts, maize, cassava and sweet potatoes. Generally, cash crop production has tended to be higher for districts near Lusaka (major market) such as Mumbwa where it accounts for over 30%. There is evidence that farmers have increasingly adopted the growing of new crops under out-grower schemes.

Agricultural exports have performed well since the early 1990s, rising from a total value of USD 23,466 to USD 106,026 respectively, an increase of more than 350%.

## *CASSAVA AND SWEET POTATO PRODUCTION AND CONSUMPTION*

### *Background*

The majority of the 30% of the country's population who depend on cassava as a staple are largely from the key producing areas, namely: Northern, Luapula, Northwestern and Western provinces. For the rest of the country, including Copperbelt and Lusaka provinces (the country's leading markets), cassava is largely eaten as a snack in a roasted form together with roasted groundnuts.

### *Production and Utilisation Trends*

The total agricultural land in Zambia is approximately 35 million hectares out of which 5.3 million ha (15%) is the total arable area. The cassava production area was 110,000 ha in 1991 (2.1% of arable land). This rose to an estimated 165,000 ha (3.1% of arable land) in

2001 (FAO estimates). The corresponding figures for sweet potatoes according to FAO estimates are 3,800 ha (0.072%) and 3,600 ha (0.068) respectively.

The most common cassava varieties grown are Bangweulu, Nalumino and kapumba. According to FAO estimates, production of cassava in Zambia increased from 682,000 mt in 1991 to 950,000 mt in 2001, up by 40%. The average yield in the period under review was 6 tonnes per hectare. The corresponding production figures for sweet potato show a decline from 56,000 mt in 1991 to 53,000 in 2001. The yield per hectare averaged 14.7 mt.

There is a strong likelihood that the FAO statistics have been grossly under-estimated. It is generally argued that both the hectarage under production as well as production figures of tuber crops, and particularly cassava, have undergone a steep upswing in the 1990s due to reasons stated above.

*Cassava Utilisation*

Of the 30% Zambian population who depend on cas va as the main staple food, a good number of them eat it throughout the year. However, from December to March there is an increase in cassava consumption because the period being just before new crops are harvested, the availability of other food stuffs such as cereals is either very low or non-existent. During the period of peak consumption, 96% of the households in major producing areas eat cassava nshima twice a day.

*Sweet Potato Utilisation*

Northwestern province has the highest sweet potato production per unit area. The peak period for sweet potato consumption coincides with the harvesting period, i.e. April to August/September. During the peak period, 94% of the households in producing areas eat boiled sweet potato more than 7 times per week. Dried sweet potato is eaten by only 19%, and 5 times per week.

***Research and Development***

Research work in Zambia on cassava and sweet potato started in 1979 following the establishment of the Root and Tuber Improvement Programme (RTIP). However, it was not until 1987 that serious research work was launched following funding from the Swedish International Development Authority (Sida) that commenced that year to RTIP. Successful research on cassava has been undertaken focusing on a number of areas, the key ones being: breeding; agronomy; pathology; genetic evaluation and utilisation; yield potential and adaptability; best time to harvest cassava; appropriate spacing; and; necessity of weeding.

The RTIP over the past years has done significant work in popularizing the production of improved cassava varieties among smallholder farmers. Although no specific adoption surveys have been undertaken, there is evidence that Bangweulu, Nalumino and Kapumba recommended varieties, whose average yields in metric tones per hectare are: 31.27; 28.86 and 21.72 respectively have been widely adopted by farmers. As noted, their yields are more than three times the average yield of traditional varieties estimated at 6 tones per hectare.

Research work in sweet potato has been of a lower magnitude compared to cassava. Unlike cassava which has had 11 areas of research work, sweet potato has had 4, amounting to almost a third of that of cassava, namely: breeding; fertiliser trial; genetic evaluation and utilisation, and; new promising clones.

The three recommended sweet potato varieties, are; Zambezi, Luapula and Chingovwa with respective yields in metric tones per hectare of 16, 17, and 18 compared to the average yield of traditional varieties ranging from 7 to 14 tones per hectare.

## *PROFILE OF CASSAVA AND SWEETPOTATO SUPPLY CHAIN ACTORS*

### *Cassava Marketing Chain*

Fresh cassava marketing has two distinct channels: *First, direct* channel in which the farmer sells directly to the final rural consumer (commonly confined to areas of production). The *second* channel involves the use of an intermediary, the rural traders, who, in most cases, happen to be women in the markets or on road sides. There are three common channels for processed cassava: (i) *direct* channel in which the farmer processes the product and sells it *directly* to final rural consumers; (ii) the farmer selling directly to the urban consumer; (iii) The use of the middleman and the trader.

### *Sweetpotato (Fresh) Marketing Chain*

Sweet potatoes are sold almost wholly in the fresh form, using three channels. In the *first* channel, farmers sell directly to final consumers either in the rural market or the urban market. The *second* channel involves traders who buy from farmers and sell directly to consumers. The *third* channel involves brokers/commission agents and the urban trader.

### *Profile of Consumers*

#### *Cassava*

The largest number of consumers (buyers) in both urban and rural markets were low income (50.8% and 11.9% respectively). More than 30% of the consumers had reached tertiary/ college education; 38% secondary; 29% primary and the rest (2.5%) had never been to school.

Common varieties consumed for high dry matter and low fibre content were: Mwakamoya (15.9%), Manyokola (10.5%) and Bangweulu (8.5%). The majority of consumers (68.7%) got their cassava from retailers.

Cassava was a good substitute for a number of food stuffs. The three most common were sweet potatoes (34.9%), Irish potatoes (25,5%), and bread (11.4%).

#### *Sweetpotato*

The highest number of sweet potato consumers came from the low income group in both urban (51%) and rural areas, a situation very similar to that of cassava. However, unlike cassava, there were more urban middle income consumers for sweet potato (37% compared to 19.9%). The education status was not very different from that of cassava

consumers. A good number had been to a tertiary institution (37%); 41% had attained secondary education.

The bulk of sweet potatoes (82.5%, against 68.7% for cassava) were purchased from retailers at the city markets. The most preferred variety was chingovwa (by 66%). Reasons for buying the preferred variety included sweetness, dry matter content, low fibre content, white colour and big tubers. The sweet potato was consumed mostly in the boiled form (56%) though some consumers would eat it even as fried chips (20%), roasted or even raw.

An overwhelming 92% of households were substituting other foods with sweet potato (compared to 74.1% for cassava). Sweet potatoes, during their season were substituting bread (63.6%), Irish potato (9.8%), Cassava (9.2%), Rice (6%), Fruits (4.3%), Nshima, meal samp and pumpkins (7.1%).

### *Profile of Traders*

#### *Cassava Trader*

Three quarters of the respondents were male (75%). Close to 60% were aged between 26 to 45. Women were predominantly found at local markets, and sold small quantities of the commodity. The educational level of many traders was modest with the majority having gone as far as primary (63.3%). The majority (73.3%) were involved in retailing. As many as 84.1% of respondents had only started the business in the past 10 years.

The domestic market potential for cassava was generally estimated by most traders as either quite big or reasonably big (70.6%). This was unlike the export market, which was mostly described as either non-existent, or the respondents did not know about its existence (56%).

#### *Sweet Potato Traders*

All the traders were in the 16-65 age range with the average age range being 26-35 years. Literacy levels were much lower than was witnessed for consumers. Of the 146 traders, 16 or 11% had never been to school, 81 or 55% had only attended primary school, 46 or 25% had been to secondary school. Those who had been to a tertiary institution were only 3 or 2%.

Prices of sweet potatoes were determined on the criteria of size of the tubers (65.8%), size and colour (13.0%) and size and number of tubers (8.9%). As for customers of sweet potatoes, traders easily found willing buyers at public markets in the towns (85.6%). The domestic market potential for sweet potatoes was described as quite big (35.6%), reasonably big (43.8%), quite small (6.2%) and small (11%). The export market potential on the other hand was disappointing with 71% traders saying they did not know about it.

### *Profile of Producers*

#### *Cassava Producers*

Men and women producers were almost equal (59 men and 61 women). Their ages ranged from as young as 14 to over 65 years. The most common number of people per

household was [illegible] (25.8%). Their literacy level was mostly primary school (70%) with 5.8% not having been to school at all. The majority (73%), had farming as their mainstay in life. Secondary data shows that in Luapula province, cassava is the most important cash crop.

Five cropping patterns were used by the producers. These were mono cropping, inter-cropping, mixed cropping, a mixture of both mono and mixed cropping and a mixture of inter and mixed cropping. Mixed cropping pattern was the most commonly used (38%) followed by those using inter-cropping (26%). The reasons given for adopting mono cropping were predominantly because of the ease of management (75%). Those farmers who adopted mixed cropping did so largely because it was labour saving (76%). Inter-cropping, on the other hand was typically adopted because it was both labour saving and there was inadequate land (74%). Planting material was readily available to 64% of respondents.

For the majority of households (87%), cassava was grown for sale with both the husband and wife often actively participating in the marketing decisions. The peak of cassava marketing season in Zambia is usually between the months of march/April and August/September. Prices often soar especially if it is either at the beginning of harvest or at the end of harvest.

About half (49%) of producers preferred Katobamputa variety. The next most preferred was Bangweulu, by 19%. Means of transportation of cassava chips, flour and fresh roots by producers to markets was mainly by bicycle (51.7%). As high as 88% of the producers had seen an increase in production over the past years. Producers generally thought the increase was a consequence of cassava being a low external input crop. Close to 73% of farmers stored cassava largely in chip form for future consumption as well as resale at a later stage.

A total of 110 respondents or 92% out of the sample size of 120 where involved in processing cassava. The most commonly cited processing technology was pounding and sieving into flour (92%). Over three-quarters of producers (78%) graded/sorted their cassava roots before selling. The main criteria used were: damage of produce, size of tubers and colour of tubers. Quite often, no special materials and costs were involved for grading to take place (78%). The reason for this high percentage of farmers grading/sorting their produce was better prices for graded products (74%).

*Sweet potato Producers*

Of the 103 producers, 76 were male and 27 female. Their average ages were 36-45 years. A number of people were involved in farming in each household. In 18 of the households for example, over 9 people were involved in the growing of sweet potatoes. About two thirds (64%) of respondents had farming as their main source of livelihood. The popular variety among farmers was predominantly Chingovwa (97%). Almost all farmers easily accessed the planting material of their preferred variety.

Three cropping patterns were practiced; mono cropping, mixed cropping and inter cropping. Unlike cassava which had mixed cropping as the most commonly practiced cropping pattern, sweet potato producers preferred to use mono cropping almost exclusively (77%). This was essentially because of easy management of the crop and

because it was labour saving. Four farmers practiced mixed cropping exclusively and this was because it was equally easy to manage, land saving and labour saving.

At least 72% of respondents sold their sweet potatoes. Husbands were commonly the decision-makers on the sale of the crop (45%) followed by both husbands and wives being jointly involved (38%). The bulk of them (91%) were involved in the sales of sweet potatoes during the 1998/1999 season. Prices were determined on the basis of size and grade (quality) of tuber, by two thirds of the respondents. Marketing of sweet potatoes peaked around July/August (85%) with period of highest prices. Sweet potato were transported using portage, bicycle, ox-cart and public transport. The most common of these was portage.

Only 7% of producers stored their sweet potatoes. Storage places were in the soil, own house (29% each) and dug pits (14%). After storage, prices were often depressed (43%), an indication that the produce may have lost quality. To underscore this issue, 71% of those who stored reported rotting as a big problem they encountered in storage.

The majority of households (88%) graded their swe potato crop. The criteria that were used were according to tuber size and amount of damage to the tubers (67%) and amount of damage to tubers (21%).

### *Production Cost and Margins*

Cassava and sweet potatoes have much lower production costs than crops like maize, which require more expensive inputs such as chemical fertilizer. The two crops have been traditionally grown without the use of fertilizers with good yields.

The farmer's gross profit margin for sweet potato ranged between 26% to 47% depending on whether he uses middlemen or sells directly. The mark-up for a middleman was 4.4% to 12% for fresh sweet potato. The corresponding values for cassava are 88% (for a producer selling fresh cassava locally) and 14% to 19% for chips. On the other hand, the middleman's profit margin ranged from 8% to 11% for flour.

# 1.0 INTRODUCTION AND BACKGROUND

## 1.1 Background

This report is a synthesis of a study on the marketing and commercialisation of Cassava and Sweet Potato crops in Zambia, undertaken over a period of two years. The Study was regional in coverage, involving two other countries, Malawi and Tanzania. A three phased approach was employed for the study as follows:

- ***Phase I:*** Literature review. This took place between August and November 2002. Its product was a report assessing work done in Zambia on marketing and commercialisation of cassava and sweet potato;

- ***Phase II:*** Qualitative Assessment. This commenced in December 2000 and finished in February 2001 with a *Qualitative Report*, Detailing the Marketing Chains; and,

- ***Phase III:*** Began in February 2001 and ended in March 2002. This was a quantitative study and formed the bulk of the work whose product was the main report.

The following were the key study objectives:

- To carry out comprehensive literature reviews to understand current production trends of cassava and sweet potato and identify information gaps before collecting field level data;

- To understand the dynamics of the cassava and sweet potato markets by characterising the producers, the rural market wholesalers, transporters and the retailers, focusing also on seasonal variations of product demand and supply determining in turn seasonal price variations;

- To find out the current levels of household processing of cassava and sweet potato whether for own consumption or for the market; including determination of the proportion of production that is marketed and assess the technologies used in processing the raw materials;

- To assess consumer perception and preferences of the different forms of cassava and sweet potato sold on the market relative to their end-use. In line with this, assess whether there is any substitution of other products for these new products from cassava and sweet potato;

- To study the current linkages between farmers and industrial processors of cassava (e.g. contract farming, etc.) and assess mutual benefits from these arrangements;

- To study the different marketing channels for cassava and sweet potato and determine the marketing margins and market efficiency;

- To study opportunities for and constraints to the development of regional trade for processed cassava products, and;

- To study the factors that determine the adoption of cassava and sweet potato in the predominantly maize-based farming systems.

## 1.2 Methodology

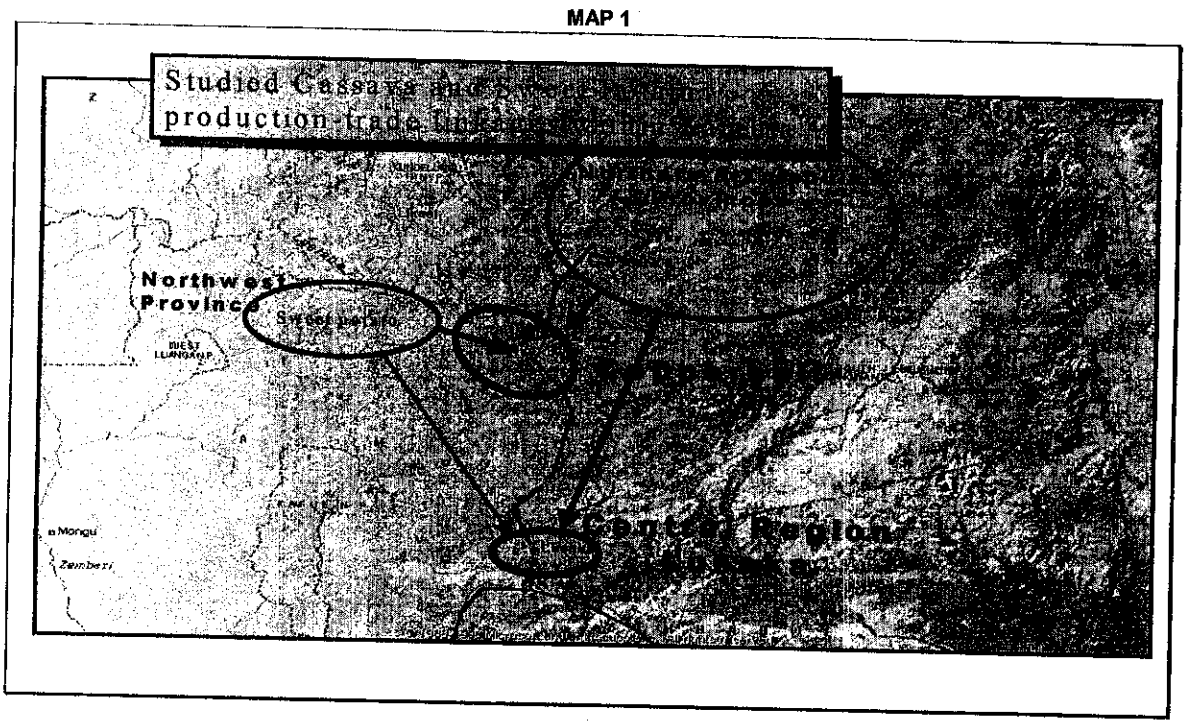
### 1.2.1 Sample Sites

The major sample sites for the survey were four, namely; Mansa (the main producing area for cassava); Solwezi (the main producing area for Sweet potato); Kitwe (the main copperbelt market for both cassava and sweet potato), and; Lusaka (the major market for the country's agricultural products).

### 1.2.2 Justification for Selected Sites

The choice of study sites was deliberate (**Map 1**). As noted above, Mansa (Luapula province), Kitwe (Copperbelt province), and Lusaka (Lusaka province) were selected for the cassava part of the study.

**MAP 1**




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

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

For the sweet potato part of the study, Solwezi (North-Western province) along with the other two sites mentioned above (Kitwe and Lusaka) were selected. North-Western province is the country's highest producer of sweet potato. Although a study has not yet been undertaken for verification, at least more than two thirds of the province's sweet potato is transported outside the province for consumption. Again Kitwe is the nearest, largest town on the Copperbelt to Solwezi. Naturally, one would expect to find a lot of sweet potato from North-Western province in Kitwe. The reasons for the choice of Lusaka as a study site with regard to the sweet potato component of the qualitative market study are similar to those given above in the case of cassa

### 1.2.3 Qualitative Phase

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

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

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

### 1.2.4 Quantitative Phase

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

**Table 1: Sampling Details and Sites**

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

## 2.0 ECONOMIC AND SOCIAL TRENDS

Zambia is a land-locked country located in Southern Africa, sharing a common border with 8 other countries. The country has a total area of 753,000 square kilometers and an estimated population of just over 10 million. Administratively, Zambia is divided into 9 provinces namely: Lusaka, Central, Copperbelt, Northern, Luapula, North-western, Western, Southern and Eastern. Each province is further divided into districts with well over 70 districts the country over.

### 2.1 The Economy[1]

Zambia at independence inherited an economy with serious imbalances caused by the dominance of copper in the economy and the concentration of industrial activities along the line of rail while rural areas were neglected. After independence, there was an attempt to redress this imbalance. However, the import substitution strategies that were adopted at the time meant that urban areas continued to be major beneficiaries. The result was high growth rates for manufacturing, transport and services averaging respectively at 8%, 7% and 1% between 1966 and 1974. It altered the structure of production away from mining, whose share in GDP declined from 41% in 1965 to 33% in 1974, to manufacturing and services with their contribution to GDP rising to from 7% and 14% in 1965 to 13% and 21% respectively. The rising share of services in GDP resulted from the massive investments made in education and health.

The sharp fall in the price of copper in 1975 from which it has never fully recovered has led to a continued decline in the dominance of copper production in GDP. Between 1990 and 2001, the share of copper in GDP only averaged 10%. Mineral based exports still dominate foreign earnings even though this has reduced to about 70%, from 93% in 1965. Copper is still important to the Zambian economy. However, there have always been urgent calls to diversify away from copper production since its decline started. This continues to this day. The recently adopted Poverty Reduction Strategy Paper identifies agriculture, tourism and manufacturing as the growth sectors that will help to resuscitate the economy and bring down the high levels of poverty.

That Zambia's economy has deteriorated over time is evident from the deepening human crisis. In the 1990s, poverty deepened with some social groups that had been relatively secure becoming vulnerable to poverty and hunger. In 1998, 82% of the population lived on an equivalent of $1 a day while nearly 60% of the population suffered from food insecurity. Although 69% of the population was classified as poor in 1991, the proportion rose to 73% in 1998, itself an improvement after the 1996 peak of 81%. Of the poor in 1998, 58% were classified as extremely poor while 55% were below the poverty datum line. In 2002, it is estimated that about 1.2 million Zambians would need emergence food aid to avoid starvation.

This deepening human crisis has been captured in the deterioration to human development as captured by the UNDP Human Development Index (HDI) which apart from income also emphasises progress in education attainment and health status. Both the

[1] This section draws heavily from Dr. Dennis Chiwele's Chapter 2 of the Sida's Agricultural Sector Programme 2003 to 2007 Technical Proposal, RuralNet Associates Limited.

global Human Development Reports and the National Human Development Reports show how Zambia's HDI declined rapidly between 1985 and 1995, falling lower than its value in 1975, the only country to be in this situation of the 79 countries for which a time series for this period could be constructed.

It has therefore become imperative that this human crisis be reversed. In this regard, the Zambian Government is making a greater focus on reducing poverty in its policies and strategies. Therefore, in April 2002, a Poverty Reduction Strategy Paper to run for three years was adopted by Cabinet with the goal to reducing poverty to 50% by the end of 2004. Agriculture, through the implementation of the Agriculture Commercialisation Programme, is supposed to be the key instrument for reducing poverty and hunger in Zambia because it is recognised as combining in a unique way the virtues of growth and equity.

In an attempt to reverse economic decline and reverse the declining economic trends, Zambia has undertaken serious economic reforms. However, despite the well intended economic adjustments, real economic growth has not been realised. Over the period 1990 to 2001, Zambia had an average annual growth rate of 1%. As a result, per capita GNP has had a downward trend to a fraction of what it was at independence. National savings fell to levels that cannot support the needed investment. Consequently, there has been low investment, low rate of capital formation and poor income generating capabilities and employment creation, further dampening the livelihoods of the majority of Zambians. Overall, per capita income dropped by more than 50% in real terms between 1970 and 2000.

The average annual growth of 1% against a population growth rate of 2.9% per annum, together with inadequate pro-poor interventions, weak integration of the poor, and especially small scale farmers into the market, absence of appropriate livelihood approaches, weak governance together with weak access by the majority of the population to real assets have combined to worsen hunger and poverty in Zambia.

## 2.2 Foreign Trade

There has been extensive reform of the trade regime in the country in the past decade and this has included lowering trade taxes, narrowing their dispersion, and collapsing the trade tax bands to three. Furthermore, most non-tariff barriers have been removed with the country's signing of the Common Market for East and Southern Africa (COMESA) protocol in 2000. While this has expanded Zambia's export opportunities within the region, it has also led to other reversals. The high production costs in the country has resulted in manufacturing industry being uncompetitive.

In nominal terms, Zambia's earnings from goods and services dropped from US$1,625 million in 1980 to US$1,016 million in 2001. This is a decline of 37.5%, with a substantial decrease recorded when reflected in real terms. Imports of goods and services have fallen less drastically, declining by 22.8% from US$1,986 million in 1980 to US$1,534 million in 2001.

## 2.3 Population Developments

The 2000 Census of population and housing estimates that the total population of the country is just over 10.2 million. This is an increase from the 1990 and 1980 figures of 7.4 million and 5.7 million respectively. Population growth rates were pegged at 2.7% for the 1980-1990 period and showed a marginal increase in the past decade rising up to 2.9%. The number of people living in rural areas was in the majority in 1980 with 60.1% reported to be rural dwellers. There was just a marginal increase to 60.6% by 1990. However, it is expected that this figure must have reduced by the year 2000 because of increased rural-urban migration witnessed in the 1990s to the extent that Zambia is now being considered as one of the most urbanised countries in Africa. With a current population of .....Lusaka province for example, has more than doubled its population (growth rate 3.8%) since 1980 (CSO, 2000).

The rural-urban migration was initially triggered by a booming mining industry in the late 1960s, which resulted in huge investments in both social and economic sectors of the country`s major towns. This led to rural-urban migration in search of employment and opportunities. Lack of adequate investment in rural areas over the years has resulted in such areas being unattractive.

## 2.4 Private Sector Developments

Following liberalization of Zambia's economy accelerated in the early 1990s, there has been considerable private sector developments in the agricultural sector as evidenced by the innovative forms of market integration. This is beginning to fill the gap left by the demise of co-operatives and other government sponsored marketing institutions. This has been best achieved through contractual arrangements between producers and the integrating agencies and has been most successful in high value crops such as paprika, vegetables, cotton, sunflower and soybeans through the following modes:

- ***Market specification contracts***. This involves specification of some of the products characteristics that will be acceptable to the firm. This method is being used by organisations engaged in marketing of fresh flowers and vegetables such as Agriflora.

- ***Resource providing contracts***. A processing or marketing firm provides resources to farmers to be used in the production process. It is the most common form of market integration in Zambia. The contracting agency provides inputs to the producer and repayment of inputs is in kind. The farmer is required to supply a stipulated volume of the product immediately after harvest. A substantial part of marketed maize is produced this way. Traders supply inputs on an agreed exchange ratio, and because of the high cost of fertiliser, the exchange ratio tends to be in favour of the traders. Fertiliser companies like Omnia are involved in pre-financing maize production. Amanita Zambiana pre-financed maize and soybeans production for 2001/2002 season for a minimum of 100 hectares per crop per farmer. Many milling companies are planning or have already started pre-financing crop production.

- ***Management and income guaranteeing contracts***. This method of market integration is being used by Agriflora. It involves forward contracting to supply a

product at an agreed price and quality. The farmer does not have to look for a market for the product after harvest.

- ***Market integration in the cotton industry***. This is a new form of market integration which takes place at three levels: the company, the entrepreneur and the farmer. The company supplies inputs to the entrepreneur, who in turn supplies these inputs to selected farmers who are contracted to produce a specified volume of cotton. The farmers are obliged to supply cotton to the entrepreneur who in turn is contracted to supply to Dunavant. This arrangement is working well and the recovery rate is said to be above 80%.

## 3.0 AGRICULTURAL PRODUCTION

Zambia's agricultural production is influenced by the three agro-ecological zones into which the country is divided. **Table 2** summarises the key features of the country=s three major agro-ecological zones.

**Table 2: Main Features of Zambia=s Agro-ecological Zones**

| Zone | Coverage | Elevation (m) | Rainfall (mm) | Growing season (days) | Annual Mean Temp.(c) |
|---|---|---|---|---|---|
| I | Major valleys e.g. Gwembe, Lunsemfwa and Luangwa; Parts of Western & Southern provinces | 300-900<br>900-1200 | <800 | 80-120 | 20-25 |
| II | Sandveld plateau of Central, Eastern, Lusaka and Southern provinces; Kalahari sand plateau & Zambezi flood plains of Western province | 900-1300 | 800-1000 | 100-140 | 23-25 |
| III | Part of degraded Central African plateau covering Northern, Luapula, Copperbelt, North-western provinces & parts of Serenje and Mkushi districts | 1100-1700 (>1000 in case of Luapula) | 1000 mean annual | 120-150 | 16-25 |

**Source: Complied from A.Bunyolo and Others AAgro-ecological & Climatic Conditions in S.W. Mulokela (ed), 1995; Zambia Seed Technology Handbook**

Agriculture in Zambia may be divided into three main categories: (i) production by large scale holders (commercial farmers) estimated at 1% of the total farming population; (ii) production by a growing number of emergent/medium scale holders estimated at 20% of the farming population; and, (iii) production by a mass of traditional/small scale holders scattered throughout the country, producing at low levels and selling nothing or little to the market. These are estimated at 79% of the country=s farming population. Recent estimates put the total number of small-scale households at 600,000 (MAFF, 2000).

Agriculture still remains the sector with the highest potential in the country. Over 60% of the country's labour force depends on the agricultural sector. The agricultural GDP grew by 50%, from USD 2,455 million in 1991, to 3,706 million in 2000. However, in a number of years, there has been a fluctuation in the agricultural GDP growth rate due to recurring droughts in the same period.

## 3.1 Food Production

Total maize production (Zambia's staple food) declined from 1,128,670 metric tonnes in 1989/90 to 801,877 metric tonnes in 2000/01, a decline of close to 30%. The annual maize production during the period under consideration varied due to the varying weather conditions. The period was characterized by several droughts. Other crops have shown some improvement (see **Table 3**) during the same period. The increase in the production of small grains (sorghum and millets) in the period under review was particularly dramatic (see **Table 3**). This may be attributed to two factors, *first,* the small grains are more drought tolerant and *second*, they require less inputs. Consequently, they were more appealing in the face of deteriorating socio-economic conditions of smallholders brought about by the overall decline in the country's economy.

## Table 3: Total Agricultural Production for Selected Crops, 1989/90 to 1999/00

Metric Tonnes

| Crops | 1989/90 | 1990/91 | 1991/92 | 1992/93 | 1993/94 | 1994/95 | 1995/96 | 1996/97 | 1997/1998 | 1998/99 | 1999/00 | 2000/01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White Maize | 1,128,670 | 1,095,908 | 483,492 | 1,579,767 | 1,020,749 | 737,835 | 1,409,485 | 921,968 | 649,537 | 852,475 | 971,614 | 801,877 |
| Tobaco Virginia | 1,550 | 865 | 1,258 | 4,138 | 5,015 | 2,240 | 1,950 | 3,504 | 9,675 | 2,169 | 3,416 | 5,640 |
| Tobacco Burley | 1,550 | - | 1,050 | 2,514 | 1,083 | 1,560 | 1,892 | 939 | 25,941 | 3,762 | 3,196 | 4,196 |
| Groundnuts | 25,086 | 28,188 | 20,504 | 42,141 | 34,732 | 36,119 | 34,755 | 45,589 | 56,934 | 45,302 | 53,950 | 53,251 |
| Sunflower | 31,945 | 17,032 | 2,388 | 33,881 | 15,737 | 21,999 | 42,857 | 12,773 | 7,008 | 6,748 | 8,074 | 19,176 |
| Wheat | 47,646 | 52,206 | 48,436 | 61,588 | 54,173 | 33,795 | 51,196 | 32,456 | 70,000 | 69,226 | 74,700 | 1,102,086 |
| Paddy Rice | 9,293 | 14,602 | 8,289 | 13,993 | 6,358 | 12,110 | 13,296 | 14,033 | 6,399 | 14,700 | 8,871 | 6,547 |
| Soya Beans | 23,814 | 22,824 | 7,822 | 24,872 | 21,893 | 18,782 | 34,800 | 29,283 | 12,322 | 26,703 | 22,769 | 4,249 |
| Seed Cotton | 63,536 | 48,721 | 25,899 | 47,851 | 33,093 | 16,578 | 40,824 | 74,647 | 110,000 | 58,515 | 56,758 | 49,498 |
| Mixed Beans | 14,312 | 14,123 | 20,401 | 23,534 | 23,180 | 23,751 | 23,838 | 13,728 | 13,905 | 16,492 | 14,708 | 21,349 |
| Sorghum | 19,591 | 20,939 | 13,007 | 35,448 | 35,068 | 26,523 | 35,640 | 28,056 | 25,399 | 25,494 | 26,801 | 30,245 |
| Millet | 107 | 66 | 181 | 179 | 135 | 182 | 143 | 130 | 1,446 | 69,618 | 43,161 | 49,606 |
| Sugar Cane | 1,128,670 | 1,126,539 | 1,136,075 | 1,255,209 | 1,222,037 | na | na | na | na | na | 145,890 | na |

Source: Government of the Republic of Zambia. Macroeconomic Indicators, June 2001. Ministry of Finance and Economic Development

PREVIOUS PAGE BLANK

The crop diversification policy by the government has resulted in the reduction of the share of maize's total annual cultivated hectarage. The biggest relative gain in the area cultivated has been with the small grains and tubers (millet, sorghum, cassava and sweet potatoes). The combined share increased from 20.8% in 1990/91 to 36.9% in 1999/00 (see **Table 4**). Both the share of cultivated area for other crops, mostly legumes and oilseeds, and cash crops dropped as well. Therefore, the gain in the share of small grains and tubers was at the expense of the rest of the crops, but mostly maize. Cassava has had the largest share of the gain in hectarage followed by sweet potatoes.

The increase in hectarage under cultivation of low input crops (cassava, sweet potato and small grains) has resulted in a reduction in fertiliser use in kg per hectare by small scale farmers, from 98.2 kg in 1991 to 37.5 in 2000, a reduction of 62%. The removal of fertilizer and grain (maize) marketing subsidies coupled with the general decline in the socio-economic conditions of smallholder farmers, pushed the price of the commodity beyond reach by the majority of the farmers, causing them to resort to crops requiring low inputs. The recurring droughts of the 1990s also contributed to the decline in total annual cultivated hectarage of maize in favour of the more drought tolerant root and tuber crops and small grains.

**Table 4: Percentage Share Of Crops in total Hectares for Various Farm Categories**

| Crop | Year | All Smallholders | Male Headed | Female Headed | Small Scale | Medium Scale | Zone I | Zone II | Zone III |
|---|---|---|---|---|---|---|---|---|---|
| Maize | 1993/94 | 59.03 | 59.76 | 54.75 | 57.05 | 68.98 | 49.87 | 71.14 | 33.94 |
| | 1994/95 | 57.81 | 57.5 | 59.22 | 56.16 | 69.02 | 53.35 | 69.75 | 40.99 |
| | 1998/99 | 44.16 | 44.65 | 41.99 | 43.32 | 56.58 | 35.50 | 61.38 | 21.15 |
| | 1999/00 | 48.37 | 48.69 | 46.86 | 46.87 | 59.55 | 37.06 | 66.35 | 24.19 |
| Small Grains and Tubers | 1993/94 | 22.98 | 21.95 | 29.03 | 26.14 | 7.07 | 40.62 | 8.00 | 47.77 |
| | 1994/95 | 23.53 | 23.51 | 23.62 | 25.91 | 7.27 | 45.53 | 7.62 | 50.75 |
| | 1998/99 | 35.58 | 35.34 | 36.68 | 37.25 | 10.97 | 54.83 | 12.50 | 64.02 |
| | 1999/00 | 36.93 | 36.56 | 38.65 | 39.21 | 20.10 | 57.12 | 14.62 | 65.15 |
| Cash Crops | 1993/94 | 6.51 | 7.19 | 2.53 | 5.09 | 13.68 | 7.07 | 9.71 | 0.86 |
| | 1994/95 | 6.81 | 7.29 | 4.57 | 5.99 | 12.40 | 0.73 | 13.11 | 0.62 |
| | 1998/99 | 6.68 | 7.15 | 4.52 | 6.03 | 16.14 | 2.80 | 11.58 | 0.57 |
| | 1999/00 | 4.79 | 5.08 | 3.45 | 4.43 | 7.49 | 1.34 | 8.33 | 0.40 |
| Legumes /Oil seeds | 1993/94 | 10.28 | 10.00 | 11.94 | 10.39 | 9.72 | 2.43 | 11.93 | 8.04 |
| | 1994/95 | 11.04 | 10.91 | 11.64 | 11.10 | 10.64 | 0.39 | 10.15 | 13.46 |
| | 1998/99 | 12.17 | 11.49 | 15.30 | 12.26 | 10.97 | 5.06 | 13.16 | 12.91 |
| | 1999/00 | 8.51 | 8.28 | 9.56 | 8.32 | 9.92 | 3.34 | 8.97 | 9.34 |
| Other Crops | 1993/94 | 1.20 | 1.10 | 1.75 | 1.33 | 0.54 | 0.00 | 0.61 | 2.33 |
| | 1994/95 | 0.82 | 0.79 | 0.98 | 0.84 | 0.67 | 0.00 | 0.63 | 1.23 |
| | 1998/99 | 1.41 | 1.38 | 1.51 | 1.14 | 5.33 | 1.81 | 1.37 | 1.35 |
| | 1999/00 | 1.40 | 1.38 | 1.47 | 1.18 | 2.94 | 1.24 | 1.74 | 0.93 |

Source: Calculated from Post Harvest Survey Data, various years

**Table 4** shows that the main increase in the share of cultivated area for small grains and tubers is in Zones I and III. In Zone I it increased from 40.6% in 1993/94 to 57.1% in 1999/00 while in Zone III the share of small grains and tubers increased from 47.8% to 65.2% respectively. In Zone II, maize is still overwhelmingly dominant as in the 1999/00 season it accounted for 66.4% of the area cultivated, slightly down from 71.1% in 1993/94. Both Zones I and III are unsuitable for maize cultivation.

The growing of small grains and tubers has also increased significantly among medium small scale farmers, rising from 7.1% to 20.1%. This again attests to the rising marketability of these crops. The trends also indicate what is generally known that as food crops become

increasingly marketable, men tend to participate in their production more. The relative area cultivated to small grains and tubers was 29.0% and 22.0% for female and male headed households respectively in 1993/94. This presented a 7% percent gap. By 1999/00, the gap had reduced to only 0.6% as the share of small grains in area cultivated increased for sexes.

### 3.2 Food Security Status

In Zambia, poverty and household food security are closely related. Poverty assessment studies have used a food security measure, the "minimum food basket" approach. This food basket contains foods eaten in Zambia, and which meet the nutritional requirements of household members. Households are "core poor" if their expenditure (a proxy for disposable income) is less than the cost of this "minimum food basket". These households falling in this bracket are not able to meet their nutritional requirements and other basic needs for human development. According to this definition, in 1996, at least 77% of rural households and 39% of all urban households were "core poor" (FHANIS).

The most affected socio-economic groups are small-scale farmers. The most affected victims are women and children. At least 9% of women in rural areas were chronically under nourished in 1996. Maternal mortality was 694 per 100,000 live births (Zambian Demographic and Health Survey 1996). Women also bear the twin burdens of agricultural activities and of caring for the sick and children (ZDHS, 1996). Nutrition fell sharply in the 1990s. Previously, from 1985 to 1991/92, nutritional status was stable and a decline was even recorded in the rates of stunting.

The evidence in malnutrition in the 1990s is overwhelming, characterised by a sharp increase in household food insecurity and childhood malnutrition. Food insecurity based on the consumption expenditure relative to the cost of the minimum food basket in most parts of the country shows that in 1996, at least 77% of the rural and 39% of the urban households were classified as severely food insecure, representing a picture similar to the situation in 1991/92 (the year of the worst drought in living memory).

There is a multiplicity of primary causes to increased poverty in the country. During the 1990s, the structural adjustment programs led to rapid increase in poverty. Inflation rates exceeded 100% for over three years. Many consumer subsidies, e.g. for mealie meal were eliminated. Public sector parastatals were trimmed back causing a drastic fall in employment. The elimination of fertiliser and grain marketing subsidies brought about untold misery to rural farming households. The recurring droughts of the 1990s worsened the situation.

Household food insecurity is largely a function of low food production. However, post-harvest losses due to poor storage which results in a loss of over 30% of food produced is a significant contributor. In addition, inadequate processing technologies undermines the nutritional value and the level of utilisation of the food produced at household level. Unfortunately, interventions have focused on increasing food production without promoting better storage and processing technologies to enhance gains in food production with respect to household food security.

The already high prevalence levels of malnutrition, an indicator of household food security, deteriorated even further with the 1998 figures for stunted and underweight children coming out worse than the 1996 figures (see **Table 5**). The 1996 levels of malnutrition were a slight improvement over the 1993 figures.

**Table 5: Indicators of Malnutrition Levels by Province, Selected Years[2]**

| | 1991 | 1992 | 1993 | 1996 | 1998 |
|---|---|---|---|---|---|
| **Stunting (%)** | | | | | |
| Central | 48 | 53 | 49 | 46 | - |
| Copperbelt | 38 | 48 | 46 | 45 | 56 |
| Eastern | 48 | 53 | 58 | 51 | 47 |
| Luapula | 46 | 53 | 63 | 55 | 47 |
| Lusaka | 37 | 40 | 39 | 44 | 59 |
| Northern | 54 | 33 | 53 | 61 | 47 |
| Northwestern | 28 | 45 | 61 | 54 | - |
| Southern | 33 | 41 | 39 | 50 | 61 |
| Western | 37 | 48 | 52 | 50 | 50 |
| Zambia | 40 | 48 | 51 | 50 | 53 |
| **Underweight (%)** | | | | | |
| Central | 22 | 26 | 19 | 21 | - |
| Copperbelt | 23 | 22 | 17 | 22 | 26 |
| Eastern | 28 | 28 | 26 | 19 | 26 |
| Luapula | 30 | 31 | 36 | 36 | 13 |
| Lusaka | 21 | 17 | 21 | 19 | 31 |
| Northern | 34 | 31 | 33 | 33 | 20 |
| Northwestern | 19 | 16 | 36 | 32 | - |
| Southern | 18 | 22 | 25 | 25 | 25 |
| Western | 22 | 33 | 29 | 27 | 20 |
| Zambia | 23 | 25 | 27 | 25 | 24 |
| **Wasting (%)** | | | | | |
| Central | 5 | 3 | 3 | 5 | - |
| Copperbelt | 8 | 5 | 5 | 7 | 6 |
| Eastern | 5 | 7 | 5 | 4 | 4 |
| Luapula | 9 | 6 | 5 | 6 | 4 |
| Lusaka | 10 | 8 | 5 | 5 | 5 |
| Northern | 8 | 4 | 7 | 6 | 6 |
| Northwestern | 14 | 3 | 6 | 6 | - |
| Southern | 7 | 7 | 5 | 4 | 4 |
| Western | 5 | 5 | 7 | 4 | 4 |
| Zambia | 6 | 6 | 5 | 5 | 5 |

**Source: Calculated From Priority Surveys and Living Conditions Monitoring Surveys**

[2]. Unfortunately, data beyond 1998 is note available as this was the last year that the LCMS was conducted. The situation might be different beyond 1998 particularly with the diversification towards the more drought tolerant crops noted above.

### 3.3 Cash Crop Production

Cash crop production for the smallholders has tended to be dominated by cotton. Others, on a much reduced level, include tobacco, groundnuts, maize, cassava and sweet potatoes. Generally, cash crop production has tended to be higher for districts near Lusaka (major market) such as Mumbwa where it accounts for over 30%. There is evidence that farmers have increasingly adopted the growing of new crops under out-grower schemes. Access to the key market and the nearness to processing facilities for domestic sale or export to foreign markets has been an important factor in this regard.

Non-Traditional Exports (NTEs) of which agricultural exports are a major component have performed well since the early 1990s, rising from a total value of USD 102,202 in 1990 to USD 256,236 in 2000, an increase of 150%. In the same period, agricultural exports rose from USD 23,466 to USD 106,026 respectively, an increase of more than 350% (see **Table 6**).

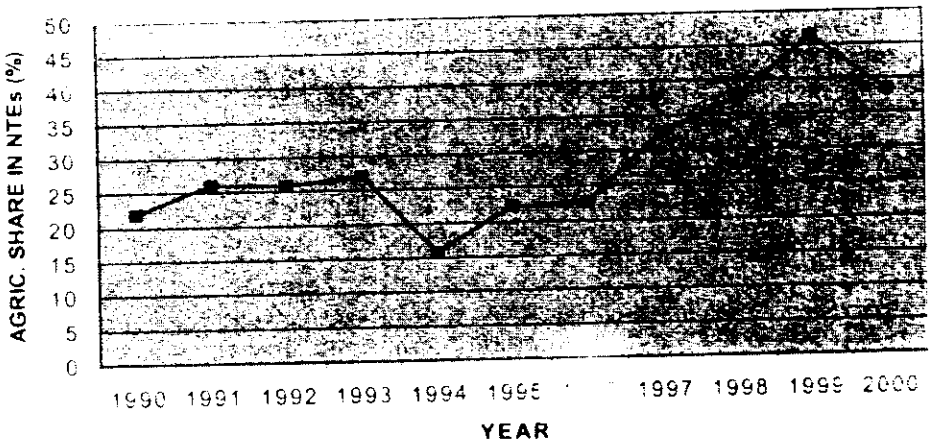
**Table 6: Agricultural Verses Non Traditional Exports 1990 – 2000 (US $'000)**

| Year | Animal Products | Flouriculture Products | Horticulture Products | Leather | Primary Agriculture Products | Total | Total NTEs | Agric. as % of NTEs |
|---|---|---|---|---|---|---|---|---|
| 1990 | 2,291 | 1,050 | 4,544 | 1,039 | 14,542 | 23,466 | 102,202 | 23 |
| 1991 | 1,185 | 1,902 | 5,807 | 675 | 22,761 | 32,330 | 121,322 | 27 |
| 1992 | 456 | 2,987 | 2,934 | 375 | 19,968 | 26,720 | 101,970 | 26 |
| 1993 | 740 | 5,506 | 2,391 | 1,259 | 25,072 | 34,968 | 124,091 | 28 |
| 1994 | 355 | 9,110 | 2,421 | 1,235 | 10,008 | 23,129 | 138,859 | 17 |
| 1995 | 654 | 18,000 | 2,589 | 1,211 | 24,000 | 46,454 | 202,498 | 23 |
| 1996 | 1,972 | 4,784 | 3,286 | 2,131 | 44,527 | 56,700 | 240,824 | 24 |
| 1997 | 3,412 | 7,385 | 5,637 | 2,220 | 90,959 | 109,613 | 328,557 | 33 |
| 1998 | 4,116 | 32,355 | 19,002 | 3,134 | 57,642 | 116,249 | 301,792 | 38 |
| 1999 | 4,374 | 42,607 | 23,128 | 1,859 | 61,973 | 133,941 | 284,946 | 47 |
| 2000 | 3,374 | 33,863 | 27,355 | 4,331 | 37,103 | 106,026 | 256,236 | 41 |

Source: MOF (May, 2001), Macro-economic indicators

The trend of the agricultural exports within the NTEs has been that of an upward swing, particularly following the start of the Agricultural Sector Investment Programme (ASIP) implementation in 1996 (see **Chart 1**). In 1999, the share of agriculture in NTEs rose to 46.4% from 21.9% in 1990 as chart 1 illustrates.

CHART 1: SHARE OF AGRICULTURE IN NON-TRADITIONAL EXPORTS




Source: Adapted from MoFED, June 2001: ***Microeconomic Indicators***

## 4.0 CASSAVA AND SWEET POTATO PRODUCTION AND CONSUMPTION

### 4.1 Background

It is estimated that 30% of the Zambian population (estimated at more than 10 million) depend on cassava as a major staple food (statistics for sweet potato are not available). The Zambian population that depends on cassava is increasing every year due to the ever escalating production costs of the traditional staple, maize, as well as the increase in drought incidences, as noted in **Section 4.2** below.

**Table 7** gives an indication of the contribution of cassava and sweet potato to the country's food basket. It is the projected food balance sheet for Zambia for 1998/99 consumption year. Out of a total of 1,937 metric tons of food required, cassava was 15.5% of the total, while sweet potato was 3.8%. A combination of sweet potato and cassava accounted for almost 20% of the total food consumption requirement of the country with respect to the 1998/1999 consumption year.

The majority of the 30% of the country's population who depend on cassava as a staple are largely from the key producing areas, namely: Northern, Luapula, Northwestern and Western provinces. For the rest of the country, including Copperbelt and Lusaka provinces (the country's leading markets), cassava is largely eaten as a snack in a roasted form together with roasted groundnuts. In addition, though statistics are not available, there is an increasing number of consumers on the Copperbelt and Lusaka who mix cassava flour with that of maize for the preparation of nshima, the country's staple dish.

**Table 7: Projected Annual Balance Sheet for 1998/99 Consumption Year ('000 MT dry weight)**

| | Maize | Cassava | Wheat | Sorghum & Millet | Sweet Potato |
|---|---|---|---|---|---|
| A. Opening stocks(May 98) | 80 | - | 26 | 1 | - |
| B. Production (1997/98) | 649 | 300 | 77 | 87 | 74 |
| C. Total availability (A+B) | 729 | 300 | 103 | 88 | 74 |
| D. Staple food requirement | | | | | |
| (1) Human consumption | 1,110 | 300 | 157 | 78 | 74 |
| (2) National stocks | 10 | - | - | - | - |
| (3) Stock-fed | 30 | - | - | - | - |
| (4) Breweries | 50 | - | - | 2 | - |
| (5) Seed | 10 | - | - | 1 | - |
| (6) Export/trade | 50 | - | - | 3 | - |
| (7) Losses | 52 | - | 5 | 4 | - |
| Total requirement | 1,312 | 300 | 163 | 88 | - |
| E. Surplus/deficit(-) | -583 | 0 | -63 | 0 | 0 |
| F. Food relief requirement | -55 | 0 | 0 | 0 | 0 |
| G. Food aid import | -20 | 0 | 0 | 0 | 0 |
| H. Commercial import | 508 | 0 | 60 | 0 | 0 |

Source: Ministry of Agric. Food and Fisheries

## 4.2 Production and Utilisation Trends

### *Production Trends*

The total agricultural land in Zambia is approximately 35 million hectares out of which 5.3 million ha (15%) is the total arable area. The cassava production area was 110,000 ha in 1991 (2.1% of arable land). This rose to an estimated 165,000 ha (3.1% of arable land) in 2001 (FAO estimates). The corresponding figures for sweet potatoes according to FAO estimates are 3,800 ha (0.072%) and 3,600 ha (0.068) respectively.

On average, cassava is grown on between 1 and 2 hectares per household, split into 3 to 5 fields whose planting is staggered resulting in different periods of maturity and harvesting. Common cassava varieties grown are Bangweulu, Nalumino and kapumba. Others are Katomputa, kabala, Mushinge and Mwakamoya. According to FAO estimates, production of cassava in Zambia increased from 682,000 mt in 1991 to 950,000 mt in 2001, up by 40%. The average yield in the period under review was 6 tonnes per hectare. There was a slight decline in yield from 6.2 t/ha in 1991 to 5.8t/ha in 2001. This may have been caused by a deterioration in soil fertility. The corresponding production figures for sweet potato show a decline from 56,000 mt in 1991 to 53,000 in 2001. Th eld per hectare averaged 14.7 mt.

There is a strong likelihood that the FAO statistics have been grossly under-estimated. It is generally argued that both the hectarage under production as well as production figures of tuber crops, and particularly cassava, have undergone a steep upswing in the 1990s due to largely two reasons as noted above: (i) The recurring droughts in the period under review have accelerated production of cassava in favour of maize due to its relatively more drought tolerance. Consequently, the latter has had a drastic reduction in the share of the total annual hectarage under cultivation. (ii) The erosion of smallholder farmer capital base due to recurring droughts and animal diseases in the period under review, coupled with the deterioration of the country's economy have made fertilizer become out of reach. As noted above (see **Section 3.1**), fertilizer application by smallholder farmers in kg per hectare reduced by 62% from 1991 to 2000, forcing farmers to turn to low input crops of which cassava is the most prominent. There is a dire need to undertake a survey aimed at estimating hectarage under cultivation as well as production figures of both cassava and sweet potato.

### *Cassava Utilisation*

Of the 30% Zambian population (as noted above) who depend on cassava as the main staple food, a good number of them eat it throughout the year (see **Table 8**). However, from December to March there is an increase in cassava consumption because the period being just before new crops are harvested, the availability of other food stuffs such as cereals is either very low or non-existent.

**Table 8: Cassava Availability and Peak Period of Availability**

| % of households having their Peak Consumption of Cassava in Specified Months | | | | | | | | | | | | Number of respond'nts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | |
| 59 | 60 | 64 | 69 | 68 | 64 | 57 | 52 | 51 | 51 | 57 | 58 | 598 |

Source: Baseline Survey 1996 by RTIP

During the period of peak consumption, 96% of the households eat cassava nshima twice a day. Other products such as roasted cassava, boiled cassava and raw cassava are eaten by much less people (45-60%) and 4 to 5 times a week (**Table 9**).

**Table 9: Types of Cassava Products Consumed During Months of Peak Consumption & Frequency of their Consumption**

| Average Number of Times per Week the H/hold Eats Specified Type of Cassava Product in Months of Peak Consumption | | | | | | | | | | Number of respond'ts |
|---|---|---|---|---|---|---|---|---|---|---|
| Nshima | | Roasted | | Boiled | | Raw | | Flour in Porridge | | |
| % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | |
| 96 | 13 | 61 | 5 | 53 | 4 | 46 | 4 | 10 | 7 | 598 |

Source: Baseline Survey 1996 by RTIP

During the period outside the peak period 54% of the households eat cassava nshima once in a day. On the other hand, the other products are eaten 3 to 4 times a week and by only 25-30% of the households (**Table 10**).

**Table 10: Types of Cassava Products Consumed During Months of Lesser Consumption & Frequency of their Consumption**

| Average Number of Times per Week the H/hold Eats Specified Type of Cassava Product in Months of Lesser Consumption | | | | | | | | | | Number of respond'ts |
|---|---|---|---|---|---|---|---|---|---|---|
| Nshima | | Roasted | | Boiled | | Raw | | Flour in Porridge | | |
| % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | |
| 54 | 7 | 28 | 4 | 27 | 3 | 24 | 3 | 4 | 7 | 598 |

Source: Baseline Survey 1996 by RTIP

### *Sweet Potato Utilisation*

Unlike cassava which has specific areas in the country where it is predominantly produced and naturally such areas have particularly high consumption levels, sweet potato production is more evenly spread throughout the country. Nonetheless, Northwestern province still has the highest production per unit area. The peak period for sweet potato consumption coincides with the harvesting period, i.e. April to August/September, which averages 3.4 months (**Table 11**).

**Table 11: Sweet Potato Availability and Peak Period of Consumption**

| % of households having their Peak Consumption of Sweet Potato in Specified Months | | | | | | | | | | | | Number of respond'nts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | |
| 15 | 11 | 12 | 10 | 7 | 10 | 37 | 61 | 68 | 55 | 38 | 22 | 511 |

Source: Baseline Survey 1996 by RTIP

During the peak period, 94% of the households in producing areas eat boiled sweet potato more than 7 times per week (**Table 12**). Dried sweet potato is eaten by only 19%, and 5 times per week and roasted sweet potato by 47% of the households, 6 times a week. Fresh raw sweet potato is eaten by 30% of the households, 5 times a week (Table 12).

**Table 12: Types of Sweet Potato Products Consumed During Months of Peak Consumption & Frequency of their Consumption**

| Average Number of Times per Week the H/hold Eats Specified Type of Sweet Potato Product in Months of Peak Consumption | | | | | | | | Number of respond'ts |
|---|---|---|---|---|---|---|---|---|
| Boiled | | Dried | | Roasted | | Raw | | |
| % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | |
| 94 | 8 | 19 | 5 | 47 | 6 | 30 | 5 | 511 |

Source: Baseline Survey 1996 by RTIP

Outside the peak period, sweet potato is consumed by 62% of the households about 4 times a week and [illegible] eat dried sweet potato 4 times a week (**Table 13**).

**Table 13: Types of Sweet Potato Products Consumed During Months of Less Consumption & Frequency of their Consumption**

| Average Number of Times per Week the H/hold Eats Specified Type of Sweet Potato Product in Months of Less Consumption | | | | | | | | Number of respond'ts |
|---|---|---|---|---|---|---|---|---|
| Boiled | | Dried | | Roasted | | Raw | | |
| % | Avg/wk | % | Avg/wk | % | Avg/wk | % | Avg/wk | |
| 62 | 4 | 33 | 4 | 26 | 3 | 18 | 3 | 511 |

Source: Baseline Survey 1996 by RTIP

## 4.3 Research and Development

Research work in Zambia on cassava and sweet potato started in 1979 following the establishment of the Root and Tuber Improvement Programme (RTIP). However, it was not until 1987 that serious research work was launched following funding from the Swedish International Development Authority (SIDA) that cor[illegible]nced that year to RTIP. **Table 14** summarises major results of cassava research in Zambia.

**Table 14: Summary of Key Results of Past Cassava Research in Zambia**

| Research Work | Major Results |
|---|---|
| Breeding | Over 100,000 cassava seeds have been germinated. The IITA seeds had 40% germination while the seed from Zambia had over 95% germination (the latter was more than 60% of the 100,000 seeds). A total of 4,239 cassava clones were developed. From this, 11 varieties were identified which yielded over 30 tonnes per hectare, thereby out-yielding the improved varieties whose yields are are shown in Table 15 below. |
| Agronomy | Three agronomic trials were conducted: (i) Cassava inter-cropping trial; (ii) Cassava rotation trial & (iii) Effect of cassava ratooning on tuber yield. The respective results are as follows: (i) establishment of cassava was generally satisfactory without major pests & diseases; the establishment of maize, beans, sorghum & s/potato was poor (ii) Poor soils were observed in all areas where cassava was cultivated; the crop establishes itself in 1st season & bulking occurs in 2nd season; & (iii) the crop was well established. |
| Pathology | The objective was to assess the prevalence of ACMD cassava disease as well as to establish strategies for its control. Result: control of ACMD in areas with high disease pressure will be successfully achieved by introducing resistant or tolerant genotypes whereas in those areas with low disease pressure, crop sanitation is an effective control method for ACMD. |
| Genetic evaluation & utilization | Locally available genetic material was evaluated against its resistance against Cassava Mosaic Virus (CMV), which can affect yield loss from 20% to 90%. Out of the 36 clones evaluated, only Nalumino was resistant to CMV. |
| Yield potential & adaptability | The objective was to test the adaptability of cassava grown under various soil conditions. Out of the more than 30 clones, clone Mwansamfungo had the best average yield of 26.06 t/ha. It also had a good root shape and moderately resistant to CMV. |
| Best time to harvest cassava | 11 clones were harvested at different times over a 4 year period. Results: yield per ha regardless to quality continued to increase from 12 MAP to 24 MAP. However, at 20 MAP it decreased. Highest productivity level was at 16 MAP with 41.69 kg/Ha/day & quality was best. |
| Appropriate spacing | Two clones were used to establish the optimum spacing. The spacings used were: 0.4mx0.4m; 1.0mx1.0m; 1.50mx1.50m. Result: The appropriate spacing was 1.0mx1.0m which gave highest yield of 10.87 t/ha. |
| Necessity of weeding | 4 treatments, including farmers practice, using 2 spacings were undertaken. The highest yield was from 3 times of weeding per year at 45 days interval. Appropriate weeding could increase yield by more than 200%. |
| Biological control of cassava m/burg & g/mites | Over 161,000 individuals of 5 species of natural enemy parasites & predators were released at 4 widely spaced sites in 4 provinces. Result: there has been confirmation of the establishment of Epidinocarsis Lopezi, the most effective natural enemy of cassava mealybug (CMB). Consequently, the bug reduced in varying degrees. |
| Effect of CMB on farming system | This was done in 3 districts in Luapula province. Result: During & after the outbreak of CMB, there was a shortage of planting materials and food in the subsequent seasons. |
| Post harvest technology | Designing & construction of storage & drying structures & processing equipment undertaken. However, inadequate funding for the propagation of the technology. |

Source: Root & Tuber Improvement Programme Annual Report 1995; Review of Research of Root & Tuber Improvement Programme in Zambia 1993; Root & Tuber Improvement Programme, Research Highlights 1987 - 1988

The RTIP over the past years has done significant work in popularizing the production of improved cassava varieties among smallholder farmers. Although no specific adoption surveys have been undertaken, there is evidence that Bangweulu, Nalumino and Kapumba recommended varieties, whose average yields in metric tones per hectare are: 31.27; 28.86 and 21.72 respectively have been widely adopted by farmers. As noted, their yields are more than three times the average yield of traditional varieties estimated at 6 tones per hectare. **Table 15** gives an overview of basic characteristics of the three recommended cassava varieties.

**Table 15: Agronomic Performance and Characteristics of Three Recommended Cassava Clones**

| Traits | Bangweulu | Nalumino | Kapumba |
|---|---|---|---|
| Yield (T/ha) | 31.27 | 28.86 | 21.72 |
| Dry matter (%) | 39.20 | 46.00 | 44.70 |
| Harvest index (%) | 58.30 | 52.70 | 56.70 |
| ACMV (African Cassava Mosaic Virus) | MR | R | MR |
| CMB (Cassava Mealybug) | MR | R | MR |
| CGM (Cassava Green Mite) | MR | R | MR |
| HCN content | High | High | Medium |
| Fibre content (% DM) | - | 2.82 | 2.61 |
| Cooking quality | Moderate | Moderate | Moderate |
| Maturity (Months) | 12-16 | 16-24 | 16-24 |

Source: Better Cultural Practices for Cassava & S/potato, 1997

As noted in **Table 16**, research work in sweet potato has been of a lower magnitude compared to cassava. Unlike cassava which has had 11 areas of research work, sweet potato has had 4, amounting to almost a third of that of cassava.

**Table 16: Summary of Key Results of Past Sweet Potato Research in Zambia**

| Research Work | Major Results |
|---|---|
| Breeding | Sweet potato germplasm collection done at two different periods; firstly involving 118 clones. Later, involving 84 clones. 2000 sweet potato seed germinated, leading to 19,404 sweet potato clones developed. These were screened down to 140 clones & planted at 3 different sites. The highest yield was at Mansa with 41.38t/ha; followed by Misamfu with 33.47t/ha; & Mutanda at 30.44 t/ha. Research has continued on larger plots for further analysis & assessment. |
| Fertilizer trial | Sweet potato response to different rates of "D" compound was evaluated. Result: No significant difference in all treatments in the yield of fresh roots. |
| Genetic evaluation & utilization | Locally available genetic material (31) collected from different sweet potato growing areas in Zambia. Fourteen entered advanced yield trial and harvested 6 months after planting (MAP). Kasoko Kabange yielded 11.94 t/ha. The others yielded less than 5t/ha. |
| New promising clones | Forty clones (both local & introduced material from IITA) were evaluated for major traits such as: plant type, root shape, flesh colour, yield potential & storability. Result: yield varied from 8.63 t/ha to 18.63t/ha under Mansa conditions without fertilizer. Most preferred by consumers were; red skin with white flesh colour; copper skin with deep orange flesh colour. |

Source: Root & Tuber Improvement Programme Annual Report 1995; Review of Research of Root & Tuber Improvement Programme in Zambia 1993; Root & Tuber Improvement Programme, Research Highlights 1987 – 1988

**Table 17** summarises key traits of the three recommended sweet potato varieties, namely; Zambezi, Luapula and Chingovwa with respective yields in metric tones per hectare of 15.65; 17.42, and 17.77 compared to the average yield of traditional varieties ranging from 7 to 14 tones per hectare.

**Table 17: Agronomic Performance and Characteristics of three Improved Sweet Potato Clones**

| Traits | Zambezi | Luapula | Chingovwa |
|---|---|---|---|
| Yield (T/ha) | 15.65 | 17.42 | 17.77 |
| Dry matter (%) | 22.60 | 25.75 | 24.95 |
| Skin colour | Cooper | Red | White |
| Flesh colour | Deep orange | White | White |
| Storability | Good | Good | Poor |
| Cooking quality | Good | Good | Good |
| Plant type | Runner | Runner | Erect |
| Leaf type | Deep lob | Shallow lob (finger type) | Deep lob |
| Flowering habit | Poor | Poor | Good |
| Maturity (Months) | 4 | 4 | 3.5 |

Source: Better Cultural Practices for Cassava & S/potato, 1997

## 5.0 PROFILE OF CASSAVA AND SWEETPOTATO SUPPLY CHAIN ACTORS

In the main study, a total of 120 cassava and 103 sweet potato producers were interviewed. The number of traders interviewed was 150 and 146 for the two crops respectively. Consumers interviewed were 201 for cassava and 200 for sweet potato, reflecting the higher number of consumers.

Except in Mansa taken as the major cassava producing area for the fresh cassava tubers marketing, Copperbelt and Lusaka were involved in marketing largely processed cassava products, i.e. flour and chips. The processed cassava products were deemed ideal for Copperbelt and Lusaka markets due to the long distances involved. On the other hand, sweet potato were largely traded fresh. This appeared to be the most preferred form for consumption.

### 5.1 Description of the Marketing Chains

In the following discussion of the marketing chain for cassava and Sweetpotato, the terms chain and channel are used interchangeably to refer to the route that the produce take from the producer to the final consumer.

#### 5.1.1 Cassava Marketing Chain

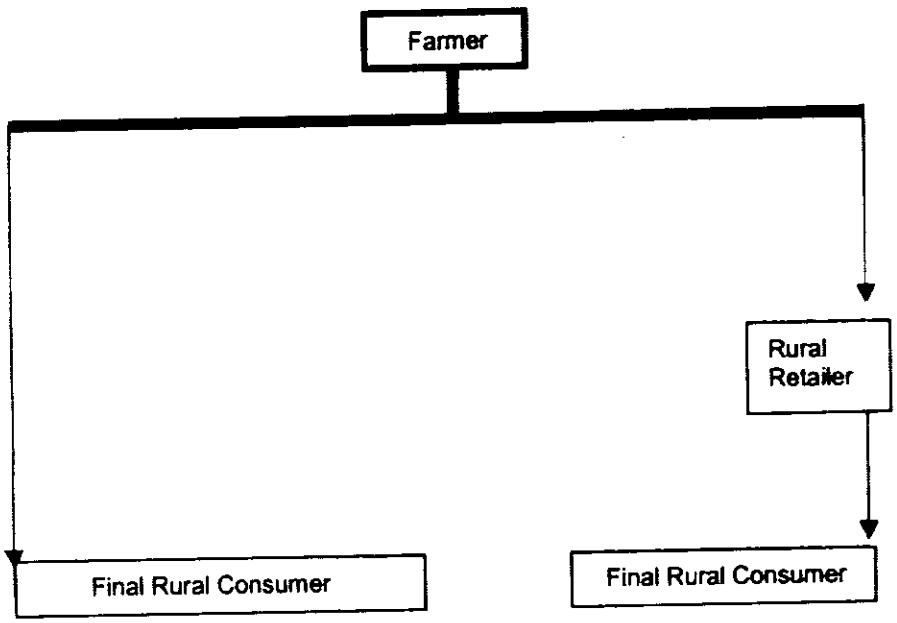
The marketing chain for cassava takes two basic forms, depending on the type in which the product is sold to the final consumer/user. The first channel is the one that is used to get the fresh cassava to the final consumer (largely confined to Mansa, the area of production). The other channel is for the processed products (chips and flour) from the producer (farmer) to the final consumer. Perishability is the factor determining which of the two channels a given product would follow.

***Fresh Cassava Marketing Chain***

The market for fresh cassava is basically rural. Almost all of it is sold within the areas of production, which consist of the northern parts of the country (and in case of this study, Mansa). In terms of physical distance, the channel for fresh cassava is short. This is largely explained by the short shelf life. Consequently, farmers and traders would rather dispose of fresh cassava within the first few days after harvest. For this reason, urban markets are unattractive due to the long distances involved from areas of production.

Within the overall chain for fresh cassava, two distinct channels are visible (see **Figure 1**). *First* there is the *direct* channel in which the farmer sells directly to the final rural consumer. There are no intermediaries used. This is the shortest channel and the farmer either transports the produce and sells it in the market at retail price or s/he sells the produce on his farm to consumers who come there at farm gate price. The *second* channel involves the use of an intermediary, the rural traders, who, in most cases, happen to be women in the markets or on road sides. These buy from farmers and sell to final consumers in small quantities at retail prices. The quantities that these traders buy are just enough to be sold within a day or so to avoid loss due to deterioration in quality.

***Figure 1: Fresh Cassava Marketing Chain***

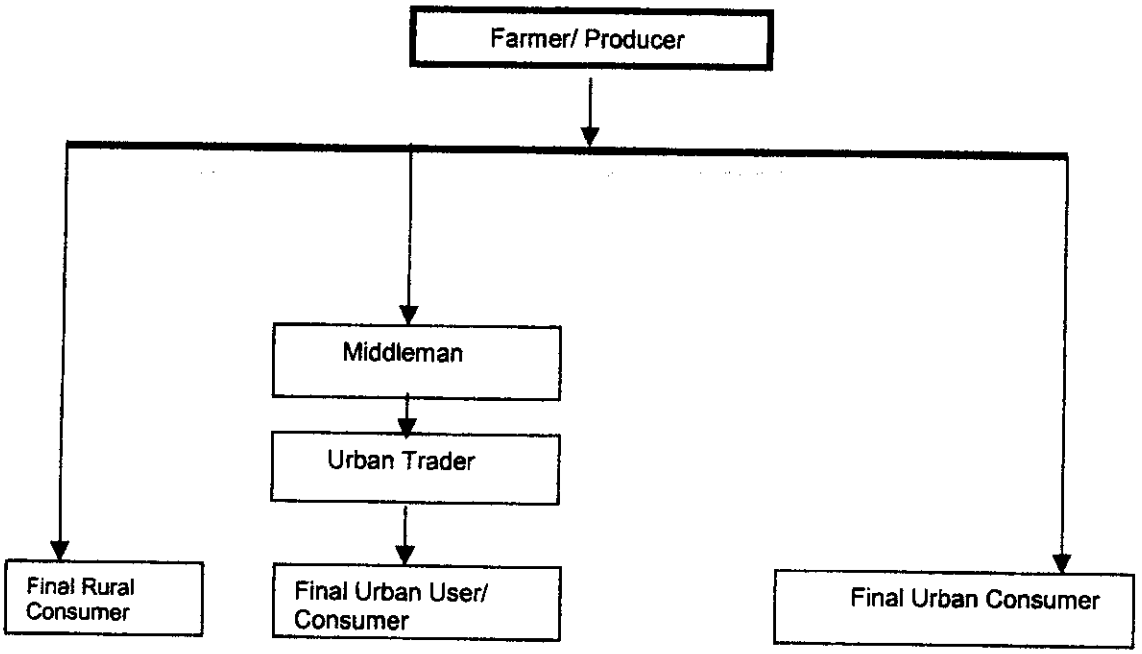



***Processed Cassava Marketing Chain***

Processed cassava consists of dried chips or flour and constitutes the predominant form in which cassava is marketed. These are storable products and when compared to fresh cassava volume for volume, they are much lighter in weight. They are, therefore, amenable to transportation over long distances. As can be seen in **Figure 2**, three channels are used to get the produce to the final consumer in both rural and urban markets. The major focus was on urban markets, i.e. Copperbelt and Lusaka provinces.

*First*, we have the *direct* channel in which the farmer processes the product and sells it *directly* to final rural consumers. In this case final consumers are households within the farmer's vicinity or people who come to buy from the local markets where the farmer sells produce himself. When selling is done in the local rural market, the farmer transports the produce to the market. The *second* channel involves the farmer selling directly to the urban consumer. The farmer transports the produce to urban areas (Copperbelt and Lusaka provinces) and stays there to sell the produce in small quantities to final urban consumers at retail prices. The *third* channel makes use of the middleman and the trader. The middleman can either be an urban businessperson or a rural businessperson. The middleman buys in bulk from many different farmers and sells the chips or flour in much smaller quantities to traders who in turn sell to final urban consumers. The traders sell in central markets, min markets or along the streets.

***Figure 2: Processed Cassava (Chips and Flour) Marketing Chain***

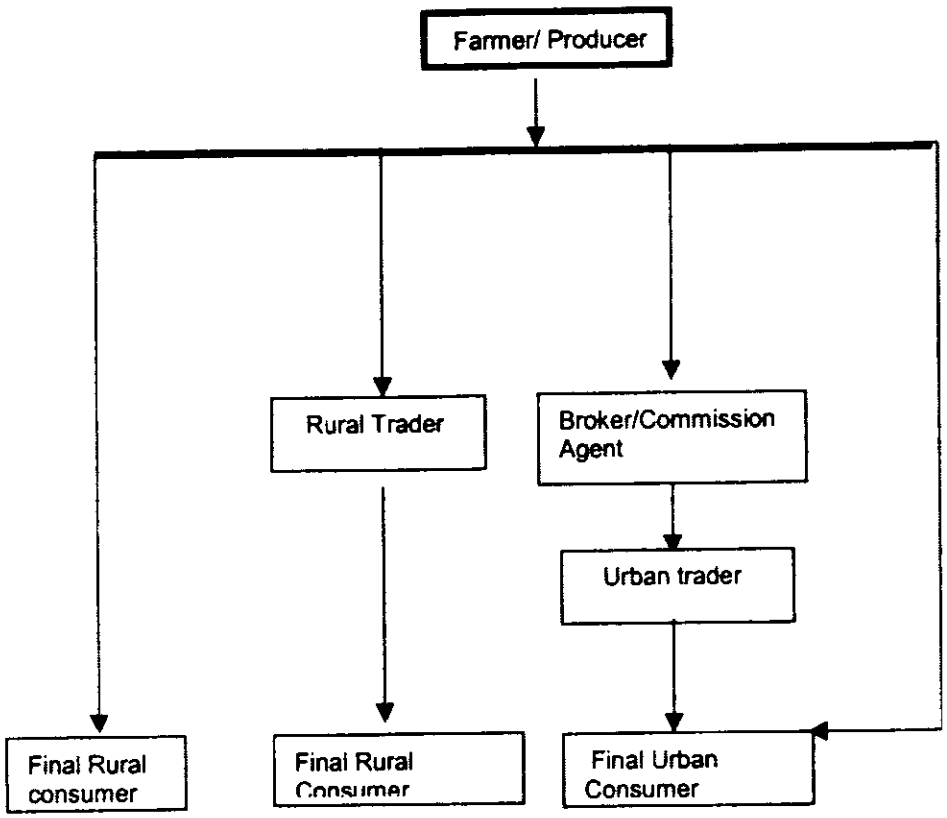



### *5.1.2* Sweetpotato (Fresh) Marketing Chain

Sweetpotatoes are sold almost wholly in the fresh form. Processing is currently being done on a very small scale and the processed product is mainly for use by the farmer himself. Sweetpotato marketing is undertaken using three channels (**Figure 3**). This applies to both rural and urban markets with the latter being more predominant.

In the *first* route (or channel), farmers sell directly to final consumers either in the rural market or the urban market. When selling in the urban market, the farmer invariably transports the produce to urban areas and stays there to sell the produce himself. The *second* channel involves traders who buy from farmers and sell directly to consumers. The traders can be either rural or urban. The *third* channel involves two marketing intermediaries. The two intermediaries are brokers/commission agents and the urban trader. The commission agent does not take title to the product. He sells on behalf of the farmer. The agent usually appears when the product is in short supply and the demand is high. The agents are more common in Lusaka than the Copperbelt.

*Figure 3: Fresh Sweet Potato Marketing Chain*




### 5.2 Profile of Consumers

The analysis of the profile of consumers focuses on the following key parameters: (i) brief background; (ii) their socio-economic status; (iii) varieties consumed; (iv) storage and processing; and, (v) substitutes to the crops and major constraints. While there were more female than male respondents who bought both cassava and sweet potato (there was no provision under consumers for such a question in the questionnaire), it needs to be born in mind that most respondents came from male headed households.

#### 5.2.1 Cassava

***Brief Background***

A total of 201 cassava consumers were interviewed in three study sites namely; Lusaka, Kitwe and Mansa. Of these, 44 were from Mansa (a rural market) and the rest from the Copperbelt and Lusaka urban markets. Each of the three sites was divided into high, medium and low density residential areas, representing three different respective income levels. In each residential site, random sampling was used to select households for interviewing.

***Socio-economic Status***

**Table 18** shows that the largest number of consumers (buyers) in both urban and rural markets were low income (50.8% and 11.9% respectively). The middle income consumers

were the second highest category (19.9% and 8.5% respectively). More than 30% of the consumers had reached tertiary/ college education; 38% secondary; 29% primary and the rest (2.5%) had never been to school. Almost two thirds of respondents were married. Singles and widows accounted for 30.3% of respondents (Table 18).

**Table 18: Cassava Consumer Demographics**

| Variable | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Category of Respondents** | | | | |
| Rural Low Income | 21 | 3 | 24 | 11.9 |
| Rural Middle Income | 17 | 0 | 17 | 8.5 |
| Rural High Income | 3 | 0 | 3 | 1.5 |
| Urban Low Income | 70 | 32 | 102 | 50.8 |
| Urban Middle Income | 31 | 9 | 40 | 19.9 |
| Urban High Income | 14 | 1 | 15 | 7.5 |
| **Formal Education** | | | | |
| None | 4 | 1 | 5 | 2.5 |
| Lower Primary | 13 | 9 | 22 | 11.0 |
| Higher Primary | 30 | 6 | 36 | 17.9 |
| Junior Secondary | 36 | 5 | 41 | 20.4 |
| Senior Secondary | 25 | 11 | 36 | 17.9 |
| Tertiary | 48 | 13 | 61 | 30.4 |
| **Marital Status of Household Head** | | | | |
| Single | 21 | 16 | 37 | 18.4 |
| Married | 125 | 1 | 126 | 62.7 |
| Widowed | 2 | 22 | 24 | 11.9 |
| Separated | 4 | 3 | 7 | 3.5 |
| Divorced | 4 | 3 | 7 | 3.5 |

### *Varieties Consumed*

Common varieties consumed were Mwakamoya (15.9%), Manyokola (10.5%) and Bangweulu (8.5%). The rest of respondents did not know the type of varieties consumed. Those who consumed specific varieties gave two major reasons: (i) high dry matter content (14.9%); and, (ii) low fibre content. The majority of consumers (68.7%) got their cassava from retailers (see **Table 19**). Close to 90% of respondents (89.0%) did not have any special recipes they knew of or used when preparing cassava for consumption. Those who bought processed cassava fell in this category, an indication that there was very little innovation in cassava consumption. The few who had some recipes largely came from Mansa, where cassava was also eaten in its fresh form.

The major problems that constrained the consumers' ability to consume or access more cassava were issues relating to the seasonality of the produce (42%), low supply, high cost and poor quality. These four complaints, in that order, represented 77.6% of all respondents. Various options were advanced as solutions to these constraints. Some consumers indicated that they would prefer increased production of the produce (20.9%) while others said the produce could be produced under irrigation (11.4%) so that it was available throughout the year.

**Table 19: Cassava Consumption**

| Variable | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Source of produce** | | | | |
| Producers | 31 | 2 | 33 | 16.4 |
| Retailers | 97 | 41 | 138 | 68.7 |
| Wholesalers | 4 | 1 | 5 | 2.5 |
| Own Field | 6 | 1 | 7 | 3.5 |
| Producers & Retailers | 4 | 0 | 4 | 2.0 |
| Producers and Research Centre | 3 | 0 | 3 | 1.5 |
| Retailers and Wholesalers | 4 | 0 | 4 | 2.0 |
| Retailers and Own Field | 5 | 0 | 5 | 2.5 |
| Producers Retailers and Wholesale | 1 | 0 | 1 | 0.5 |
| Producers, Retailers and Own Field | 1 | 0 | 1 | 0.5 |
| **Home Recipes Regarding Cassava** | | | | |
| Yes | 17 | 5 | 22 | 11.0 |
| No | 139 | 40 | 179 | 89.0 |
| **Recipes** | | | | |
| Boil mix with beef | 5 | 2 | 7 | 31.8 |
| Boil mix butter and salt | 2 | 0 | 2 | 9.1 |
| Boil mix with groundnuts and salt | 8 | 1 | 9 | 40.9 |
| Pound bake | 1 | 0 | 1 | 4.5 |
| Peel slice and deep fry for 15 minutes | 0 | 1 | 1 | 4.5 |
| Roast, add salt and dry | 1 | 1 | 2 | 9.2 |

### *Storage and Processing*

Close to half of all respondents, 44.8% stored cassava before consumption. The storage method and duration essentially differing a lot between urban and rural consumers. Those in urban areas, because of the small quantities of cassava they bought, stored less cassava than their rural counterparts. In rural areas, the cassava could be stored for long periods since it is a major staple in some regions such as Luapula province in the north. Storage becomes particularly crucial during the rainy season (December to March) as processing is difficult due to the cloudy weather conditions. In this regard, most of what is consumed during the rainy season has to be processed and stored before the on-set of rain. Loss of quality of the product, rotting and breaking were the most common problems reported during storing period (**Table 20**).

Close to half, i.e. 48.8% reported processing the cassava. The final output was quite often cassava meal for making Nshima (69%), scones or Munkoyo. Processing costs generally ranged from $1.14 to $5.17 per 50kg bag of tubers (Table 20). Nonetheless, the majority (close to 70%) did not encounter any processing costs. Processing of cassava was generally considered time consuming (21.4%) and difficult because of a lack of proper technology (10.0%). This was particularly true in case of rural communities in production areas that buy the commodity in large quantities as a staple.

**Table 20: Cassava Storage and Processing**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Storage of cassava before consumption** | | | | |
| Yes | 72 | 18 | 90 | 44.8 |
| No | 84 | 27 | 111 | 55.2 |
| **Cassava Processing** | | | | |
| Process | 78 | 20 | 98 | 48.8 |
| Does not process | 78 | 25 | 103 | 51.2 |
| **Estimated Processing Cost (per 50kg)** | | | | |
| US$1.14 - US$2.57 | 5 | 0 | 5 | 5.1 |
| US$2.58 - US$4.29 | 13 | 2 | 15 | 15.3 |
| US$4.30 - US$5.17 | 9 | 1 | 10 | 10.2 |
| None | 51 | 17 | 68 | 69.4 |
| **Uses Of Processed Cassava** | | | | |
| Nshima | 61 | 7 | 68 | 69.4 |
| Dried chips boiled for eating | 4 | 5 | 9 | 9.4 |
| Scones | 8 | 4 | 12 | 12.2 |
| Munkoyo (local sweet brew) | 4 | 3 | 7 | 7.1 |
| Chips / Munkoyo (local non-alcoholic sweet brew) | 1 | 1 | 2 | 2.0 |

### *Substitutes and Major Constraints*

Cassava was a good substitute for a number of food stuffs. The three most common were sweet potatoes (34.9%), Irish potatoes (25,5%), and bread (11.4%). The question of substitution in areas of cassava production (e.g. Mansa) does not arise because of it being a stable in such areas. Just over three-quarters of respondents (77.1%) said they would increase their purchases of cassava if their income were to increase (**Table 21**).

**Table 21: Cassava Substitutes and Nutritional Values**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Cassava Substitutes** | | | | |
| Yes | 117 | 32 | 149 | 74.1 |
| No | 39 | 13 | 52 | 25.9 |
| **Reaction If Income Increased** | | | | |
| Would buy more Cassava | 115 | 40 | 155 | 77.1 |
| Would not buy more cassava | 34 | 2 | 36 | 17.9 |
| Not sure | 7 | 3 | 10 | 8.0 |
| **Nutritional Rank of most preferred substitutes compared to cassava** | | | | |
| Very Nutritious | 63 | 13 | 76 | 37.8 |
| Nutritious | 45 | 17 | 62 | 30.8 |
| Not Nutritious | 2 | 1 | 3 | 1.5 |
| None / No response | 46 | 14 | 60 | 29.9 |
| **Nutritional Rank of Cassava compared to its most preferred Substitutes** | | | | |
| Very Nutritious | 36 | 14 | 50 | 24.1 |
| Nutritious | 62 | 16 | 78 | 38.8 |
| Not Nutritious | 13 | 3 | 16 | 8.0 |
| None | 45 | 12 | 47 | 28.4 |

Constraints in cassava marketing which respondents pointed out were usually a combination of two to five. Ranking prominently on this list were problems to do with quality, seasonality, inefficient transport system, uncompetitive prices and storage technology

### 5.2.2 Sweetpotato

#### *Brief Background*

Three sites were identified for the interviews conducted on sweet potato consumers. These were Lusaka, Kitwe and Solwezi the latter also happens to be a major production center in the country). A total of 200 consumers were interviewed from various backgrounds and social status.

#### *Socio-economic Status*

According to **Table 22**, the highest number of sweet potato consumers came from the low income group in both urban (51%) and rural areas, a situation very similar to that of cassava. However, unlike cassava, there were more urban middle income consumers for sweet potato (37% against 19.9%).

**Table 22: Sweet Potato Consumer Demographics**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Category of respondents** | | | | |
| Rural low income | 4 | 1 | 5 | 2.5 |
| Rural middle income | 3 | 0 | 3 | 1.5 |
| Rural high income | 1 | 0 | 1 | 0.5 |
| Urban low income | 77 | 25 | 102 | 51.0 |
| Urban middle income | 49 | 25 | 74 | 37.0 |
| Urban high income | 10 | 5 | 15 | 7.5 |
| **Marital Status** | | | | |
| Single | 23 | 19 | 42 | 21.0 |
| Married | 114 | 3 | 117 | 58.5 |
| Widowed | 1 | 15 | 16 | 8.0 |
| Separated | 2 | 9 | 11 | 5.5 |
| Divorced | 4 | 10 | 14 | 7.0 |
| **Formal Education** | | | | |
| None | 2 | 1 | 3 | 1.5 |
| Lower primary | 6 | 4 | 10 | 5.0 |
| Higher primary | 23 | 8 | 31 | 15.5 |
| Junior secondary | 25 | 10 | 35 | 17.5 |
| Senior secondary | 33 | 14 | 47 | 23.5 |
| Tertiary | 55 | 19 | 74 | 37.0 |

As is the case of cassava, respondents were mostly married (58.5%) and some single, (21%). In terms of educational background, a similar situation obtained to that of cassava. The education status was not very different from that of cassava consumers. A good number had been to a tertiary institution (37%); 41% had attained secondary education. The others had only attended primary school while 3 people had never been to school. This situation is unlike what was the case with cassava consumers who had much less education. This can be a reflection that sweet potatoes are enjoyed and widely accepted by people of various educational backgrounds.

### *Varieties Consumed*

The bulk of sweet potatoes (82.5%, against 68.7% for cassava) were purchased from retailers at the city markets. The most preferred variety was chingovwa (by 66%). Other varieties purchased were; Kapiri, Katondo and Mbete (**Table 23**). Reasons for buying such varieties included sweetness, dry matter content, low fibre content, white colour and big tubers. The sweet potato was consumed mostly in the boiled form (56%) though some consumers would eat it even as fried chips (20%), roasted or even raw.

**Table 23: Sweet Potato Varieties and Consumption**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Source of Sweet potato** | | | | |
| Producers | 7 | 1 | 8 | 4.0 |
| Retailers | 116 | 49 | 165 | 82.5 |
| Wholesaler | 5 | 1 | 6 | 3.0 |
| Own produce | 3 | 0 | 3 | 1.5 |
| Producers and Retailers | 5 | 4 | 9 | 4.5 |
| Retailer and wholesalers | 2 | 0 | 2 | 1.0 |
| Producer and own produce | 6 | 1 | 7 | 3.5 |
| **Varieties Bought - First Choice Variety** | | | | |
| Chingovwa | 96 | 36 | 132 | 66.0 |
| Kalyabaleme | 1 | 0 | 1 | 0.5 |
| White | 1 | 0 | 1 | 0.5 |
| Kapiri | 11 | 2 | 13 | 6.5 |
| Mwandaba | 3 | 0 | 3 | 1.5 |
| Katondo | 1 | 1 | 2 | 1.0 |
| Mbete | 1 | 0 | 1 | 0.5 |
| Don't know | 30 | 17 | 47 | 23.5 |
| **Form in which Sweet Potato is Consumed** | | | | |
| Boiled | 142 | 55 | 197 | 56.1 |
| Fried chips | 48 | 23 | 71 | 20.2 |
| Roasted | 25 | 12 | 37 | 10.5 |
| Raw | 28 | 12 | 40 | 11.4 |
| Grilled | 0 | 1 | 1 | 0.3 |
| Baked | 0 | 2 | 2 | 0.6 |
| Salads | 1 | 1 | 2 | 0.6 |
| Brew traditional drink | 1 | 0 | 1 | 0.3 |
| **HHs using sweet potato in their recipes** | | | | |
| Yes | 54 | 90 | 79 | 39.5 |
| No | 25 | 31 | 121 | 60.5 |

Sweet potatoes were eaten along with tea/coffee/water (61.0%). Prices of sweet potatoes were determined by two major factors; (1) size of the tuber accounting for 55% of respondents, and (2) size and number of tubers represented by 13%. More consumers used recipies in sweetpotato (39.5%) than in cassava (11%).

### *Sweetpotato Storage and Processing*

Like cassava consumers, less than half (44.5%) of households stored their sweet potatoes after purchase. The method most common of storage being in dry form (i.e cut into small strips and then sun dried). Very few people stored it in its fresh form in sacks, in dug pits or even frozen. This kind of storage was for short periods of time to avoid the danger that the sweet potatoes could go bad/rot. Short shelf life was the biggest problem cited (58.4%). Other problems cited related with storage were: loss of taste (6.7%) and breaking (3.4%), see **Table 24**.

**Table 24: Sweet Potato Storage and Processing**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Households Involved in Sweet Potato Storage** | | | | |
| Store | 61 | 28 | 89 | 44.5 |
| Don't Store | 83 | 28 | 111 | 55.5 |
| **Problems Faced in Sweet Potato Storage** | | | | |
| No problem | 9 | 6 | 15 | 16.9 |
| Product easily rots | 36 | 16 | 52 | 58.4 |
| Product breaks easily | 3 | 0 | 3 | 3.4 |
| Product losses taste | 4 | 2 | 6 | 6.7 |
| Storage pests and rats | 2 | 0 | 2 | 2.2 |
| Product easily breaks and rots | 1 | 0 | 1 | 1.1 |
| Product easily losses taste & rots | 5 | 4 | 9 | 10.1 |
| Product easily breaks, losses taste & rots | 1 | 0 | 1 | 1.1 |
| **Processing s/potato** | | | | |
| Yes | 32 | 9 | 41 | 20.5 |
| No | 112 | 47 | 159 | 79.5 |
| **Estimated processing cost (per 25kg bag)** | | | | |
| $0.3 - $0.7 | 9 | 1 | 10 | 24.4 |
| $0.9 - $1.3 | 2 | 0 | 2 | 4.9 |
| $1.4 - $1.9 | 1 | 0 | 1 | 2.4 |
| $2 - $2.3 | 1 | 0 | 1 | 2.4 |
| Don't know | 19 | 8 | 27 | 65.9 |
| **Uses of Processed products** | | | | |
| Snack | 20 | 7 | 27 | 65.9 |
| Breakfast/snack | 9 | 1 | 10 | 24.4 |
| Breakfast/supper | 1 | 0 | 1 | 2.4 |
| Nshima | 2 | 1 | 3 | 7.3 |

Processing was practised by 20.5% of households (compared to almost 50% in case of cassava). The average cost of processing per 25 kg bag was in the range of $0.29-$0.71. The sweet potato was often processed into fried chips (73.1%), which could easily be sold at the markets as a snack. The smallest number of respondents (7.3%) made Nshima out of sweet potato (Table 24). Time consuming and lack of proper technology were cited as major constraints related to sweetpotato processing.

### *Substitutes and Constraints*

An overwhelming 92% of households were substituting other foods with sweet potato (compared to 74.1% for cassava). Sweet potatoes, during their season were substituting bread (63.6%), Irish potato (9.8%), Cassava (9.2%), Rice (6%), Fruits (4.3%), Nshima, meal samp and pumpkins (7.1%). Clearly, sweet potatoes are an important food crop that is a vital component of the diets of many families (**Table 25**). Perceived major marketing constraints relating to sweet potato included; poor quality of products/ seasonality/ absence of storage/processing (13%) and low production (9.5%).

**Table 25: Sweet Potato Substitutes and Constraints**

| Variables | Male headed | Female headed | Total | % |
|---|---|---|---|---|
| **Households Substituting other Products with Sweet Potato** | | | | |
| Yes | 134 | 50 | 184 | 92.0 |
| No | 10 | 6 | 16 | 8.0 |
| **Sweet Potato Substitutes** | | | | |
| Bread/buns | 87 | 30 | 117 | 63.6 |
| Rice | 8 | 3 | 11 | 6.0 |
| Cassava | 11 | 6 | 17 | 9.2 |
| Sample | 3 | 1 | 4 | 2.2 |
| Nshima | 3 | 2 | 5 | 2.7 |
| I/potato | 12 | 6 | 18 | 9.8 |
| pumpkins | 2 | 2 | 4 | 2.2 |
| Fruits | 8 | 0 | 8 | 4.3 |
| **Consumers that would buy more sweet potato after income increase** | | | | |
| Yes | 121 | 48 | 169 | 84.5 |
| No | 20 | 6 | 26 | 13.0 |

## 5.3 Profile of Transporters

The main survey questionnaire did not include information on transporters. Consequently, what is written here is drawn from the qualitative study and focuses on the following: Major forms of transporation; Cost per bag and average distance and time; and, average volume transported by road. For cassava, 8 transporters were interviewed and 12 for sweetpotato. These were interviewed at the major markets in Lusaka and Kitwe.

### *Major Mode of Transportation*

Buses and trucks were commonly used for long distance haulage of both cassava and sweetpotato. For cassava, 3 out 8 used buses/trucks while in case of sweetpotato, 3 out of 12 used trucks for long distance haulage. For short distance haulage, bicycles and the head were the common modes of transportation for both cassava and sweetpotato. Only 1 out of 8 used a bicycle to transport cassava and 2 out of 8 transported the produce on their own heads. The corresponding figures for sweetpotato out of 12 were 2 and 5 respectively.

### *Cost per Bag, Average Distance and Time*

The cost of transporting a 50kg bag of chips of cassava over an average distance of 279 km was US $ 0.38, while that of transporting a 25 kg bag of fresh sweetpotato over an average distance of 6 to 15 km was the same.[3] On average, it took 5 hours 40 minutes per trip to transport cassava and 25 minutes for sweetpotato.

### *Average Volume Transported*

Transporters talked to hauled an average of 9 by 50 kg bags of dried cassava chips per trip and between 1 and 9 by 25 kg bags of fresh sweetpotato. The low volumes can be attributed to the fact that the qualitative survey was done when harvesting of both crops was just beginning to pick up.

[3] Data collection was done in March 2002, at the time when sweetpotato harvesting was just beginning. In this regard, all transporters interviewed hauled the commodity from within a radius of 15 km. Sweetpotato from Northwestern province had not yet started arriving at the Lusaka and Kitwe markets as the tendency is to go to the nearest places first.

## 5.4 Profile of Traders

This section seeks to address the key issues of the traders' demographics, availability of market information, handling and processing of both crops, demand and supply conditions, conditions in the market in relation to demand and the role of traders' associations.

### 5.4.1 Cassava Traders

A total of 150 cassava traders were interviewed. These were from three study sites namely; Mansa, Lusaka, and Kitwe. Traders, by definition were those players who were selling cassava to either consumers or to other traders who ultimately sold to consumers. They were mostly interviewed from their trading stalls at markets in the townships and at the major trading points for farm produce such as Soweto market in Lusaka.

#### *Cassava Trader Demographics*

Three quarters of the respondents were male (75%). Close to 60% were aged between 26 to 45. The dominance of men in the business was possibly due to the physical strength needed to travel around the country to go and buy the cassava from farmers and bring it to the market. Women were predominantly found at local markets, which was much easier for them since they only had to sell small quantities of the commodity (**Table 26**).

The educational level of many traders was modest with the majority having gone as far as primary (63.3%). The majority (73.3%) were involved in retailing. As many as 84.1% of respondents had only started the business in the past 10 years. The large number of people getting into business during this period may possibly be a reflection of the impact of open market policies which compelled many people to seek alternative livelihoods after the privatization of the state run firms and the massive retrenchments that followed.

**Table 26: Cassava Trader Demographics**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Gender and age in years | | | | |
| 16 – 25 | 29 | 10 | 39 | 26 |
| 26 - 35 | 39 | 13 | 52 | 34.7 |
| 36 - 45 | 24 | 11 | 35 | 23.3 |
| 46 - 55 | 14 | 3 | 17 | 11.3 |
| 56 -65 | 4 | 1 | 5 | 3.3 |
| 65 + | 2 | 0 | 2 | 1.3 |
| **Literacy levels of traders** | | | | |
| None | 12 | 0 | 12 | 8.0 |
| Lower primary | 29 | 6 | 35 | 23.3 |
| Upper primary | 47 | 13 | 60 | 40.0 |
| Junior secondary | 17 | 11 | 28 | 18.7 |
| Senior secondary | 7 | 8 | 15 | 10.0 |
| **Category of respondents** | | | | |
| Retailer | 95 | 15 | 110 | 73.3 |
| Middlemen | 5 | 12 | 17 | 11.3 |
| Wholesaler | 7 | 1 | 8 | 5.3 |
| Retailer/wholesaler | 5 | 10 | 15 | 10.0 |
| **Length of time in cassava trading** | | | | |
| Less than a year | 9 | 1 | 10 | 6.7 |
| 1 year | 27 | 7 | 34 | 22.7 |
| 2 - 4 | 35 | 16 | 51 | 34.0 |
| 5 - 10 | 19 | 12 | 31 | 20.7 |
| 11 - 15 | 8 | 1 | 9 | 6.0 |
| 16 - 20 | 7 | 0 | 7 | 4.7 |
| 21 - 25 | 3 | 0 | 3 | 2.0 |
| 26 - 30 | 2 | 1 | 3 | 2.0 |
| 31 - 35 | 1 | 0 | 1 | 0.6 |
| 37 + | 1 | 0 | 1 | 0.6 |

### *Market Information*

Market information is a critical component for the survival of any enterprise. The government in particular has a crucial role to play in ensuring that marketing information is made readily available to farmers. It was surprising, however, to note that an overwhelming majority of traders (close to 90%%) got marketing information from friends, relatives, business colleagues and their own observations and not from any government agency or any other institution. Of this, more than 50% got market information from their own observations (**Table 27**).

Close to 90% felt the information obtained was sufficient. Of those who felt the inadequacy of information, 80% said that what was missing was how to bargain for better prices (Table 27).

There was generally very little/no change in the farm gate prices of cassava chips, tubers and flour between the two seasons (1998/99 and 1999/2000). The price of chips ranged from as low as US $1.43 to a maximum of US $7.14 per 50 kg bag. The prices of tubers were in the same range as chips while those for flour were higher at $4.86 to $8.57 per 50 kg bag. The higher cost for flour was due to the value added. Marketing costs incurred included market levies, handling and storage charges, and transport costs. Major buyers of cassava were ordinary consumers at the public markets (84.0%).

**Table 27: Cassava Market Information**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Information sufficiency** | | | | |
| Sufficient | 34 | 100 | 134 | 89.3 |
| Not sufficient | 3 | 7 | 10 | 6.7 |
| Not sure | 1 | 5 | 6 | 4.0 |
| **Information missing** | | | | |
| Communication with producers | 1 | 0 | 1 | 10 |
| Where obtain cheaper products | 0 | 1 | 1 | 10 |
| How to bargain for better prices | 2 | 6 | 8 | 80 |
| **Source** | | | | |
| Friends/relatives/business colleagues | 41 | 14 | 55 | 36.7 |
| Customers | 1 | 0 | 1 | 0.7 |
| Own Observation | 62 | 15 | 77 | 51.3 |
| Friends/relatives/business colleagues & own observations | 7 | 8 | 15 | 10.0 |
| Friends/relatives/business colleagues, customers & own observations | 1 | 0 | 1 | 0.7 |

### *Cassava Storage and Processing*

The bulk of traders stored processed cassava before sale (75.3%) mostly in a rented private store at the market where they kept the cassava (see **Table 28**). The cassava was put in sacks and stacked away. The period of storage was from one to seven days with quantities ranging from 1 – 10 by 50 kg bags of chips or flour (64.7%).

**Table 28: Cassava Storage & Processing**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Whether store before sale** | | | | |
| Store before sale | 26 | 87 | 113 | 75.3 |
| Do not store | 12 | 25 | 37 | 24.7 |
| **Storage place** | | | | |
| Own house | 5 | 18 | 23 | 20.4 |
| Rental private store | 12 | 48 | 60 | 53.1 |
| Own shop in the market | 2 | 2 | 4 | 3.5 |
| Open air in the market | 2 | 17 | 19 | 16.8 |
| Own house and rental shop | 4 | 2 | 6 | 5.3 |
| Own house and open air | 1 | 0 | 1 | 0.9 |
| **Quantity of 50kg bags stored** | | | | |
| Up to 1 bag | 4 | 44 | 48 | 32.0 |
| 2 - 4 | 2 | 24 | 28 | 18.7 |
| 5 - 10 | 9 | 12 | 21 | 14.0 |
| Over 10 bags | 6 | 5 | 13 | 8.7 |
| No response/Don't know | 15 | 27 | 42 | 28.0 |
| **Storage cost in US $** | | | | |
| 0.06 - 0.14 | 4 | 27 | 31 | 20.7 |
| 0.17 - 0.23 | 3 | [illegible] | 4 | 2.7 |
| 0.26 - 0.31 | 5 | 5 | 10 | 6.7 |
| 0.34 - 0.43 | 2 | 2 | 4 | 2.7 |
| 1.43 | 0 | 1 | 1 | 0.7 |
| No storage costs | 1 | 7 | 8 | 5.3 |
| No response/Don't store | 23 | 69 | 92 | 61.3 |
| **Change in price of products after storage** | | | | |
| Higher | 3 | 10 | 13 | 8.7 |
| Lower | 12 | 33 | 45 | 30.0 |
| Same | 11 | 46 | 57 | 38.0 |
| Don't store/ no response | 12 | 23 | 35 | 23.3 |

Storage costs were very minimal. After storage, the price of the products would normally remain the same (38.0%) or even reduce (30.0%). Only 8.7% of respondents indicated an increase in price. The reduction or stagnation of price after storage was really a consequence of deterioration in the quality of products. Of those who stored, three quarters

of them had storage losses. The losses related to theft, rotting/damage and just a general reduction in quality. Storage loss was generally estimated at 6-20 %

Those who did not store were often either in immediate need of cash, were facing high demand or did not have proper storage facilities.

### *Cassava Demand and Supply*

The majority of traders did not reveal where they got their supplies of cassava from (69%). They may have been out fear for competition. Over 60% of traders felt that they adequately satisfied the demand of their customers (see **Table 29**). Those who felt otherwise, mentioned low production and seasonal supply (44.7%) as the two key issues that were affecting their ability to satisfy demand.

**Table 29: Cassava Demand and Supply**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Source Of Supply – Cassava Chips and flour** | | | | |
| Own farm /garden | 6 | 3 | 9 | 6.0 |
| Producers | 10 | 16 | 26 | 17.3 |
| Middleman | 3 | 5 | 8 | 5.3 |
| Wholesalers | 0 | 1 | 1 | 0.7 |
| Own farm/garden and producers | 1 | 0 | 1 | 0.7 |
| Own farm / garden wholesalers | 1 | 0 | 1 | 0.7 |
| No response | 17 | 87 | 104 | 69.3 |
| **Extent Of Satisfaction Of Demand By The Trader** | | | | |
| Satisfied | 17 | 75 | 92 | 61.3 |
| Not Satisfied | 20 | 36 | 56 | 37.3 |
| Don't know | 0 | 1 | 1 | 0.7 |
| No response | 1 | 0 | 1 | 0.7 |

### *Cassava Market and Demand*

The domestic market potential for cassava was generally estimated by most traders as either quite big or reasonably big (70.6%). This was unlike the export market, which was mostly described as either non-existent, or the respondents did not know about its existence (56%). The major constraints in the marketing of cassava were mentioned in order of their degree of seriousness. The most serious were: poor/expensive transport system (36.9%); poor technology on processing and storage (21.9%), and low production (9.8%). The type of responses indicated a fair appreciation of the real issues that the domestic market was generally facing.

Respondents further expressed satisfaction with the amount of signals/information available on the market (85.1%), even though this information was mainly from private sources and not the government (see **Table 30**). This may be an indication of improved market conditions driven by the private sector.

**Table 30: Cassava Market and Demand**

| Variable | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Domestic market potential** | | | | |
| Quite big | 12 | 23 | 25 | 23.3 |
| Reasonably big | 15 | 56 | 71 | 47.3 |
| Quite small | 4 | 11 | 20 | 13.3 |
| Small | 1 | 19 | 20 | 13.3 |
| Don't know | 0 | 3 | 3 | 2.0 |
| No response | 1 | 0 | 1 | 0.7 |
| **Export market potential** | | | | |
| Quite big | 2 | 0 | 2 | 1.3 |
| Reasonably big | 1 | 1 | 2 | 1.3 |
| Quite small | 3 | 2 | 5 | 3.3 |
| Small | 1 | 6 | 7 | 4.7 |
| Don't know | 12 | 55 | 67 | 44.7 |
| Non existence | 5 | 12 | 17 | 11.3 |
| No response | 14 | 36 | 50 | 33.3 |
| **Amount Of Signals/Information Available To Influence Decision-Making On The Market** | | | | |
| Enough | 34 | 92 | 126 | 85.1 |
| Not enough | 2 | 5 | 7 | 4.7 |
| Don't know | 2 | 9 | 11 | 7.4 |
| No response | 0 | 4 | 4 | 2.7 |
| **Past Five Year Trend In Cassava Marketing** | | | | |
| Increasing | 34 | 73 | 107 | 71.3 |
| Decreasing | 2 | 21 | 23 | 15.3 |
| Stagnant | 2 | 11 | 13 | 8.7 |
| Don't know | 0 | 5 | 5 | 3.3 |
| No response | 0 | 2 | 2 | 1.3 |

The trend in cassava marketing was also described as increasing by 71.3% of respondents which confirms the earlier assertion that many people had started doing this kind of business in the past 10 years. In fact, those that had started business in the past 5 years were in the majority (63.4%). Increase in demand and good prices were cited as major factors leading to increase in cassava marketing. More than 95% of the respondents said cassava trader associations did not exist.

### 5.4.2 Sweet Potato Traders

A total of 146 traders were interviewed in Lusaka, Kitwe and Solwezi, with the bulk having come from the former two. Of these, 123 were female and 23 males. The female were more than the male traders because female were the ones who were generally found at trading places such as markets, selling or hawking usually small amounts of sweet potatoes in heaps to consumers. Men preferred to travel long distances to the production areas from where they purchased the produce at wholesale price and resold to the marketeers.

#### *Sweet Potato Trader Demographics*

All the traders were in the 16-65 age range with the average age range being 26-35 years. Literacy levels were much lower than was witnessed for consumers. Of the 146 traders, 16 or 11% had never been to school, 81 55% had only attended primary school, 46 or 25% had been to secondary school. Those who had been to a tertiary institution were only 3 or 2% (**Table 31**).

**Table 31: Sweet Potato Trader Demographics**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Gender and Age in years** | | | | |
| 16 – 25 | 7 | 34 | 41 | 28.1 |
| 26 – 35 | 14 | 45 | 59 | 4 |
| 36 – 45 | 1 | 23 | 24 | 16.4 |
| 46 – 55 | 0 | 17 | 17 | 11.6 |
| 56 – 65 | 1 | 4 | 5 | 3.4 |
| 65+ | 0 | 0 | 0 | 0 |
| **Literacy Levels of Traders** | | | | |
| None | 1 | 15 | 16 | 11.0 |
| Lower Primary | 2 | 20 | 22 | 15.1 |
| Upper Primary | 5 | 54 | 59 | 40.4 |
| Junior Secondary | 13 | 26 | 39 | 26.7 |
| Senior Secondary | 0 | 7 | 7 | 4.8 |
| Tertiary | 2 | 1 | 3 | 2.1 |
| **Category of Respondents** | | | | |
| Retailer | 7 | 110 | 117 | 80.1 |
| Middlemen | 13 | 3 | 16 | 11.0 |
| Wholesaler | 2 | 0 | 2 | 1.4 |
| Retailer/ Wholesaler | 1 | 10 | 11 | 7.5 |
| **Source of initial capital** | | | | |
| Savings and credit associations | 0 | 1 | 1 | 0.7 |
| Relative/friend | 10 | 80 | 90 | 61.6 |
| Own savings | 13 | 39 | 52 | 35.6 |
| No response | 0 | 1 | 1 | 0.7 |
| Micro financing and own savings | 0 | 1 | 1 | 0.7 |
| Relative/friend own savings | 0 | 1 | 1 | 0.7 |

Retailers were the dominant group with 80.1% of all the respondents. Middlemen accounted for 11% and wholesalers, 1.4%. The rest were both retailers and middlemen. As was the case with cassava traders, almost all the traders only joined the business in the past 6 years with initial monies to start the business having come from their own savings or friends/relatives (97.2%), see Table 31.

### *Sweet Potato Market Information*

Market information was largely obtained from traders' own observations (38.4%) and relatives/friends/business associates (34.9%). The same trend was observed for pricing information. This trend was a result of low/non existent extension services being provided to the traders (see **Table 32**).

**Table 32: Sweet Potato Market Information**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Source of Marketing Information** | | | | |
| Friends/relatives/business colleagues | 5 | 46 | 51 | 34.9 |
| Customers | 0 | 1 | 1 | 0.7 |
| Farmers Associations | 0 | 1 | 1 | 0.7 |
| Own Observations | 9 | 47 | 56 | 38.4 |
| Friends/relatives/business colleagues & customers | 0 | 1 | 1 | 0.7 |
| Friends/relatives/business colleagues & own observations | 9 | 27 | 36 | 24.7 |
| **Criteria for Determining Price** | | | | |
| Size of tubers | 10 | 86 | 96 | 65.8 |
| Number of tubers | 1 | 0 | 1 | 0.7 |
| Grade of tubers | 1 | 1 | 2 | 1.4 |
| Size of tubers and colour of tubers | 2 | 17 | 19 | 13.0 |
| Size of tubers and number of tubers | 2 | 11 | 13 | 8.9 |
| Size of tubers and grade of tubers | 2 | 0 | 2 | 1.4 |
| Colour and number of tubers | 1 | 0 | 1 | 0.7 |
| Size, colour and grade of tubers | 0 | 2 | 2 | 1.4 |
| Size, number and grade of tubers | 4 | 1 | 5 | 3.4 |

Farm gate prices for tubers ranged from $0.29-$2.29 per 25 kg bag. The average price was around $0.71-$1.00 for the 1998/99 marketing season. This figure rose slightly to $1.01-$1.43 per 25 kg bag in the following marketing season. Selling prices were in the same ranges as farm gate prices during the 1998/99 season. The average selling price, however, was slightly higher at $1.01-$1.43 per 25 kg bag during that season. The following season, average selling prices were set at a much higher range of $2.01-$2.43 per 25 kg bag. Clearly, selling prices were much more subject to an adjustment upwards compared to farm gate prices. Producers were in other words, more vulnerable to exploitation by traders.

Prices of sweet potatoes were determined on the criteria of size of the tubers (65.8%), size and colour (13.0%) and size and number of tubers (8.9%). Marketing costs incurred included handling costs, storage costs, market levies, transport costs and licence fees.

As for customers of sweet potatoes, traders easily found willing buyers at public markets in the towns (85.6%). These buyers, as pointed out earlier, were mainly ordinary consumers who bought for outright consumption.

### *Sweet Potato Storage and Processing*

About three-quarters (74%) of traders stored their sweet potatoes before sale. Their understanding, however, of storage was mixed up as some of them described the heaps that they had in the open air at the markets as storage places (43.5%). Others, on the other hand, rented private stores (35.2%) while others kept it in their houses (15.7%), see **Table 33**.

**Table 33: Sweet Potato Storage and Grading**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Storage before sale** | | | | |
| Do store | 18 | 90 | 108 | 74 |
| Do not Store | 5 | 33 | 38 | 26.0 |
| **Storage place** | | | | |
| Own house | 2 | 15 | 17 | 16 |
| Rental private store | 6 | 32 | 38 | 35.2 |
| Open air in market | 9 | 38 | 47 | 43.5 |
| Own shop | 0 | 4 | 4 | 3.7 |
| Own house & open air | 0 | 1 | 1 | 0.9 |
| Own house & rental shop | 1 | 0 | 1 | 0.9 |
| **Change in Prices after Storage** | | | | |
| Higher | 1 | 1 | 2 | 1.9 |
| Same | 7 | 66 | 73 | 67.6 |
| Lower | 10 | 23 | 33 | 30.6 |
| **Households experiencing losses** | | | | |
| Experience Losses | 20 | 103 | 123 | 84.5 |
| Do not experience Loss | 3 | 20 | 23 | 15.7 |
| **Traders Grading/Sorting Sweet Potato before Sale** | | | | |
| Grade | 19 | 118 | 137 | 93.8 |
| Do not grade | 4 | 5 | 9 | 6.2 |

The storage period, as was the case with cassava traders, ranged from a day to seven days. They generally stored for 1-3 days. This storage was strictly before they could find a customer. Sweet potatoes processed into chips and dried for any longer term storage. Simple storage methods were used such as putting in sacks, spreading it on dry grass, floor or open air.

Small quantities in the range of 1-10 bags were often stored at any one time. Only one person reported storing quantities between 101-150 and another one stored over 1200 bags. This was testimony to the fact that most traders were small time retailers. Minimal costs were incurred in the storage process. In fact, the average cost was pegged at $0.29 per bag. After storage, prices often remained the same (68%) or decreased (31%), perhaps because of some loss in quality.

Three major problems were encountered in storage. These were (1) the product rotting/getting damaged (66%), (2) thefts, and (3) accumulation of rental charges. Those who did not store did so because of a desire for immediate cash, lack of facilities and the high perishability of the produce. Even without storing, sometimes households encountered losses largely arising from the same problems that traders who stored experienced. These losses were estimated at between 1 and 60 percent. Most traders' losses were less than 30 percent.

Apart from storage, traders were engaged in grading/sorting of sweet potatoes before sale (94%). The criteria for grading/sorting were size of tubers (56%), size and colour (24%) and size and quality/smoothness (7%). The group that did not grade did not do so because they found it either too time consuming or unnecessary.

### *Sweet Potato Demand and Supply*

The major sources of supply of traders' sweet potatoes were producers (48%) and middlemen or wholesalers (24%). Quantities purchased at any one time averaged between 1 to 200 bags were the common numbers bought. The average purchase price was around $1.01-$1.86 per 25 kg bag (see **Table 34**).

**Table 34: Sweet Potato Demand and Supply**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| ***Sources of Supply of sweet potato*** | | | | |
| Own garden | 7 | 1 | 8 | 5.5 |
| Producers | 52 | 18 | 70 | 48.0 |
| Middlemen | 33 | 2 | 35 | 24.0 |
| Retailers | 1 | 0 | 1 | 0.7 |
| Own garden and producers | 8 | 0 | 8 | 5.5 |
| Own garden and middlemen | 1 | 0 | 1 | 0.7 |
| Producer and middlemen | 19 | 1 | 20 | 13.7 |
| Middlemen and wholesalers | 0 | 1 | 1 | 0.7 |
| Own garden, producers and middlemen | 1 | 0 | 1 | 0.7 |
| Producers, middlemen and retailers | 1 | 0 | 1 | 0.7 |
| ***Final Market of Sweet Potatoes*** | | | | |
| Central Market | 6 | 35 | 41 | 28.1 |
| Mini/ Market | 10 | 86 | 96 | 65.8 |
| Wholesaler | 2 | 1 | 3 | 2.1 |
| Central & mini/open market | 3 | 0 | 3 | 2.1 |
| Mini/open market wholesaler | 2 | 1 | 3 | 2.1 |
| ***Price Of Purchasing Of 25 Kg Bag Of Sweet Potato In US$*** | | | | |
| $0.29 - $0.71 | 6 | 4 | 10 | 6.8 |
| $0.72 - $1.00 | 10 | 23 | 33 | 22.6 |
| $1.01 - $1.86 | 2 | 38 | 30 | 20.5 |
| $1.87 - $2.43 | 2 | 31 | 33 | 22.6 |
| $2.44 – 3.00 | 2 | 19 | 21 | 14.4 |
| $3.01 – 3.43 | 0 | 5 | 5 | 3.4 |
| No response | 1 | 3 | 4 | 2.7 |

### *Sweet Potato Market and Demand*

The domestic market potential for sweet potatoes was described as quite big (35.6%), reasonably big (43.8%), quite small (6.2%) and small (11%). The export market potential on the other hand was disappointing with 71% traders responding by saying they did not know about it. Of the respondents, 32 or 22% said the potential was non-existent for exporting sweet potatoes. Constraints cited, and considered as very serious for sweet potato promotion as a domestic cash earner were (1) poor technology on storage and processing. (2) expensive transport, (3) inefficient transport system and (4) low seasonal supply (see **Table 35**).

**Table 35: Sweet Potato Market and Demand**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| *Extent of Domestic Market Potential* | | | | |
| Quite Big | 5 | 47 | 52 | 35.6 |
| Reasonably big | 13 | 51 | 64 | 43.8 |
| Quite small | 1 | 8 | 9 | 6.2 |
| Small | 4 | 12 | 16 | 11.0 |
| Don't Know | 0 | 5 | 5 | 3.4 |
| *Level of Export Market Potential* | | | | |
| Quite Big | 0 | 1 | 1 | 0.7 |
| Reasonably big | 0 | 4 | 4 | 2.7 |
| Quite small | 1 | 2 | 3 | 2.1 |
| Small | 0 | 2 | 2 | 1.4 |
| Don't Know | 13 | 91 | 104 | 71.2 |
| Non existence | 9 | 23 | 32 | 21.9 |
| *Past Five Year Trend in Sweet Potato Marketing* | | | | |
| Increasing | 18 | 91 | 109 | 74.8 |
| Decreasing | 3 | 22 | 25 | 17.1 |
| Stagnant | 2 | 8 | 10 | 6.9 |
| Don't know | 0 | 2 | 2 | 1.4 |

The market was described as having provided enough signals/information to influence decision-making. It is surprising, however, how this occurred without a proper and organised system especially considering that extension services have been almost non-existent. In the past five years, the trend in terms of sweet potato marketing was on the increase. Reasons being the increased demand and higher prices (among other things) having encouraged increased production.

In terms of their transportation, sweet potatoes were commonly transported on people's heads (portage) just like in the case of cassava. About two fifths (38%) of the traders used this means perhaps because they were retailers carrying small amounts of the produce to their market stalls. Thirteen percent hired a vehicle/used a bicycle. Distances ranged from 0.05 kilometers to as much as 600 kilometers. The largest number of traders traveled a distance within 0.05 - 60 kilometers. Quantities transported were anything from one 25-kg bag to over 40 bags. The mean number though was in the range of 1 - 9 bags carried at a time with each bag of tubers costing an average of $0.43 - $1.43 to transport.

Major constraints cited in the general marketing of sweet potatoes were (1) a lack of proper transport facilities, (2) a lack of proper storage facilities, (3) low prices, (4) a lack of market for the produce especially at peak season leading to rotting and ungraded produce. Traders made general and rather broad suggestions as solutions to these problems. These were; improvements in the road network, provision of storage facilities, improvements in packaging/grading and more organised markets.

### *Sweet Potato Traders Associations*

As was the case with cassava traders, the existence of associations for sweet potato traders was virtually not there. Only 6 people knew of the existence of such an association and only one person knew about its operations. When the rest of the traders were asked why they were not members of the association, they said they were ignorant of the dynamics of being a member, let alone forming one.

## 5.5 Profile of Producers

This last section deals with producers who have been deliberately put at the end of the analysis chain because they ideally respond to consumer demands and tastes. The section

focuses on the following aspects of producers' profile; (i) Demographics, (ii) Crop Production, (iii) Marketing and Pricing, (iv) Storage, (v) Processing, (vi) Handling, and (vii), Producer Associations.

### 5.5.1 Profile of Cassava Producers

A total of 120 cassava producers were interviewed all in Mansa (in the Luapula province of Zambia) because it is one of the country's highest producers of cassava as a province. Lusaka and Kitwe were selected as important sites in observing the marketing chain and no growers were selected for interview at these sites.

#### *Cassava Producer Demographics*

Men and women producers were almost equal (59 men and 61 women). Their ages ranged from as young as 14 to over 65 years. The most common number of people per household was 7-8 (25.8%). Their literacy level was mostly primary school (70%) with 5.8% not having been to school at all (see **Table 36**). The low literacy levels have implications in terms of marketing of cassava because such people can be vulnerable to exploitation by their counterparts from the cities that may come to purchase cassava from them in the villages. Their capacity to absorb and to use new marketing strategies may also be hindered.

**Table 36: Cassava Producer Demographics**

| Variables | Male HHH | Female HHH | Total | |
|---|---|---|---|---|
| **Gender of respondents** | | | | |
| Male | 61 | 0 | 61 | 50.8 |
| Female | 45 | 14 | 59 | 49.2 |
| **Age** | | | | |
| 14 - 25 | 13 | 5 | 18 | 15 |
| 26 - 35 | 36 | 2 | 38 | 31.7 |
| 36 - 45 | 30 | 4 | 34 | 28.3 |
| 46 - 55 | 16 | 2 | 18 | 15 |
| 56 - 65 | 6 | 1 | 7 | 5.8 |
| 65 + | 5 | 0 | 5 | 4.2 |
| **Literacy level** | | | | |
| Lower primary | 14 | 4 | 18 | 15 |
| Upper primary | 60 | 5 | 65 | 54.2 |
| Junior secondary | 21 | 4 | 25 | 20.8 |
| Senior secondary | 5 | 0 | 5 | 4.2 |
| None | 6 | 1 | 7 | 5.8 |
| **Off-farm activities** | | | | |
| Yes | 27 | 6 | 33 | 27.5 |
| No | 79 | 8 | 87 | 72.5 |
| **Type of off - farm activities** | | | | |
| Tailoring | 2 | 0 | 2 | 6.1 |
| Marketing | 3 | 4 | 7 | 21.2 |
| Carpentry | 5 | 0 | 5 | 15.2 |
| Grocery (Kantemba) | 7 | 1 | 8 | 24.2 |
| Fishing | 1 | 1 | 2 | 6.1 |
| Formal employment | 4 | 0 | 4 | 12.1 |
| Crafts/charcoal/salon | 5 | 0 | 5 | 15.1 |

For the majority of these people (73%), farming was their mainstay in life. The few who were engaged in other non-farming activities were typically involved in running a grocery (24%), marketeering (21%), carpentry (15%), crafts/selling charcoal/salon (15%) and all others (24%). Secondary data shows that in Luapula province, cassava is the most important cash crop.

### *Cassava Crop Production Aspects*

Five cropping patterns were used by the producers. These were mono cropping, inter-cropping, mixed cropping, a mixture of both mono and mixed cropping and a mixture of inter and mixed cropping. Mixed cropping pattern was the most commonly used (38%) followed by those using inter-cropping (26%). The reasons given for adopting mono cropping were predominantly because of the ease of management (75%) Those farmers who adopted mixed cropping did so largely because it was labour saving (76%). Inter-cropping, on the other hand was typically adopted because it was both labour saving and there was inadequate land (74%). All the producers used stems/cuttings for planting. Just over half of the producers (56%) used their own stems. Close to 22% of the respondents got their planting materials from research stations and 11% were given by fellow farmers (see **Table 37**). Cassava is also a less labour intensive crop compared to cereal crops.

**Table 37: Cassava Crop Production Aspects**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Cropping pattern used** | | | | |
| Mono cropping | 24 | 1 | 25 | 20.8 |
| Inter cropping | 25 | 6 | 31 | 25.8 |
| Mixed cropping | 41 | 4 | 45 | 37.5 |
| Mono cropping & mixed cropping | 11 | 0 | 11 | 9.2 |
| Inter cropping & mixed cropping | 5 | 3 | 8 | 6.7 |
| **Source of planting material** | | | | |
| Own cuttings | 56 | 11 | 67 | 55.8 |
| Bought cuttings | 5 | 0 | 5 | 4.2 |
| Given | 13 | 0 | 13 | 10.8 |
| Research station | 23 | 3 | 26 | 21.7 |
| Own cuttings/given | 3 | 0 | 3 | 2.5 |
| Own cuttings/bought | 1 | 0 | 1 | 0.8 |
| Own cuttings/research | 2 | 0 | 2 | 1.7 |
| Given/research | 2 | 0 | 2 | 1.7 |
| Bought/given/research | 1 | 0 | 1 | 0.8 |
| **Reasons for growing cassava** | | | | |
| Food | 23 | 3 | 26 | 21.7 |
| Income | 0 | 0 | 0 | 0 |
| Food & Income | 83 | 11 | 94 | 78.3 |
| **Availability of planting material** | | | | |
| Available | 65 | 12 | 77 | 64.2 |
| Scarce | 41 | 2 | 43 | 35.8 |

Men were usually the decision-makers in many homes regarding what crops to be grown accounting for 20% against 3% with respect to their wives. Most households had joint decision by man and wife on what crops to be grown (63%). Cassava was grown typically for both food and cash (78% of respondents). Most farmers sold processed cassava (chips, and in some cases, flour) as this tended to give a better price due to value added.

Planting material was readily available to 64% of respondents. The quality of the planting material was often considered to be good (42%) even though some farmers were not sure about it (55% of them) . The few that bought their planting material (cuttings) spent anything from 14 cents to as much as over $1.57 per area. The majority (95%), however, did not know the cost of planting material perhaps because they did not buy any but instead got it from their own fields, from friends or from research stations. Problems faced in cassava production ranged from those regarded by producers as minor ones such as low prices and land shortage/poor roads to those perceived as major ones such as high labour demand and lack of capital. Some farmers felt the solution to the problem was to improve extension services, improve the availability of inputs and crop management practices.

### *Cassava Marketing and Pricing*

For the majority of households (87%), cassava was grown for sale with both the husband and wife often actively participating in the marketing decisions. However, just as in the case of deciding the type of crop to grow, more husbands (15%) were independently involved in marketing decisions than wives (2%). Consumers were the single most common buyers of cassava (39%) followed by a combination of both consumers and middlemen (20%) and middlemen, (15%). The bulk of respondents only got involved in selling cassava in the past 10 years. This could be a reflection of the increasing importance of cassava as a staple in the country in the face of reoccurring droughts in the period under consideration.

On average, producer prices were stagnant during the two farming seasons of 1998/99 and 1999/2000. Prices were in the range of $1.71 -$10.00 per 50kg. The lower range was for fresh cassava and the upper for processed cassava, i.e. chips. Fresh cassava would be predominantly consumed within Mansa during the period of the survey. Similarly, the trend in terms of number of 50 kg bags sold was about the same during the two seasons. The size of root (23%), both size and colour (20%), weight (19%) and colour of tubers (18%) were the key determinants of fresh roots prices. Processed cassava (chips and flour) had no special determinants of prices. Cassava takes long to grow and mature. In most cases (72%), farmers had to wait for two growing seasons before they could be in a position to start selling their produce (see **Table 38**).

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

## Table 38: Cassava Marketing & Pricing

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Period of Highest Prices** | | | | |
| Beginning of harvest | 28 | 7 | 35 | 29.2 |
| End of harvest | 1 | 0 | 1 | 0.8 |
| Beginning of harvest and mid harvest | 12 | 1 | 13 | 10.8 |
| Beginning of harvest and end of harvest | 20 | 3 | 23 | 19.2 |
| Beginning of harvest, mid and end of harvest | 34 | 3 | 37 | 30.8 |
| Through out the year | 6 | 0 | 6 | 5.0 |
| Do not sale | 5 | 0 | 5 | 4.2 |
| **Period of Lowest Prices** | | | | |
| Beginning of harvest | 44 | 4 | 48 | 40.0 |
| Middle of harvest | 41 | 10 | 51 | 42.5 |
| End of harvest | 14 | 0 | 14 | 11.7 |
| Beginning of harvest and middle of the season | 2 | 0 | 2 | 1.7 |
| Do not sale | 5 | 0 | 5 | 4.2 |
| **Distance to the selling point in kms** | | | | |
| Don't sale | 5 | 0 | 5 | 4.2 |
| 1 - 5 | 13 | 4 | 17 | 14.2 |
| 6 - 10 | 21 | 1 | 22 | 18.3 |
| 11 - 15 | 32 | 1 | 33 | 27.5 |
| 16 - 20 | 11 | 4 | 15 | 12.5 |
| 21 - 25 | 2 | 0 | 2 | 1.7 |
| 26 - 30 | 1 | 0 | 1 | 0.8 |
| 150 | 3 | 0 | 3 | 2.5 |
| Don't know | 18 | 4 | 22 | 18.3 |
| **Transport cost in US $ (50kg bag of chips)** | | | | |
| 0.03 - 0.29 | 6 | 2 | 8 | 6.8 |
| 0.3 - 0.71 | 5 | 0 | 5 | 4.2 |
| 0.72 - 1.29 | 4 | 0 | 4 | 3.3 |
| 1.3 - 1.86 | 22 | 3 | 25 | 20.8 |
| 1.89 - 3.00 | 1 | 0 | 1 | 0.8 |
| 3.01 - 5.71 | 3 | 0 | 3 | 2.5 |
| Don't know | 60 | 9 | 69 | 57.5 |
| Don't sale | 5 | 0 | 5 | 4.2 |
| **Cassava production trend** | | | | |
| Increasing | 94 | 12 | 106 | 88.3 |
| Decreasing | 11 | 0 | 11 | 9.2 |
| Stagnant | 1 | 1 | 2 | 1.7 |
| Don't know | 0 | 1 | 1 | 0.8 |
| **Households selling cassava** | | | | |
| Do Sale | 91 | 13 | 104 | 86.7 |
| Don't sale | 15 | 1 | 16 | 13.3 |
| **When cassava is sold** | | | | |
| 12 - 18 months after planting | 9 | 0 | 9 | 7.5 |
| After 2 growing seasons | 73 | 13 | 86 | 71.7 |
| 12 - 18 months after 2 growing season | 9 | 0 | 9 | 7.5 |
| Don't know | 15 | 1 | 16 | 13.3 |

About half (49%) of producers preferred Katobamputa variety. The next most preferred was Bangweulu, by 19%. The other varieties were grown in small hectarages. One would have expected that the variety most preferred by consumers (Mwakamoya and Manyokola) would be grown the most since the producers would be competing to meet the high demand. However, it should be noted that this could be a problem of the same variety being known by many different names depending on the region of the country and language spoken by interviewees. Katobamputa was preferred because of its early maturing aspects. It was thus able to put money in farmers' pockets faster. On the other hand, producers also indicated that traders preferred Katobamputa (54%) and Bangweulu (11%) variety. The most commonly cited reason for growing the variety was the high flour content.

Means of transportation of cassava chips, flour and fresh roots by producers to markets was mainly by bicycle (51.7%). Close to a fifth (18.3%) used portage, (as was the case in the majority of traders). The rest used a combination of these including ox-carts.

Overall, producers thought that production of cassava was on the increase. Infact, 88% said they had seen an increase in production over the past years. Producers generally thought the increase was a consequence of cassava being a low external input crop.

### *Cassava Storage Issues*

Close to 73% of farmers stored cassava largely in chip form for future consumption as well as resale at a later. Of those who stored, 66% stored in their own houses. Those who stored in the soil (root form) as well as own houses (chip form) were 8%. The quantities stored of 50kg bags were in the range of 1-10 bags (59%) with a maximum storage period of 7 months. The majority stored between 2 – 4 months (60%). Sacks were the most popular materials for storage. Producers' dry cassava chips fetched the same or a higher price after storage (68%), see **Table 39**.

**Table 39: Cassava Storage Issues**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Whether store before sale** | | | | |
| Do Store | 81 | 8 | 89 | 74.2 |
| Don't store | 25 | 6 | 31 | 25.8 |
| **Place of storage** | | | | |
| Own house | 71 | 8 | 79 | 65.8 |
| In soil and own house | 10 | 0 | 10 | 8.3 |
| Don't know | 25 | 6 | 31 | 25.8 |
| **Period of storage** | | | | |
| 2 weeks – 1 month | 10 | 0 | 10 | 8.3 |
| 2 months – 4 months | 64 | 7 | 71 | 59.2 |
| 5 months – 7 months | 5 | 1 | 6 | 5.0 |
| Don't know | 2 | 0 | 2 | 1.7 |
| Don't store | 25 | 6 | 31 | 25.8 |
| **Comparison of prices before and after storage** | | | | |
| Lower | 3 | 5 | 8 | 6.7 |
| Same | 22 | 1 | 23 | 19.2 |
| Higher | 56 | 2 | 58 | 48.3 |
| Do not sale | 25 | 6 | 31 | 25.8 |
| **Storage problems** | | | | |
| Easily rot | 18 | 6 | 24 | 20.0 |
| Rental store expensive | 1 | 0 | 1 | 0.8 |
| Storage pests (e.g. termites) | 7 | 1 | 8 | 6.7 |
| Easily rot and breakage | 44 | 1 | 45 | 37.5 |
| Easily rot and storage pests | 1 | 0 | 1 | 0.8 |
| Easily rot, breakage and pests | 2 | 0 | 2 | 1.7 |
| No problems | 8 | 0 | 8 | 6.7 |
| Do not store | 25 | 6 | 31 | 25.8 |

Storing the produce had its own implications such as rotting and breaking. It was suggested that the solution to these problems was to use pesticides (13.3%), sell immediately (10.8%) etc. About half of the respondents did not offer any solution or did not know what could be done.

Those who did not store gave the following reasons (i) needed cash immediately, (ii) lacked facilities, and (iii) did not see the importance of doing so. When probed for suggestions on how the storage process could be improved, the 33 respondents said that improved storage facilities needed to be provided although they did not indicate who was to provide such facilities.

### *Cassava Processing*

A total of 110 respondents or 92% out of the sample size of 120 where involved in processing cassava. The most commonly cited processing technology was pounding and sieving into flour (92%). Peeling and soaking in (preferably) running water to 'neutralise' the bitter taste often preceded this process. Chips were common products of processing, which were made from a process of peeling, soaking and then cutting the tubers into small strips. It needs to be mentioned here that flour is made from chips. Chips store better than flour and easily go up to 4 months. The 16 that did not process did not do so because they lacked knowledge on processing (43.8%) and because they felt their customers demanded fresh products (31.3%), (see **Table 40**).

**Table 40: Cassava Processing Issues**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Households involved in cassava processing | 100 | 10 | 110 | 91.7 |
| Do not process | 6 | 4 | 10 | 8.3 |
| **Final product** | | | | |
| Flour | 100 | 10 | 110 | 91.7 |
| Do not process | 6 | 4 | 10 | 8.3 |
| **Technology used in cassava processing** | | | | |
| Peel soak dry | 45 | 7 | 52 | 43.3 |
| Peel soak dry pound sieve | 49 | 3 | 52 | 43.3 |
| Do not process tubers | 12 | 4 | 16 | 13.4 |
| **Final product of roots** | | | | |
| Chips | 45 | 7 | 52 | 43.3 |
| Flour | 49 | 3 | 52 | 43.3 |
| Do not process tuber | 12 | 4 | 16 | 13.4 |
| **Use Of Processed Cassava** | | | | |
| Household consumption only | 20 | 2 | 22 | 18.3 |
| Sell processed products | 21 | 1 | 22 | 18.3 |
| Household consumption, sell some | 53 | 7 | 60 | 50.0 |
| Do not process | 12 | 4 | 16 | 13.4 |

ROOTS * Note that No processing value was indicated for any of the respondents

### *Cassava Handling Issues*

Over three-quarters of producers (78%) graded/sorted their cassava roots before selling. The main criteria used were: damage of produce, size of tubers and colour of tubers. Quite often, no special materials and costs were involved for grading to take place (78%). The reason for this high percentage of farmers grading/sorting their produce was better prices for graded products (74%), see **Table 41**.

**Table 41: Cassava Handling Issues**

| Variables | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Household grading / sorting cassava before sell** | | | | |
| Grade cassava before sale | 83 | 10 | 93 | 77.5 |
| Do not grade | 23 | 4 | 27 | 22.5 |
| **Criteria for grading** | | | | |
| Size of tubers | 18 | 6 | 24 | 20 |
| Colour of tubers | 10 | 1 | 11 | 9.2 |
| Amount of damage | 30 | 2 | 32 | 26.7 |
| Size of tubers and taste | 4 | 0 | 4 | 3.3 |
| Size of tubers and amount of damage | 2 | 1 | 3 | 2.5 |
| Amount of damage and taste | 2 | 0 | 2 | 1.7 |
| Size, colour of tubers and amt of damage | 8 | 0 | 8 | 6.7 |
| Size, colour of tubers and taste | 2 | 0 | 2 | 1.7 |
| Do not grade | 23 | 4 | 27 | 22.5 |
| **Grading Costs** | | | | |
| None | 83 | 10 | 93 | 77.5 |
| Do not grade | 23 | 4 | 27 | 22.5 |
| **Households getting better price after grading** | | | | |
| Get better price after grading | 80 | 9 | 89 | 74.2 |
| Do not get a better price | 3 | 1 | 4 | 3.3 |
| Do not grade | 23 | 4 | 27 | 22.5 |
| **Households involved in cassava processing training** | | | | |
| Yes | 7 | 0 | 7 | 5.8 |
| No | 99 | 14 | 113 | 94.2 |
| **Type of processing training received** | | | | |
| Post harvest | 4 | 0 | 4 | 57.1 |
| Pre harvest | 3 | 0 | 3 | 42.9 |

Those who did not grade did not find any specific reason for grading or thought their customers would do it anyway. However, as the above statistics show, grading offers the farmers a better deal which they need to take advantage of particularly now that consumers are getting more and more concerned about the quality of products that they buy. Besides, grading would give the ordinary farmer an edge over his rivals since customers can specialise on the type of product they want to buy. Chips and flour do not have particular determinants of quality.

The bulk of producers (94%) did not receive any training at all revealing a big deficiency in extension service provision to the farmers. The seven men that received some training got it in post harvest processing.

### *Cassava Producer Associations*

As was the case with traders, the number of producers who were members of some association was very small. Only two people were members of a credit club. Among them, one managed to access credit during the previous marketing season. Worse still, only 8 people knew about the existence of a producers' association. Seven of them were members with the only benefit being exchange of knowledge.

### 5.5.2 Profile of Sweet potato Producers

One hundred and three (103) sweet potato producers were interviewed in Solwezi, which is in the province (Northwestern) with the highest production of sweet potato.

### *Sweet Potato producer Demographics*

Of the 103 producers, 76 were male and 27 female. Their average ages were 36-45 years. A number of people were involved in farming in each household. In 18 of the households for example, over 9 people were involved in the growing of sweet potatoes (see **Table 42**).

**Table 42: Sweet Potato Producer Demographics**

| Gender of respondent | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Male | 75 | 1 | 76 | 73.8 |
| Female | 15 | 12 | 27 | 26.2 |
| **Age** | | | | |
| 15 – 25 | 12 | 2 | 14 | 13.6 |
| 26 – 35 | 23 | 5 | 28 | 27.2 |
| 36 – 45 | 26 | 4 | 30 | 29.1 |
| 46 –55 | 13 | 2 | 15 | 14.6 |
| 56 –65 | 7 | 0 | 7 | 6.8 |
| 65+ | 9 | 0 | 9 | 8.7 |
| **Off-farm involvement in other activities** | | | | |
| Yes | 34 | 3 | 37 | 35.9 |
| No | 56 | 10 | 66 | 64.1 |
| **Off-farm types of activities** | | | | |
| Fishing | 6 | 1 | 7 | 18.9 |
| Carpentry | 12 | 0 | 12 | 32.4 |
| Grocery | 3 | 0 | 3 | 8.1 |
| Tailor | 4 | 2 | 6 | 16.2 |
| Marketing | 2 | 0 | 2 | 5.4 |
| Carpentry & Fishing | 1 | 0 | 1 | 2.7 |
| Teaching | 2 | 0 | 2 | 5.4 |
| Lab technique | 1 | 0 | 1 | 2.7 |

About two thirds (64%) of respondents had farming as their main source of livelihood. The 36% who did other things were involved in carpentry, fishing, tailoring, marketeering and running a grocery shop.

### *Sweet Potato Crop Production Aspects*

The popular variety among farmers was predominantly Chingovwa (97%). The second most widely grown variety was Selemuna (85%). As high as 97% of sweet potato producers planted runners only without fertilizer or manure. Runners were largely obtained from farmers' own fields/gardens (50%) and other producers (42%). This makes sweet potato a cheap crop to grow. Almost all farmers easily accessed their preferred variety too.

Three cropping patterns were practiced; mono cropping, mixed cropping and inter cropping. Unlike cassava which had mixed cropping as the most commonly practiced cropping pattern, sweet potato producers preferred to use mono cropping almost exclusively (77%). This was essentially because of easy management of the crop and because it was labour saving. Four farmers practiced mixed cropping exclusively and this was because it was equally easy to manage, land saving and labour saving. The two who practiced inter cropping said it improved soil fertility, saved on scarce land and it was easy to manage (see **Table 43**).

**Table 43: Crop Production Aspects**

| Varieties grown | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| **Most preferred** | | | | |
| Chingovwa | 87 | 13 | 100 | 97.1 |
| Selemuna | 2 | 0 | 2 | 1.9 |
| No response | 1 | 0 | 1 | 1 |
| **Second most preferred** | | | | |
| Salemuna | 38 | 6 | 44 | 84.6 |
| Chapatata | 6 | 1 | 7 | 13.5 |
| Chishimba | 0 | 1 | 1 | 1.9 |
| **Inputs used in growing sweet potato** | | | | |
| Runners | 88 | 12 | 100 | 97.0 |
| Fertilizer | 0 | 1 | 1 | 1.0 |
| Cuttings & fertilizer | 1 | 0 | 1 | 1.0 |
| Cutting & manure | 1 | 0 | 1 | 1.0 |
| **Sources of inputs used** | | | | |
| Own cuttings | 44 | 7 | 51 | 49.5 |
| Bought cuttings | 1 | 0 | 1 | 1.0 |
| Bought fertilizer | 2 | 0 | 2 | 1.9 |
| Given | 37 | 6 | 43 | 41.7 |
| NGO | 4 | 0 | 4 | 3.9 |
| Others | 2 | 0 | 2 | 1.9 |
| **Cropping patterns used** | | | | |
| Mono cropping | 67 | 12 | 79 | 76.7 |
| Inter cropping | 2 | 0 | 2 | 1.9 |
| Mixed cropping | 4 | 0 | 4 | 3.9 |
| Mono cropping & inter cropping | 5 | 0 | 5 | 4.9 |
| Mono cropping & mixed cropping | 12 | 1 | 13 | 12.6 |
| **Reasons for growing sweet potato** | | | | |
| Food | 52 | 10 | 62 | 60.2 |
| Income | 4 | 0 | 4 | 3.9 |
| Food & Cash | 34 | 3 | 37 | 35.7 |

The quality of planting material for popular varieties was described as generally good by 93% of respondents. Despite sweet potatoes being generally good income earners, 60% of producers grew it for food only, 36% for both food and income and 4% for income exclusively.

Various problems were mentioned as affecting sweet potato production. The very serious ones among them were; (1) lack of capital/credit, (2) inadequate knowledge on processing, (3) low farm gate prices, (4) pests and diseases and (5) lack of markets. The issue of low farm gate prices showed that farm gate prices have a tendency of remaining stagnant despite the increases in other charges such as the price of transport. Sweet potatoes are also very vulnerable to pests that can ruin the whole field. The way out of these problems as suggested by the producers themselves was to improve markets and extension services, crop management practices, producer prices and use improved planting material.

### *Sweet Potato Pricing and Marketing*

The fact that 72% of respondents indicated that they sold their sweet potatoes underscores the earlier assertion that producers did not necessarily grow their crop for consumption as a family but for sale. Husbands were commonly the decision-makers on the sale of the crop (45%) followed by both husbands and wives being jointly involved (38%). The high involvement of husbands in decisions for sale can have implications on household incomes particularly if the husbands acted irresponsibly with respect to the income generated. Women are often more focused on helping the entire family achieve a better standard of living (see **Table 44**).

**Table 44: Sweet Potato Marketing & Pricing**

| Sales of sweet potatoes | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Yes | 66 | 8 | 74 | 71.8 |
| No | 24 | 5 | 29 | 28.2 |
| **Major buyers of sweet potatoes** | | | | |
| Individual households | 8 | 2 | 10 | 13.5 |
| Middlemen | 4 | 3 | 7 | 9.5 |
| Retailers | 30 | 0 | 30 | 40.5 |
| Importers | 0 | 1 | 1 | 1.4 |
| Individuals middlemen | 5 | 2 | 7 | 9.5 |
| Individual & retailers | 4 | 0 | 4 | 5.4 |
| Middlemen & retailers | 15 | 0 | 15 | 20.3 |
| **Peak periods of marketing** | | | | |
| March – April | 1 | 1 | 2 | 2.7 |
| May – June | 8 | 1 | 9 | 12.2 |
| July - August | 57 | 6 | 63 | 85.1 |
| **Period of highest prices** | | | | |
| Start of harvest | 6 | 1 | 7 | 9.5 |
| Mid of harvest | 2 | 1 | 3 | 4.1 |
| End of harvest | 52 | 5 | 57 | 77.0 |
| Throughout the year | 1 | 0 | 1 | 1.4 |
| Start & end of harvest | 5 | 1 | 6 | 8.1 |
| **Duration of highest prices** | | | | |
| 1 month | 13 | 3 | 16 | 21.6 |
| 2 months | 36 | 2 | 38 | 51.4 |
| 3 months | 9 | 3 | 12 | 16.2 |
| Don't know | 8 | 0 | 8 | 10.8 |
| **Periods of lowest prices** | | | | |
| Start of harvest | 5 | 1 | 6 | 8.1 |
| Mid of harvest | 45 | 7 | 52 | 70.3 |
| End of harvest | 16 | 0 | 16 | 21.6 |
| **Duration of lowest prices** | | | | |
| 1 month | 34 | 3 | 37 | 50.0 |
| 2 months | 26 | 3 | 29 | 39.2 |
| 3 months | 6 | 2 | 8 | 10.8 |
| **Farmers Most preferred variety** | | | | |
| Chingovwa | 89 | 13 | 102 | 99.0 |
| Salemuna | 1 | 0 | 1 | 1.0 |
| **Buyers first choice variety** | | | | |
| Chingowva | 78 | 10 | 88 | 85.4 |
| Don't know | 12 | 3 | 15 | 14.6 |
| **Reasons for buyers first choice preference** | | | | |
| Good taste | 71 | 8 | 79 | 76.7 |
| Low fibre content | 8 | 2 | 10 | 9.7 |
| Don't know | 12 | 3 | 14 | 13.6 |
| **Sweet potato production trends** | | | | |
| Increasing | 78 | 11 | 89 | 86.4 |
| Decreasing | 8 | 1 | 9 | 8.7 |
| Stagnant | 4 | 1 | 5 | 4.9 |

Producers sold their produce to retailers (41%), and middlemen/retailers (20%). The bulk of them (91%) were actually involved in the sales of sweet potatoes during the 1998/1999 season. Prices were determined on the basis of size and grade (quality) of tuber, by two thirds of the respondents, and just tuber size, by a fifth. As for sales, the period of sales was

often between 7-12 months. In certain months, the quantities sold are quite low. Some reasons why producers sold the time they did; take advantage of higher prices (31%) and the produce took long to mature (26%). Upon harvesting, the sweet potatoes were sold at urban markets, farm gate, local market and to the community around exclusively in the fresh form.

Marketing of sweet potatoes peaked around July/August (85%) with period of highest prices mainly occurring at the end of the harvest (77%). This period would go on for 1 to 2 months. On the other hand, the period of lowest prices would occur at mid harvest period (70%) and would go on for another 1 –2 months. Like all rational people, producers had a way of trying to obtain high prices. This was achieved through harvesting later than most farmers (37%), grading the produce (7%), planting early so as to harvest early before the market got 'flooded' and using a combination of two or more of these methods.

The farmers who did not sell their produce did not do so because of basically two reasons; the produce was not enough for consumption and they lacked a market. Other households had problems in trying to market even if they tried to. Infact, 86% of the households were facing problems ranging from low prices, a lack of market, lack of storage facilities to variations in price and long distance to the market. Suggested solutions to these problems were, among others, improving pricing system (35%), improving storage facilities, encouraging market cooperation and organising the market.

Naturally, Chingovwa was the most preferred variety by buyers (85%) according to the farmers, hence perhaps, its massive production. This preference was due to its good taste (77%) and low fibre content (10%). As for its production, the trend in sweet potato production was generally described as increasing (86%), notably due to growing demand as more households substitute bread for sweetpotato (see **Table 44**). Looking at the numbers of people interviewed, the largest number had only been producing in the past 6 years (86%).

Sweet potato were transported using portage, bicycle, ox-cart and public transport. The most common of these was portage.

### *Sweet Potato Storage Issues*

Only 7% of producers stored their sweet potatoes. Storage places were in the soil, own house (29% each) and dug pits (14%). Two people stored five 25-kg bags and another two stored twenty-five 25-kg of fresh tuber. This was for a period of within two weeks, an indication that the high perishability of the product requires quick disposal in the market before it becomes bad. No special materials were used in storage other than to just spread the produce on the floor or open air. However, the four who stored claimed that they incurred storage costs of between $1.43 and $2.29 (see **Table 45**).

After storage, prices were often depressed (43%), an indication that the produce may have lost quality. To underscore this issue, 71% of those who stored reported rotting as a big problem they encountered in storage. The remainder of respondents said the prices remained the same (29%) and went up (29%). Reasons cited for not storing were; (1) lack of storage facilities and high perishability (29%), (2) a lack of appreciating the importance of storing (17%), and (3) immediate need for cash.

## Table 45: Storage Issues

| Whether store sweet potato before sale | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Store sweet potato before sale | 6 | 1 | 7 | 6.8 |
| Don't store | 84 | 12 | 96 | 93.2 |
| **Place of storage** | | | | |
| In the soil | 2 | 0 | 2 | 28.6 |
| Own house | 1 | 1 | 2 | 28.6 |
| Dug pit | 1 | 0 | 1 | 14.3 |
| No response | 2 | 0 | 2 | 28.6 |
| **Quantity stored of 50kg bags** | | | | |
| 5 bags | 2 | 0 | 2 | 28.6 |
| 25 bags | 1 | 1 | 2 | 28.6 |
| Don't know | 3 | 0 | 3 | 42.8 |
| **Period of storage in days** | | | | |
| 3 | 1 | 1 | 2 | 28.6 |
| 7 | 1 | 0 | 1 | 14.3 |
| 14 | 1 | 0 | 1 | 14.3 |
| Don't know | 3 | 0 | 3 | 42.8 |
| **Cost of storage in $** | | | | |
| 1.45 | 3 | 0 | 3 | 42.8 |
| 2.29 | 1 | 1 | 2 | 28.6 |
| Don't know | 2 | 0 | 2 | 28.6 |
| **Comparison of sweet potato prices before and after storage** | | | | |
| Lower | 2 | 1 | 3 | 42.8 |
| Same | 2 | 0 | 2 | 28.6 |
| Higher | 2 | 0 | 2 | 28.6 |

### *Sweet Potato Processing and Handling*

The majority of households (88%) graded their sweet potato crop. The criteria that were used were according to tuber size and amount of damage to the tubers (67%) and amount of damage to tubers only (21%). All of them did not use any special materials in the grading process. About three-quarters of producers grading said grading costs were essentially in the form of labour. These costs were in the range of $1.43 to as much as $28.57. Three-quarters of them (75%) also said they got a better price after grading. The ones who did not grade found the task time consuming while others did not know why they were not grading.

Training in skills such as processing seem not to have been prioritized. Only one person had been trained in post harvest processing. The lack of training compelled many producers to maintain their traditional methods of doing things and thus denied them an opportunity to use innovative techniques to improve their lot (see **Table 46**).

## Table 46: Sweet Potato Processing & Handling

| Cost of grading | Male HHH | Female HHH | Total | % |
|---|---|---|---|---|
| Labour cost | 61 | 9 | 70 | 76.9 |
| Non | 19 | 2 | 21 | 23.1 |
| **Whether getting better prices after grading** | | | | |
| Yes | 62 | 6 | 68 | 74.7 |
| No | 4 | 0 | 4 | 4.4 |
| No response | 14 | 5 | 19 | 20.9 |
| **Reasons for not grading** | | | | |
| No need | 3 | 0 | 3 | 25.0 |
| Time consuming | 3 | 1 | 4 | 33.3 |
| Don't know | 4 | 1 | 5 | 41.7 |
| **Household trained in sweet potato processing** | | | | |
| Yes | 1 | 0 | 1 | 1.0 |
| No | 89 | 13 | 102 | 99.0 |
| **Type of training received** | | | | |
| Post harvest | 1 | 0 | 1 | 100 |

### *Sweet Potato Producer Associations*

With regard to membership to credit clubs and accessibility to credit, the situation with sweet potato producers was much worse than in case of cassava as none of the respondents were a member of an association or had received credit. Similarly, none of them were even aware of the presence of any association and as such could not join. However, 92% of them expressed eagerness to join.

## 5.6 Production Cost and Margins

Cassava and sweet potatoes have much lower production costs than crops like maize, which require more expensive inputs like chemical fertilizer. The two crops have been traditionally grown without the use of fertilizers with good yields.

Sweet potatoes is not only an important source of nutrition for the farmer but it is increasingly becoming a good source of income. In the study, the farmers who sold their crop obtained gross profit margins ranging from 26% to 47% depending on whether he uses middlemen or sells directly. Farmers who sold directly to final consumers obtained the highest gross margin (47%) whilst those who used marketing intermediaries obtained much lower gross margins. The middleman put a mark-up of between 4.4% and 12% for fresh sweet potato.

A cassava producer who sold fresh cassava roots to the local consumer obtained a gross profit margin of 88% whilst processed cassava (chips) had a gross profit margin of 88.6%. On the other hand, the marketing intermediaries' mark-up ranged from 4.4% to 19% for processed products. This depended on whether they were acting as wholesalers or retailers.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

The ever increasing production costs of maize, the country's staple food and the recurring droughts in the last decade have provided an incentive for increasing production of cassava as well as sweet potato to a lesser extent. There is clear evidence that the share of the two crops, particularly cassava, in the country's staple food basket has been on the increase over the past years. However, there is an absence of comprehensive time series data on consumption as well as demand in general by category (e.g. domestic, industrial, export) of both crops. This has made it difficult to formulate specific interventions aimed at improving the profile of cassava and sweet potato. It is highly ***recommended*** that such data be collected as part of the already existing Post Harvest Survey (PHS) by the Central Statistics Office (CSO) undertaken on a yearly basis. This would facilitate the availability of reliable data on the two crops on a yearly basis thereby avoid the current difficulties of sterile data. For instance, this report presents data which is two years old. The dynamics of the two crops have since changed. For instance, it is not uncommon now to see fresh cassava tubers being sold in markets and on streets unlike what obtained when the survey was undertaken. The use of an already existing facility would lower data collection costs and facilitate sustainability.

Potential for local industrialisation of chips and flour exist in the country. This relates to cassava processing to facilitate easy transportation of the crop due to long distances between production and consumption areas. It is ***recommended*** that simple and appropriate processing facilities be promoted at household level. This would require the establishment of an appropriate credit facility on a revolving basis to promote easy accessibility by potential beneficiaries who meet the agreed upon criteria.

The Sida and Norad funded Smallholder Access to Processing, Extension and Seeds (SHAPES) has particularly done a commendable job in promoting processing methods for cassava and sweet potato as well as different recipes at household level in the four provinces of its operations. These have been well appreciated by households in the target areas to the extent that demand for processing facilities has been created. It is ***recommended*** that in its next phase, SHAPES particularly targets the strengthening of linkages between institutions dealing with processing facilities (including micro-credit institutions) on one hand and target households, on the other hand.

Practical research done over several decades by the University of Zambia, School of Agricultural Sciences on livestock feeds formulation has demonstrated the suitability of cassava in providing the energy component in livestock feeds. However, to date nothing has been done to promote cassava energy based livestock feeds. In the same vain, there is evidence that a considerable portion of the country's population enjoys a mixture of cassava and maize meal in the country's staple food, *nshima*. Several maize millers talked to during the qualitative part of the survey indicated a willingness to produce such blended products if only the supply of cassava was to be guaranteed. Most of them complained of lack of information on available quantities of cassava. It is ***recommended*** that government comes up with a policy intervention which provides tax rebates to manufacturers and food processors who use cassava in the formulation of livestock feeds and the production of mealie mill respectively.

The private sector driven agricultural development policy framework being pursued by government is well appreciated. Nonetheless, the study has reviewed that the roles being undertaken by government in this overall development strategy are rather weak. For instance, government is doing very little in providing market information. Most of the players concerned have tended to depend on their on initiative to get the marketing information they need. This has inevitably inhibited the marketing of both crops as vital information needed to

facilitate decision making by various players in the marketing chains of the two crops have been unavailable. It is ***recommended*** that the overall mandate of the government extension staff of the Ministry of Agriculture and Co-operatives be re-oriented to include market information dissemination. This would be in line with the open market policy framework being pursued by government, with government's major roles being, among others, the provision of a regulatory framework as well as accurate information in a timely and efficient manner.

# APPENDICES

## Appendix 1: Production Cost and Margins

### *Sweet potatoes*

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

The production cost element of sweet potato is therefore largely labour. The average cost of labour per 25kg bag of sweet potato is USD 0.09[4]. With the farm gate price for a 25kg bag at USD 1.2 and 10% additional costs (packaging etc.) – bringing the cost to USD 0.21, the farmer's gross margin is USD 0.99, representing 83 % profit on sales.

### *Sweet potato distributive costs and margins*

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

Middlemen buy in bulk and sale in smaller quantities to retailers. The average wholesale price for a 25kg bag is USD 3.80. Thus a wholesaler (middleman) will have a mark-up[5] of 27%. The trader buys a 25kg bag from the wholesaler at USD3.8 and sell at the retail price of USD 4.20. Thus his mark-up[2] is 10.5%.

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

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

**Table 48: Sweet Potato Middleman Margin**

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

[4] Calculated from the following figures: the cost of labour per ha is USD 48. The average yield of sweet potatoes is 13,000kg per ha.

[5] The mark-up is profit expressed as a percentage of purchase price.

**Table 49: Sweet Potato Retailer Margin**

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

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

Cassava

The production cost structure of cassava is similar to that of sweet potato. Just like sweet potato, cassava is grown without the use of fertilizers. This eliminates the cost of fertilizer from the total production cost. In the study, some farmers bought planting materials but the majority used their own cuttings. The cost of cuttings required to produce a 50kg bag of fresh cassava is about USD 0.01[6]. The cost of labour needed to produce a 50kg bag of fresh cassava is USD 0.12[7]. The cost of producing a 50kg bag of fresh cassava is therefore as follows:

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

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

**Table 50: Fresh Cassava Producer Margin**

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

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

The cost of transporting a 50kg bag of fresh cassava over a distance of 10km is approximately USD0.08. This cost element will determine the selling price of fresh cassava when it is sold outside the farm gate. In the survey, the average selling price away from the farm gate was USD4.10, with a high of USD 10.30.

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

[6] Assuming that a 50kg-volume bag of cuttings can plant an area of 300m$^2$ and costs USD 0.14

[7] Calculated from the following figures: the cost of labour per ha is USD 48. The average yield of sweet potatoes is 20,000kg per ha.

**Table 51: Cassava Chip Producer Margin**

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

A middleman who buys a 50kg bag of fresh tubers at USD 3.95[8] and then sales it to a retailer at USD 4.50 achieves a mark-up of about 12%. The typical retail price of a 50kg bag of fresh cassava is USD 4.70 (it can be as high as USD14.00). Thus the retailer puts a mark-up of USD 4.4%.

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

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

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

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

## Appendix 2: References


1. Summary report & review of experiments carried out in Zambia during 1984-1987. Root and tuber improvement programme. C. Klinnert, A.J. Sumani, N. Ndhlovu.

2. Roots & tubers for the 21st century. Food, agriculture and the environment. IFPRI Gregory Scott, Mark W. Rosegrant, Claudia Ringler.

3. Diagnosing constraints in Institutional performance. Linking seed producers and consumers. ODI.

4. Project proposal submitted to USAID by SADC and IITA. SARRNET September,1993.

5. Quarterly progress report (1st April- 30th June,1999). Multiplication and distribution of improved seed and planting materials project. ZAMSEED, August,1999.

6. Study on Cassava processing, 3rd-12th December,1999, IITA, Ibadan, Nigeria. Trip report. Freda Luhila. PAM, 10th January,2000.

7. Provincial seed demand survey. LLFSP- Seed multiplication component. FINNIDA Funded. Davies Chitundu, Component head. Seed multiplication component, Mansa.

8. The role of cassava and maize in Zambia. A study on food consumption, energy turnover and nutritional status. Freda Luhila, April,1999).

9. Sweet potato production, marketing and utilisation in North-Western Zambia. Technical report No. 12, April,1991. Lewis Bangwe, Mutanda regional research station, IFAD/GRZ area development project, Solwezi, Zambia.

10. Proceedings of International Workshop on sweet potato production system toward the 21st century, 9-10, December,1997. Miyakonojo, Miyaraki,Japan (Organised by Kyushu National Agricultural Experiment Station. Ministry of Agriculture, Forest, Fisheries and science and technology agency of Japan.

11. Household Cassava processing in Zambia. PAM and Royal Norwegian Embassy.

12. Better cultural practices for Cassava and sweet potato. Roberto Soernajo PhD (Plant breeder and root crops specialist). Luapula regional research station, Mansa, Zambia.

13. Cassava in Luapula Province. Ministry of Agriculture and water development, research branch. Luapula regional research station, Mansa.

14. Principal findings and recommendations on cassava planting, material multiplication strategies based on the study tour to Nigeria, 28th July-11th August,1995. LLFSP, seed multiplication component. Davies Chitundu.

15. Root and tuber crops annual report, October,1997-September,1998.

Food crop research.

16. Newsletter for SARRNET and the EARRNET (ROOTS).

17. Marketing opportunities for root crops starch processing in Zambia.
Project proposal for the small grants.
Root and tuber improvement programme.

18. Information for the preparation of a project document.
Cassava, Zambia.

19. Nutrition and root crop processing and utilisation farmer workshop.
Theme: fighting malnutrition, Mansa technology assessment centre, 15th-18th April,1998.
MAFF, department of research and specialist services.
Root and tuber improvement programme, post harvest section.
M. Chitundu and M. Mwewa, Mansa.

20. Data needs for baseline and impact studies.
I.J. Minde.

21. Proposal for transfer of post harvest processing technologies and multiplication and distribution of improved cassava and sweet potato planting materials as food security measures in Zambia.
Submitted to USAID by IITA on behalf of MAFF and SARRNET,September, 1998.

22. Review of research of root and tuber improvement programme in Zambia.
Roberto Soernajo ( plant breeder and team leader).

23. Programme overview, root and tuber improvement programme.

24. Review of agronomic work on Cassava,1970-1990.
Department of agriculture, research branch.
Mount Makulu, Chilanga.

25. Root and tuber improvement programme, research highlights,1988.
R. Soernajo,J.C. Purakal, N. Ndhlovu, D. Chitundu.
Luapula regional research station (LURETSA),Mansa, Zambia.

26. Cassava processing and its labour implication on rural women of Luapula province, Zambia.
D. Chitundu, Assistant plant breeder, root and tuber improvement programme.
Mansa, April,1995.

27. Standard rule and regulation for the production of healthy propagation material for cassava and sweet potato.
Roberto Soernajo ( root and tuber improvement programme).
Mansa , Zambia.

28. Root and tuber improvement programme annual report,1995.
Root and tuber team,
Mutanda regional research station, Solwezi, Zambia, March,1996.

29. Storability of sweet potatoes
Maureen Chitundu.

30. Root and tuber improvement programme.
MAFF