Enhancing the livelihoods of the rural and urban poor through improved market access for sweet potato

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ENHANCING THE LIVELIHOODS OF THE RURAL AND URBAN POOR THROUGH IMPROVED ACCESS OF SWEET POTATO IN TANZANIA

ANUPDATE OF INFORMATION ON MARKET CHARACTERISTICS OF SWEET POTATO IN THE LAKE AND EASTERN ZONES OF TANZANIA

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EXECUTIVE SUMMARY

This report is an update of information on market characteristics of sweet potato conducted in the Lake and Eastern zones of Tanzania. It is intended to provide information under which flexible systems that are required to enable farmers to market their crops either when they need income or when market prices are most favorable.

Information was obtained by interviewing farmers and traders from Lake Zone and Eastern Zone of Tanzania using Rapid Rural Appraisal method (RRA). Groups of 12 to 14 farmers, one from each village surveyed were selected randomly for focus group interviews. Each group comprised of women and men. Traders from the municipal markets of Dar es Salaam, Morogoro and Mwanza were also interviewed. This information was complemented by information from the District Agricultural Development Office. Groups of three Scientists (a post-harvest specialist, a market specialist and a social worker) undertook the interviews.

The report documents the economic activities of the farmers and types of crops grown in the respective areas. It specifically provides information on the production, handling and marketing constraints of sweet potatoes. Other aspects shown in the report include, the marketing chain of sweet potatoes, production and marketing costs of the crop and seasonality of supply of sweet potatoes versus prices and quality in Mwanza and Dar es Salaam markets.

A number of recommendations based on the overall observation of the study have been documented in order to enable the stakeholders of the project to plan further interventions.

INTRODUCTION

Sweet potato (*Ipomoea batatas* (L) Lam) is a traditional crop for subsistence farmers in Tanzania but is now increasingly being marketed. The perishability and problems with in-ground storage mean that the crop is seasonal and with consequent peaks and troughs in prices. The major production areas are the Lake Zone, Southern Highlands, Eastern and Western Zone (Kapinga *et al.* 1995).

In Tanzania sweet potatoes are normally consumed after boiling in water. In urban areas, particularly in Dar es Salaam, sweet potatoes are roasted or deep fried for consumption as snack foods. Attempts are now being made to promote the use of sweet potatoes in bakery and confectionery products (Kapinga *et al.* 1995).

Although processed sweet potato products such as *matobolwa* and *michembe* exist, fresh tubers are preferred. Surveys in the Lake and Eastern Zones, Tanzania noted significant volumes of fresh sweet potato tubers sold in the markets of Mwanza, Morogoro and Dar es Salaam (Ndunguru *et al.* 1998; Thomson *et al.* 1997).

Although farmers and traders of sweet potato have been trading the crop for many years, their incomes have always remained low. The marketing system of the crop is poorly developed with very little information on the market characteristics of sweet potatoes. The perishability of the fresh tubers is also a major constraint to the marketing of the commodity. The low prices of sweet potatoes during harvesting contribute to the reduction of incomes from sales of the crop.

However, previous Crop Postharvest Programme (CPHP) developed an appropriate form of on-farm fresh-root storage technique to be used by farmers to market their produce at times outside the main harvest period and so gain higher returns from their crops. This means that storage and off season marketing can be seen within the wider context of improvements to handling and crop management having impacts on quality and thus increasing value. Flexible systems are required that enable farmers to market

their crops either when they need income or when market prices are most favorable. The aim of this study was to update information on market characteristics of the crop and confirm demand of sweet potatoes in lake and Eastern Zones.

METHODOLOGY

Information was obtained by interviewing farmers and traders from Lake Zone and Eastern Zone. Areas covered in each respective zone were as shown in Table 1.

Table 1: Coverage of the study

Zone	Region	District	Village/area
Lake Zone	Mwanza	Sengerema	Kafunzo
			Luholongoma
		Ukerewe	Busagani
			Bukonyo
Eastern Zone	Dar es Salaam	Temeke	Gezaulole
			Mbutu
			Tandika
		Kinondoni	Tandale
	Morogoro	Kilosa	Kyegea
			Mtumbatu

Groups of 12 to 14 farmers, one from each village surveyed were selected randomly for focus group interviews. Each group comprised of women and men. Traders from the municipal markets of Dar es Salaam, Morogoro and Mwanza were also interviewed. Checklists were used to guide collection of information from the farmers and traders. This information was complemented by information from the District Agricultural Development Office. Groups of three Scientists (a post-harvest specialist, a market specialist and a social worker) undertook the interviews. Although the work was done in two separate zones and by two different groups of market specialists, the checklist was the same. The checklist was developed during a planning workshop which was conducted at Morogoro at the end of May for the Coalition partners of the project. The survey took about 10 days for each Zone and was conducted in June 2003.

RESULTS

Economic activities of farmers

Farmers in the area surveyed depend on various activities for their economic survival as shown in Table 2. This table shows the economic activities for farmers of the Eastern and Lake Zones. Average farm size of the farmers' households are also shown in the Table. On average households in the Lake Zone have 2.5 acres to support their economic activities while those in the Eastern Zone have 5.4 acres.

Table 2: Specific economic activities

ZONE	REGION	DISTRICT	NAME OF VILLAGE	ECONOMIC ACTIVITY	AVERAGE FARM SIZE
LAKE	MWANZA	Ukerewe	Bukonyo	Agric, livestock keeping, fishing	2
			Busagami	Agric, Fishing, Livestock keeping and Lumbering	3
		Sengerema	Kafunzo	Agric, livestock, charcoal	3
			Luholongoma	Agric, livestock, small business, charcoal	2
EASTERN	DSM	Temeke	Gezaulole (Kigamboni)	Agric, fishing, small business	6
			Mbutu	Agric, fishing, small business	3
	MOROGORO	Morogoro Rural	Mtumbatu	Agric, Livestock, small business and carpentry	7.5
			Kyegea	Agric, small business, livestock keeping	4

Source: Survey Data, June, 2003.

However, cash and food crops grown by the farmers differed by Zone. The crops are grown on priorities depending on their importance as food or income generation. Table 3 shows the crops grown in the various villages according to their priority.

Based on the average household holdings of land, the crops seem to be too many than can be accommodated on the available land. In the Lake Zone, paddy and cassava are leading food crops whereas in the Eastern zone, sweet potato and maize are important food crops.

Cassava is an important cash crop in the Lake Zone followed by sweet potatoes. In the Eastern Zone sweet potatoes, maize and tomatoes rank first for income generation. As a whole, sweet potatoes are dependable cash crops in the Lake and Eastern zones. However, it is not known how much in percentage each cash crop contributes to the cash economy of the various households.

Table 3: Types of crops grown in the villages

Village	Cash crop	Rank	Food	Rank
Bukonyo	Paddy	1	Cassava	1
	Cassava	2	Sweet potato	2
	Sweet potato	3	Maize	3
	Oranges	4		
	Mangoes	5		
	Coffee	6		
Busagami	Cassava	1	Cassava	1
	Paddy	2	Sweet potato	2
	Oranges	3	Bananas	3
	Sweet potato	4	Maize	4
	Coffee	5		
	Tomatoes	6		
Kafunzo	Paddy	1	Cassava	1
	Sweet potato	2	Sweet potato	2
			Paddy	3
			Cowpeas	4
			Bambaranuts	5
			Groundnuts	6
Luholongoma	Paddy	1	Cassava	1
	Sweet potato	2	Sweet potato	2
	Cassava	3	Paddy	3
	Cowpeas	4	Beans	4
	Soybeans	5	Maize	5
	Finger millet	6		
	Maize	7		
Gezaulole	Sweet potato	1	Maize	1
	Maize	2	Sweet potato	2
	Ocra	3	Tomatoes	2
	Water mellon	4	Ocra	3
	Ground nuts	5	Water mellon	4
	Cassava	6	Ground nuts	5
Mbutu	Maize	1	Tomatoes	1
	Sweet potato	2	Sweet potato	2
	Water mellon	3	Paddy	3
	Ground nuts	4	Ocra	4
	Cassava	5		
Mtumbatu	Maize	1	Sweet potato	1
	Sweet potato	2	Maize	2
	Beans	3	Beans	3
	Cassava	4		
	Pigeon peas	5		
Kyegea	Maize	1	Sweet potato	1
	Sweet potato	2	Maize	2
	Beans	3	Beans	3
	Cassava	4		
	Pigeon Peas	5		

SWEET POTATO PRODUCTION

The seasons for planting and harvesting sweet potatoes differ from each zone. There are two planting and harvesting seasons (Main and off season). Farmers in the Lake zone have the opportunity to sell their crop twice a year. The off season crop is grown in the lowlands after harvesting paddy. Being located in areas where the weather is modified by Lake Victoria, planting and harvesting period is the same in all the areas surveyed as shown in Table 4. In the Eastern zone there is only one planting and harvesting season for the crop. This is because growing of sweet potatoes is rainfall dependant. A few farmers grow the crop in valleys as a means of maintaining planting materials.

Table 4: Sweet Potato Cropping Calendar

ZONE	REGION	DISTRICT	VILLAGE	Planting	Harvesting
LAKE	Mwanza	Ukerewe	Busagami	October-March June-September	February-June October-January
			Bukonyo	October-March June-September	February-June October-January
		Sengerema	Kafunzo	September-October July-September	January-March December-January
			Luholongoma	September-October July-September	January-March December-March
EASTERN	Dar es Salaam	Temeke	Gezaulole	March-May	July-September
			Mbutu	March-May	July-September
	Morogoro	Kilosa	Kyegea	March-May	June-August
			Mtumbatu	March-May	June-August

Source: Survey data, 2003

Sweet potato cropping systems

Two major cropping systems have been identified in the sweet potato growing areas. These are mono-cropping and intercropping with other crops such as cassava, cowpeas, maize, beans, bananas and fruit trees. Inter-cropping is the predominant cropping system (90%) in the Lake Zone compared to other areas. In the Lake Zone, about 90 % of the farmers interviewed intercropped sweet potatoes with other crops while in the Eastern zone only 30 % practiced the system.

Gender involvement in production and marketing of sweet potato

All family members in the Lake Zone are involved in cultivating the field and harvesting sweet potatoes for sale. Women mainly do planting and harvesting of sweet potatoes. Men normally market sweet potatoes in the village. Prices of the crop are determined through mutual understanding between the husband and wife. Price determination is based on information farmers get from traders and visits made by farmers to the markets.

In the Eastern Zone, men and women cultivate and plant sweet potatoes in the field. It is normally the men who harvest the crop for sale. Men mainly do marketing of sweet potatoes. Prices of sweet potatoes are negotiated between the men and traders.

Varieties of Sweet Potatoes

Lake zone

All the villagers grow sweet potatoes for home consumption and fresh market. Sweet potatoes were introduced in the villages about 40 years ago. The crop is mainly cultivated because it is easy to grow, helps to improve food security and sustain heritage. The varieties grown by the farmers are polista, mzondwa, balozi and kiliwona. Polista is preferred most because the tubers are mealy, tasty, high yielding, early maturing and good for commercial purposes. Balozi is also liked because of good yielding, produce big tubers and keep longer in the ground. Chilile is liked by children because of its orange colour and good taste.

Soils suitable for growing sweet potatoes

Soils suitable for sweet potato cultivation are the loam soils. Weather has some influence on the production and prices of sweet potatoes. Limited numbers of farmers use cow-dung or plant debris to fertilize their farms. Implements for growing sweet potatoes are available but they are considered expensive.

Reasons for growing sweet potatoes

Farmers grow sweet potatoes for various reasons as follows:-

- Food security
- Income generation
- Drought resistant

- High yielding
- Short growing season and
- Important staple crop (this last one is not a reason)

Factors considered in harvesting sweet potato

There are a number of factors that encourage farmers to harvest sweet potatoes at a particular time. These are:-

- The demand of food due to shortage of other foods in the households
- The desire to get cash from sale of the crop
- Give way to other crops such as paddy
- Rouging the crop in order to allow cassava to grow well
- Desire by the family members to eat sweet potatoes after missing it for sometime
- Exchange with fish

Availability of Labour

Available labour is normally distributed on fishing, growing paddy, cassava, sweet potatoes and harvesting citrus fruits. If labour is to be hired for sweet potato production and marketing the following costs will be necessary in carrying out the operations:

Problems of growing sweet potatoes

- The practice is labour intensive due to the use of hand hoes
- Planting material not easily available
- Pests such as weevils and rats infest the crop
- Low fertility of the soil result into low yield of the crop
- Lack of reliable market demoralizes the farmers to grow more sweet potatoes

Quality of sweet potatoes

The quality of the crop varies with season. Quality is good during the main season and bad during the low season of supply. However, balozi variety retains its quality even during the low season.

Storage of sweet potatoes

Some farmers usually leave their crop in the ground until September when prices are good. Farmers do not store sweet potatoes after harvest because they do have a means of keeping them fresh.

Eastern zone

Morogoro type of sweet potatoes are mostly produced and consumed in Eastern Zone. Sweet potatoes were introduced in Gezaulole about 8 years ago from Gairo. In Gairo the crop was introduced about 20 years ago. Farmers grow this variety because it is early maturing, high yielding and tolerant to diseases. The variety is also grown because of its market demand and high consumer preference. About 75-80% of the crop is grown for cash and 20% for food. A minor variety called chisindano is also grown, particularly in Gairo. The orange fleshed and red skin colored sweet potatoes are produced on a small scale mostly for household consumption.

Soils suitable for growing sweet potatoes

Suitable soils for growing sweet potatoes in the Eastern zone sand loam in Gezaulole and loam soils in Gairo, Morogoro. These soils are fertile enough to support economic production of sweet potatoes. Farmers do not use fertilizers in their sweet potato farms.

Reasons for growing sweet potatoes

Unlike the Lake zone, farmers in the Eastern zone grow sweet potatoes for sale to generate income and very little for household consumption

Factors considered in harvesting sweet potato

Sweet potatoes are harvested when they are mature and the market is in demand of the crop. That is when country buyers pass around and ask the farmers to sell the crop. Market prices also motivate the farmers to harvest their crop for sale. Infestation of sweet potatoes by weevils after a certain period of time force the farmers to harvest the crop.

Availability of labour

Hired labour in the area is available, but sometimes not affordable by all the farmers due to limited financial capital. In such a case, family labour is always available. Farmers can't afford to hire labor for all the necessary activities.

Problems of growing sweet potatoes

- Poor extension services from the Ministry of Agriculture and Food Security. In Gairo, for example, there is only one agricultural extension officer for the

whole division, while in Gezaulole one extension officer had to serve more than two villages.

- Un-standardized system of packaging of sweet potatoes. The fact that traders prefer to use "Rumbesa" which weigh up to 300kg while offering the same price as for 100kg bag discouraged the farmers from increasing production.
- Lack of farmers union/groups to assist in price setting and marketing.
- Lack of implements, inputs and lack of markets information.

Quality of sweet potatoes

In Gairo the quality of sweet potatoes is very good at the beginning of the harvesting season. However, the roots become infected with weevils towards the end of the season. The infection could be up to 20 percent. The quality of sweet potatoes from Gezaulole and Mbutu is normally good throughout the season. Tubers are less infected by weevils.

At farm level, sweet potatoes are normally graded by the country buyers into four grades. Sweet potatoes are graded into large, medium, small and broken tubers of sweet potatoes. While big tubers get good prices, small and broken tubers get as low, such as Tsh 1,000 per bag of 100kg.

Storage of sweet potatoes

Farmers do not store sweet potatoes at the farm. However, planting materials are stored near rivers or in the dump valleys.

Production cost of sweet potatoes per acre

Production cost of sweet potatoes per acre differ between the villages and zones. Although the activities are similar, time required for each operation differ within the areas. Table 5 shows the production costs of the Lake and Eastern zones. The production cost of the crop in Ukerewe is higher compared with that of Sengerema. This situation has some influence on the profit a farmer is likely to get in the market by selling the crop. Production cost of sweet potatoes in Ukerewe is much higher than that of Sengerema. Similarly, the cost of sweet potato production in Morogoro is higher compared to that of Dar es Salaam.

Table 5: Production cost per acre

Region	District	Village	Operation	Time required	Cost in Tsh	Total
Mwanza	Ukerewe	Busagami	Slashing grass	1 week	20,000	
			Farrowing	2 weeks	20,000	
			Planting	1 week	5,000	
			Weeding	3 weeks	25,000	
			Harvesting	1 week	15,000	
			Purchase of seeds		10,000	**95,000**
		Bukonyo	Slashing grass	2 weeks	20,000	
			Farrowing	3 weeks	30,000	
			Planting	1 week	10,000	
			Weeding	3 weeks	25,000	
			Harvesting	1 week	15,000	
			Purchase of seeds		15,000	**115,000**
	Sengerema	Kafunzo	Slashing grass	1 week	6,500	
			Farrowing	1 week	8,000	
			Planting	3 days	2,000	
			Weeding	1 Week	10,000	
			Harvesting	3 Days	7,500	
			Purchase of seeds		2,000	**36,000**
		Luholongoma	Slashing grass	10 Days	10,000	
			Farrowing	12 Days	10,000	
			Planting	3 Days	5,000	
			Weeding	8 Days	8,000	
			Harvesting	6 Days	18,000	
			Purchase of seeds		2,000	**43,000**
Morogoro	Kilosa	Kyegea	Furrowing	6 Days	20,000	
			Ridging	7 Days	20,000	
			Planting	4 Days	20,000	
			Weeding	7 Days	12,000	
			Harvesting		8,000	
			Seed		5,000	**85,000**
		Mtumbatu	Furrowing	1 Week	10,000	
			Ridging	1 Week	12,000	
			Planting	4 Days	22,500	
			Weeding	1 Week	20,000	
			Harvesting		8,000	
			Seed		5,000	**77,500**
Dar es Salaam	Temeke	Mbutu	Furrowing	1 Week	12,000	
			Ridging	1 Week	15,000	
			Planting	4 Days	5,000	
			Weeding	1 Week	7,000	
			Harvesting		10,000	
			Seed		2,000	**51,000**
		Gezaulole	Furrowing	1 Week	20,000	
			Ridging	1 Week	15,000	
			Planting	4 Days	8,000	
			Weeding	1 Week	7,000	
			Harvesting		10,000	
			Seed		4,000	**64,000**

Source: Survey data, 2003

Cost of handling sweet potatoes from the farm to the markets

The farmers and traders normally carry out a number of activities after harvesting of sweet potatoes. Each of the activity involves a certain amount of cost as shown in Table 6. This cost is based on a bag of sweet potatoes (100-140kg). Costs incurred by the farmers and traders of Mwanza do not differ significantly in the respective areas but were higher than those of the Eastern areas.

Table 6: Costs for handling sweet potatoes from the farm to the market per bag.

Region	District	Village	Operation	Cost in Tsh	
Mwanza	Ukerewe	Busagami	Staffing a bag	500	
			Transporting a bag to road side	1,000	
			Loading into lorry	300	
			Transporting from the village to Nansio	1,000	
			Unloading at the lakeshore	300	
			Transport to Mwanza	1,000	
			Packaging material	400	
			Levy	300	**4,800**
		Bukonyo	Staffing a bag	1,000	
			Transporting a bag to road side	1,000	
			Loading into lorry	300	
			Transporting from the village to Nansio	1,000	
			Unloading at the lakeshore	300	
			Transport to Mwanza	1,000	
			Packaging material	400	
			Levy	300	**5,300**
	Sengerema	Kafunzo	Staffing a bag	400	
			Transporting a bag to road side	1,000	
			Loading into lorry	500	
			Transporting from the village to Nansio	1,000	
			Unloading at the lakeshore	500	
			Transport to Mwanza	1,500	
			Packaging material	400	
			Levy	500	**5,800**
		Luholongoma	Staffing a bag	200	
			Transporting a bag to road side	1,000	
			Loading into lorry	500	
			Unloading at the lakeshore	500	
			Transport to Mwanza	1,500	
			Packaging material	300	
			Levy	200	**4,200**

Costs for handling sweet potatoes from the farm to the market per bag continued

Morogoro	Kilosa	Kyegea	Staffing a bag	200	
			Collection at a central place	200	
			Transporting a bag to road side	1,000	
			Loading into lorry	700	
			Transport to Dar es Salaam	1,000	
			Packaging material	200	
			Levy	500	**3,800**
		Mtumbatu	Staffing a bag	200	
			Collection at a central place	200	
			Transporting a bag to road side	500	
			Loading into lorry	500	
			Transport to Dar es Salaam	1,000	
			Packaging material	200	
			Levy	500	**3,100**
Dar es Salaam	Temeke	Gezaulole	Staffing a bag	700	
			Collection at a central place	200	
			Transporting a bag to road side	500	
			Loading into lorry	500	
			Transport to Dar es Salaam	700	
			Packaging material	200	
			Levy	500	**3,300**
		Mbutu	Staffing a bag	700	
			Collection at a central place	200	
			Transporting a bag to road side	500	
			Loading into lorry	500	
			Transport to Dar es Salaam	1000	
			Packaging material	200	
			Levy	500	**3,500**

Source: Survey data, 2003

Prices of sweet potatoes per bag (Tsh)

There are two types of prices that differ from place to place and from one market to another. These are farm gate prices and market prices. These prices also differ with season. During the high season prices are lower than during the low season of supply. Overall, the market prices of Dar es Salaam are higher than those of Mwanza. This

implies that traders of the Eastern zone can get higher profit from their crop than those of Mwanza if transport is not a limiting factor. Table 7 shows the gate and market prices of sweet potatoes for Lake and Eastern zone.

Table 7: Prices of sweet potatoes per bag (Tsh)

Region	District	Village	Farm gate prices		Market prices (City)	
			Low season	High season	Low season	High season
Mwanza	Ukerewe	Busagami	12,000-15,000	6,000-8,500	14,000-15,000	9,000-14,00
		Bukonyo	8,000	3,000-6,000	"	"
	Sengerema	Kafunzo	10,000	6,000	"	"
		Luholongoma	10,000-12,000	5,000	"	"
Morogoro	Kilosa	Kyegea	17,000	5,000	30,000	28,000
		Mtumbatu	22,000	7,000	30,000	28,000
Dar es Saam	Temeke	Gezaulole	13,000	9,000	28,000	26,000
		Mbutu	15,000	7,000	30,000	20,000

Prices are usually negotiated between farmers and traders who either buy in sacks or per plot. Both wife and husband participate in price negotiations. The difference in prices at the farm gate between low and high season is very significant in all the zones. However, the variation of market prices between low and high season of supply is very small.

Storage

In-ground storage is very common in all the zones surveyed, which allowed farmers to utilize sweet potato in their fresh form, on piece meal basis. But this kind of storage has some limitation because of: weevil infestation, vertebrates pest, root rots and theft. In order to avoid these problems, some of the farmers especially in the Lake zone process the crop into dry chips store them for use.

Marketing chain of sweet potatoes

Sweet potato marketing in all selected zones is characterized by a few number of small scale traders, operating privately on individual basis. Usually farmers sell sweet potatoes directly to consumers within the village whenever there is an urgent need. The marketing chain of sweet potatoes involves farmers, traders, transporters,

commission agents and consumers. However, these actors can be classified into whole sellers and retailers. Figure 1 shows the marketing chain of sweet potatoes in the Lake and Eastern zones.

As Figure 1 shows, sweet potato after being produced by farmers are partly consumed by farmers' households and the surplus production is sold to village traders, who eventually dispose of it to village consumers or inter-regional traders, popularly known as country buyers. The later procure sweet potato and transport it using hired trucks or boats particularly in Ukerewe and Sengerema to the central markets of Mwanza and Bunda where they either sell directly to other traders (wholesalers) through some commission agents. Commission agents are mainly found in Mwanza (Mwaloni market) and Dar es Salaam (Tandale and Tandika markets). They then dispose off the produce to retailers located within and outside the market premises. The retailers eventually sell sweet potato to household consumers and street vendors. In some occasion, farmers themselves may transport their produce directly to the central market for sale.

In Gairo, sweet potatoes are transported in lorries and pick-ups to Morogoro and Dar es Salaam markets. About 70% of sweet potatoes from Gairo are sold in Morogoro and Dar es Salaam markets. In Gezaulole the crop is transported by pick-ups and bicycles to Tandale and Tandika markets.

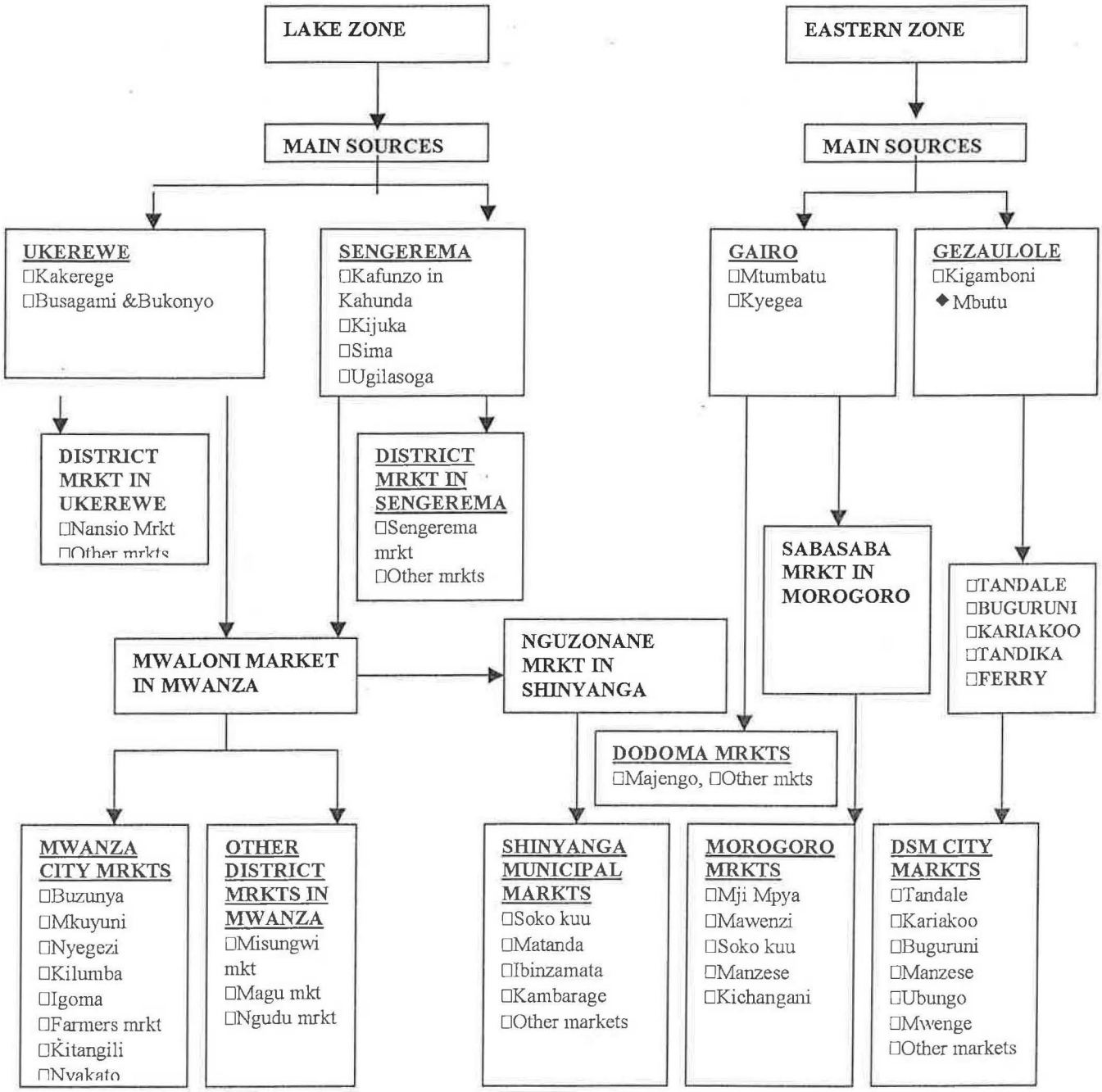

Figure 1: Marketing Chain of fresh sweet potato.

Figure 1 shows that there are many market outlets of sweet potatoes from Ukerewe and Sengerema in the Lake zone. However, Mwaloni is the only wholesale market for sweet potatoes in Mwanza city. This market is situated near the Mwaloni port on the shores of Lake Victoria, about 3km Northwest of Mwanza city. It has an association namely: **"TUPENDANE MATUNDA MWALONI",** with 50 members in total, who trade in various agricultural products, including: sweet potatoes, fish, fruits (bananas and mangoes). There are about 15 traders of sweet potatoes in Mwaloni who buy the crop on wholesale basis and sell it to retailers. These traders normally receive sweet potato consignments three times a week. (Tuesday, Thursday and Saturday). During the low season of supply, the market receives about 600 bags of 200-240kg per month. However during the high season of supply the market receives about 1,800 bags per month. As a whole the amount of sweet potatoes entering the market per annum is about 9,900 bags. The incomes received from the sales of the consignments is about Tsh 148.5 million.

On reaching at Mwaloni market, traders (members and non-members of the association) sell sweet potatoes to other traders, trading on wholesale and retail basis at the premises of the market, and to other traders from small markets scattered all over the Mwanza city. These markets are: Buzunya, Nyakato, Mkuyuni, Nyegezi, Kilumba, Igoma, Igogo and Kitangili. Sometimes, traders (members of the association) can transport sweet potatoes by hiring lorries from Mwaloni and sell it to traders of other regions and districts, particularly those from Shinyanga region and Misungwi district. This usually happens, especially during the months of Ramadhan.

Seasonality of supply, prices and quality

Sweet potatoes supplied in Mwanza city markets vary in quantities, quality and prices according to the season of the year. Figure 2 shows the seasonality of supply, quality and prices of sweet potato in Mwanza city markets. Prices are higher during the low season of supply and lower during the high season of supply. Quality is also better prices of sweet potatoes during the high season of supply. It seems therefore, quality has no direct influence on the prices of sweet potatoes sold in Mwanza city

The number of outlets of sweet potatoes from Gairo, Gezaulole and Mbutu are less than those of the sweet potato farmers in the Lake Zone as shown in Figure 1. The major markets of sweet potatoes from Gairo are Sabasaba and Mji Mwema in Morogoro municipality where as those for Gezaulole and Mbutu are Tandika, Tandale, Buguruni and Mabibo. All these markets are wholesale and retail markets for the crop. Tandale market has an association Called "Tandale Food Dealers and exporters Cooperative society Ltd. This society has about 34 members who trade on various commodities such as fruits and vegetables, sweet potatoes and cassava. There are about 8 commission agents who facilitate sales of sweet potatoes in Tandale market. In the various markets, sweet potatoes are bought on wholesale basis and sold to retailers or petty wholesalers. Retailers either sell the crop within the markets in heaps or fry chips for sale all over the city. On the average, Dar es Salaam markets receive about 3000 Mt of sweet potatoes from Gezaulole and Mbutu of 120 – 140kg. The amount of sweet potatoes entering the market of Dar es Salaam per annum is about 2453.5Mt from Gairo. It is not clear of the amount of sweet potatoes entering the Morogoro Markets. This could probably be about 500Mt. The incomes received from the sales of the consignments traded in Dar es Salaam markets is estimated to be Tsh 584.3 million

After reaching the main Dar es Salaam markets, sweet potatoes are distributed to other markets scattered all over the city.

Seasonality of supply, prices and quality

Sweet potatoes supplied in Morogoro and Dar es Salaam markets vary in quality and prices according to season of the year. Prices are higher during the low season of supply and lower during the high season of supply. Quality is also better during the high season of supply. This means that price is not a function of quality but season.

In the Eastern zone the major sweet potato markets are Tandika and Tandale which are situated about 3km away from the city center. In Tandale there is an association called "TANDALE FOOD PRODUCT DEALERS AND EXPORTES COOPERATIVE SOCIETY LTD" with about 25 members. The members of the

association are involved in marketing a variety of crops which include fresh cassava roots, sweet potatoes, fruits and vegetables. In Tandika an association is yet to be formed. However, there are groups of traders specialized in marketing specific crops such as coconuts, sweet potato and fresh cassava roots, fruits and vegetables. There are commission agents in both markets who facilitate selling the crop on wholesale basis to retailers. There also a number of retailers scattered around the market who either sell the crop in heaps or fry sweet potato chips for direct consumption.

The main supplying areas in the Eastern zone are Gairo in Morogoro and Gezaulole in Dar es Salaam, which supply sweet potato to Dar es Salaam markets, mainly Tandale market. Some sweet potato as noted by traders, may come from Zanzibar, especially when the Gairo and Kigamboni supply ceases or becomes very small. Also, traders at Sabasaba market in Morogoro mentioned the Kilombero sourced sweet potato is usually supplied at this market when the Gairo sweet potato supply stops.

Seasonality of Supply

For the Eastern zone, the low and high supplies seasons for the Gairo sourced sweet potato are (September-November) and (June-August) respectively. A similar phenomenon was discovered for the Gezaulole (Kigamboni) sourced sweet potato.

Market outlets.

The main markets for the Gairo sourced sweet potato are Sabasaba and Tandale markets in Morogoro and Dar es Salaam regions respectively, receiving more than 70% of the marketable quantity. In addition, some sweet potato from Gairo was supplied to Dodoma regional markets, particularly the Majengo market. After sweet potato reached Sabasaba market, it is supplied to other markets such as Sabasaba market in Morogoro, Mji Mpya, Soko Kuu, Mawenzi, Manzese, Kichangani and Uwanja wa Ndege. Whereas the Tandale markets in Dar es Salaam, supplies the peripheral markets, particularly the Sinza, Manzese, Ubungo and others small markets scattered all over the Dar es Salaam City.

The Gezaulole, Kigamboni sweet potato was mainly supplied to Tandale. Other markets which were reported to obtain sweet potato from Kigamboni were Tandika , Kariakoo and Buguruni..

Discussion and conclusion

All the villages surveyed produce sweet potatoes for home consumption and marketing. Polista is the only major variety of sweet potatoes produced in the Lake Zone for marketing whereas Morogoro variety is produced in the Eastern zone for the market. The production of sweet potatoes is seasonal in all the villages due to the perishability of the crop. There are no inputs used in the production of sweet potatoes except labour which is available in all the villages. Yields per acre is low with a lot of problems of weevils. The production cost of the crop vary from village to village.

Farm gate prices are very low and farmers do not have the power to dictate them. The country buyers dictate the terms. There are also cost involved in harvesting the tubers and handling them from the farm to the market. All these costs have some effect on the final income of the farmer, trader and consumer.

Transport of sweet potatoes in the villages do not seem to be a problem even though some roads become bad during the rain season. Fortunately, sweet potatoes are harvested during the dry season when roads are passable. Furthermore there are also water transport option especially in the Lake Zone. In the Eastern Zone transport is not a problem as roads are accessible throughout the year.

In all the villages, there are no standardized weight for the bags of sweet potatoes sold. This is a problem because farmers cannot get fair prices for the product. The weights of the bags are usually too big for the price. Both farm gate and market prices are very low during the high season production and very high during the low season of production. This means farmers should aim at selling the crop when prices are high in order to maximize incomes. Unfortunately, farmers do not store sweet potatoes after harvest because the technology has yet to be adopted by them.

In general sweet potatoes fetch a high price in the urban markets of Mwanza, Morogoro and Dar es Salaam. But it is not easy to say how much the farmers are getting in each village for the market sales of the crop.

Although there are defined marketing channels for the crop, the farmers are not well organized to maximize the existing marketing channels. Maybe they do not have enough knowledge on the marketing techniques.

RECOMMENDATIONS

Based on the observations made, the following recommendations are made with respect to the future implementation of the project:

- Price differences between high and low seasons exist which make storage a possibility
- Options should be accessed for improving market integration so that farmers get what they would consider a realistic price for their crops.
- Options for expanding market outlets, such as supermarkets should be accessed as alternative market outlets that might allow a greater degree of post-harvest technology to be applied.
- The project is justified to continue its focus on small scale sweet potato producers as they reply heavily on their crop for income and food security and they would be classed as poor
- Options for farmer organization should be accessed as a means of enabling better market access.
- If orange fleshed sweet potatoes are to be promoted for health reasons then high dry matter content varieties are necessary and "social marketing" is necessary to improve knowledge concerning the potential benefits of consuming the crop.

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