

Sweetpotato in Ugandan Food Systems: Enhancing Food Security and Alleviating Poverty

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Uganda is one of the world's poorest and least developed countries with a GNP per capita of US\$320 (World Bank, 1998/99). Uganda's economy and 90% of its population depend on agriculture for food, employment, and income (UNDP, 1999). Current population stands at slightly over 20 million and is growing at over 2.8%/yr. (UNDP, 1999). Some 85% of the people reside in rural areas.

Given the fragile balance between population, food production, and economic growth, government policy seeks to ensure the country's continued ability to sustain food self-sufficiency. Increases in agricultural productivity and agroenterprise development are key elements in the government's strategy to increase the incomes of rural households and to facilitate further expansion of the overall economy. These concerns are particularly acute in the Eastern Region in Soroti and Kumi districts, and in the Northern Region in Lira and Apac districts. These districts are among the poorest in the country (UNDP, 1999).

Uganda is the biggest sweetpotato (*Ipomoea batatas*) producer in Africa with an annual average output of nearly 2 million t (Scott and Maldonado, 1999). Output has steadily expanded in recent years. Consequently researchers, development project personnel, and Ministry of Agriculture officials have become increasingly interested in the role of sweetpotato in Ugandan food systems and its potential to enhance food security and increase rural

incomes (Bashaasha et al., 1995; Fowler and Stabrawa, 1992; Hall et al., 1998). The attention to sweetpotato also reflects a more general interest in roots and tubers, and matooke (cooking banana) over the last decade (Bashaasha and Mwanga, 1992; Otim-Nape and Opio-Odongo, 1992). These crops account for a major share of annual food production and consumption. The focus on sweetpotato in Uganda has also intensified since 1990 with the spread of the more virulent Ugandan form of the cassava mosaic virus disease (CMD).

This paper analyzes trends in sweetpotato production, area planted, prices, consumption, and use in Uganda over the last 10-15 yr. After a brief review of food production and use nationwide, the analysis turns to particular regions and districts. The analysis addresses the following key questions regarding the evolving role of sweetpotato in Ugandan food systems:

- What has been the evolution of production and area planted nationally by region and by district?
- Has this evolution shifted the distribution of sweetpotato production across the country and its relative importance in local food systems, especially in areas where it substitutes for or complements cassava?
- What has been the effect of increased production on prices, relative prices, consumption, and use?
- How have these trends affected the role of sweetpotato in Ugandan food systems, particularly in the poorer regions and districts of the country?

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Material and Methods

Information resources

This paper draws upon a range of primary and secondary sources. Secondary information includes (1) official Ugandan statistics on production, prices, and consumption, (2) FAO estimates of the calories and protein provided by these commodities in relation to other major foods, and (3) a selective review of the recent literature on sweetpotato and other root and tuber crops in Uganda. Primary sources include information gathered in informal interviews with key informants in 1994, 1996, and 1998, as well as with knowledgeable specialists in organizations elsewhere, e.g., Natural Resources Institute, UK, and FAO-Rome, and participant observation of rural and urban root crop processing and marketing.

Conceptual framework

This study uses a food systems conceptual framework consisting of four central traits. One is the focus on the interrelation and interaction between different subsystems, e.g., farming (production), marketing (exchange), and use (consumption) systems.

A second feature is that each subsystem is considered as a horizontal concept. In this framework, farming systems as a concept encompasses all aspects of rural activity (cropping, livestock, and forestry systems) associated with agricultural production. In contrast, the food system is essentially a vertical concept. The focus of analysis then is not the interrelation of activities at a particular horizontal level but rather the interrelation between subsystems of the food system — from production through the marketing chain to the consumer (both rural and urban), including any processing and value-added activities (Hall et al., 1998).

A third key feature is that of a historical perspective. Instead of analyzing in detail interactions at a given point in time, the

food systems approach focuses more on medium- to long-term trends in key variables. In this way we capture the evolving nature of the interrelation between subsystems.

Finally, within a country, the food systems approach frequently examines national and interregional developments as opposed to more location-specific trends. This aspect of the food systems approach is intended as a macrocomplement to analysis of particular agricultural activities at the microlevel (Morris, 1995).

Results and Discussion

Role of sweetpotato in Ugandan food systems

The average Ugandan diet contains staples such as matooke, cassava, sweetpotato or cereals such as maize. The typical meal consists of one or more of these commodities accompanied by a sauce made of beans, vegetables, fish, or meat (Bashaasha et al., 1995). Hall et al. (1998) identified at least five distinct roles for sweetpotato in Ugandan food systems, four of them peculiar to rural areas and one associated primarily with urban areas. They are:

1. A predominant staple providing the majority of calories for most of the year (sweetpotato production is seasonal and processed roots rarely last 4 mo). Examples are found in Soroti, Kumi, and parts of northern districts (Figure 1).
2. One of a number of major complementary staples consumed throughout the year but with seasonal peaks, for example, in Kabarole, Masindi, Kabale, and Iganga districts.
3. A famine reserve staple typically consumed only in significant quantities during shortages of the dominant staple.
4. A source of cash income either produced strictly for sale as in Mpigi District near Kampala (Bashaasha et al., 1995), or more commonly as a source of revenue from petty trading. That is especially true in the Northern and Eastern regions

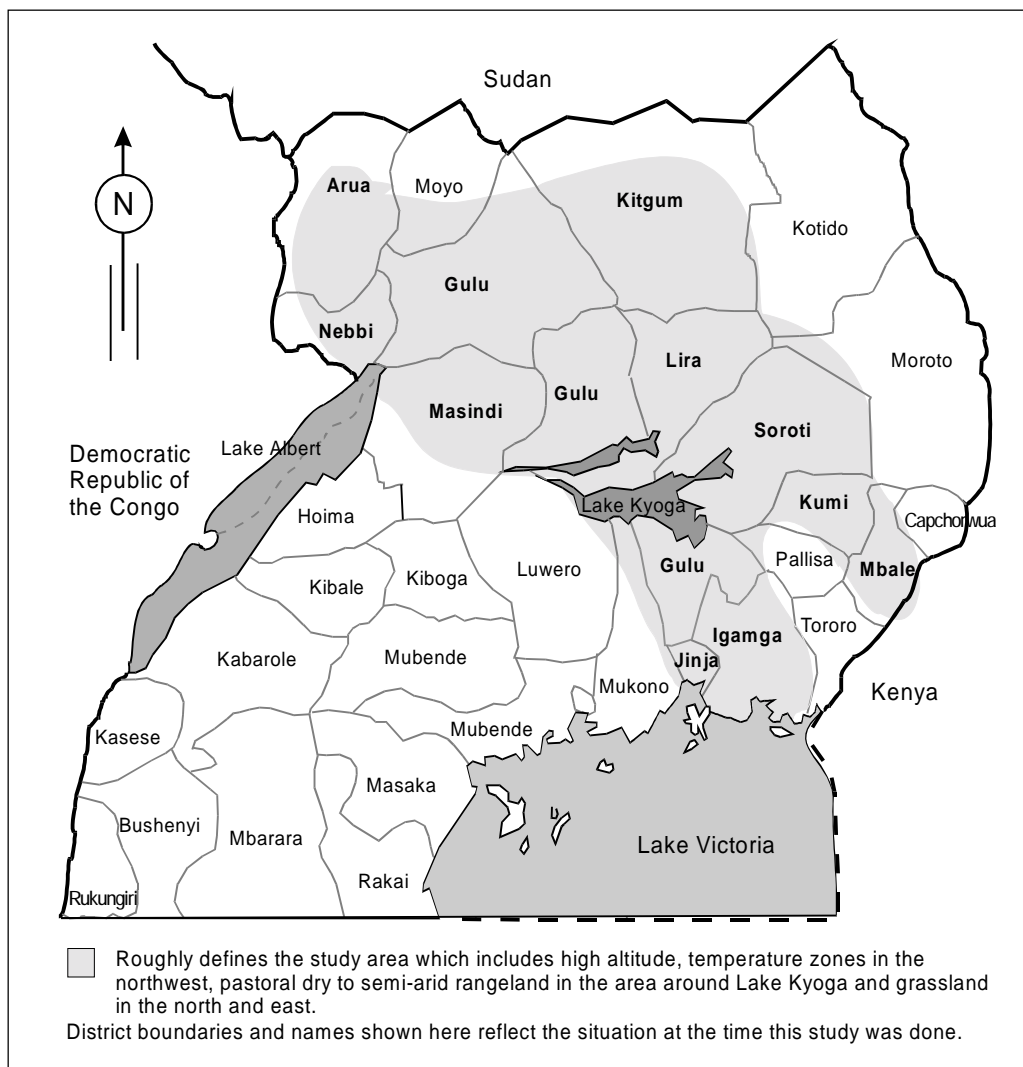


Figure 1. Ugandan administrative districts and agroecological zones.

where small farmers have relatively few opportunities to earn cash.

5. A low-priced, complementary staple for the poor and lower-income urban groups (Mwesigwa, 1995).

Production trends

Sweetpotato production in Uganda rose from 1.7 to 1.9 million t, or slightly over 12%, between 1987-89 and 1995-97. During the same period, maize output jumped 70% and matooke production increased by an estimated 1.9 million t. In contrast, cassava production fell from 3.3 to

2.2 million t, or roughly 32% (Table 1). Hence, sweetpotato assumed slightly greater importance in domestic food supplies. The increase in sweetpotato production, however, was less noteworthy than the sharp decline in cassava output or the production increases for maize and matooke.

Five of the top 10 cassava-producing districts in 1987-89 were among the top 10 sweetpotato-producing districts as well. By 1995-97, the number had risen to 7 of 10. Cassava production declined in 9 of the top

Table 1. Uganda food crop production, 1987-89 vs. 1995-97.^a

Crop	1987-89		1995-97	
	Production (000 t)	%	Production (000 t)	%
Matooke (cooking banana)	7,267	50.3	9,153	57.0
Cassava	3,313	22.9	2,253	14.0
Sweetpotato	1,683	11.6	1,888	11.8
Maize	474	3.3	804	5.0
Millet	569	3.9	525	3.3
Sorghum	335	2.3	330	2.1
Beans	341	2.4	282	1.8
Potato	207	1.4	360	2.2
Groundnuts	134	0.9	120	0.7
Rice		0.0	80	0.5
Soybean	13	0.1	83	0.5
Sesame	35	0.2	72	0.5
Pigeonpeas	38	0.3	58	0.4
Cowpeas	38	0.3	46	0.3
	14,446		16,055	

Source: Ministry of Agriculture.

^a Estimates are of economic production (after making allowance for postharvest losses) not of harvested product.

10 districts between 1987-89 and 1995-97. Furthermore, the top 10 producing districts in 1995-97 accounted for nearly 50% of the 1.1 million t decline in national production since 1987-89.

The opposite occurred in the top 10 sweetpotato districts (Table 2). The average increase in sweetpotato production for these districts for the period was just 9,155 t. In addition to the advance of CMD, the period 1987-1990 was marked by civil unrest in certain eastern districts that temporarily reduced production of all food crops. Between 1987-89 and 1995-97, only Kitgum showed a sharp increase in sweetpotato output (26,567 t) in relation to the decline in cassava production (-17,536 t). In Gulu, cassava output increased over the period by 5,176 t, but sweetpotato production jumped by 48%, or 29,681 t. For the other top 10 districts, the increase in sweetpotato output per se was modest and

also in relation to the much larger decline in cassava. Only three of the cassava-producing districts recorded a combination of a sharp decline in cassava output and a jump in sweetpotato production. In some districts production of both crops declined, although typically the drop was much greater for cassava than for sweetpotato.

Following a policy of decentralization, Uganda has created a number of new districts by subdividing some larger districts, e.g., Katakwi out of Soroti. The change in the number of districts and their respective size may affect our analysis of district production figures for 1987-89 and 1995-97. The accuracy of district-level data on acreage and yields may also suffer. However, there is little reason to believe that the data for sweetpotato are more accurate or less accurate than those for other root crops. The relation between major production increases in sweetpotato

Table 2. Uganda sweetpotato and cassava production, variation (%) and ranking, 1987-89 versus 1995-97.^a

District	Sweetpotato			District	Cassava		
	Production	Change (%)	Ranking		Production	Change (%)	Ranking
	1995-97 (000 t)	vs 1987-89	1987-89		1995-97 (000 t)	vs 1987-89	1987-89
Mbale	127	5.6	1	Mbale	169	-37.4	1
Iganga	105	2.8	2	Iganga	169	-12.8	5
Hoima	98	1.1	3	Apac	141	-27.4	4
Apac	98	7.9	7	Arua	139	-41.7	2
Kitgum	94	39.5	11	Kitgum	125	-12.3	11
Masindi	93	22.2	9	Gulu	119	4.6	16
Kumi	92	-2.8	5	Lira	118	-33.8	7
Gulu	91	48.3	13	Kumi	117	-38.7	6
Kamuli	80	1.2	8	Kamuli	107	-39.1	8
Soroti	72	3.4	10	Nebbi	100	-26.2	13
Total	1,888	12.2		Total	2,253	-32.0	

Source: Ministry of Agriculture.
^aThese district-level data are for the top ten sweetpotato- and cassava-producing districts in 1995-97 only. The totals are for all districts.

and declines in cassava at the district level has been limited to a small number of districts.

Sweetpotato rose in importance in both the Eastern and Northern regions (Table 3). Matooke accounted for the largest absolute increase in food production in the Eastern Region followed by maize and sweetpotato (Table 3). These three crops then substituted for the decline in cassava output. In contrast, cassava fell sharply in absolute output and in relation to the other principal food crops. In the Eastern Region farmers increasingly see sweetpotato as a source of cash income, particularly in the absence of cassava. That is consistent with Uganda's objective of raising rural incomes in the region given the greater incidence of poverty and lower levels of human development (Table 4).

In the Northern Region, the increase in sweetpotato production (151,000 t) was

higher than any other crop in absolute tonnage (Table 3). Maize production rose by 142,000 t. The increase in matooke output has also been noteworthy (84,000 t). But not on the scale of growth in the Eastern Region where growing conditions for matooke are more favorable. These production changes are particularly important because the Northern Region and its districts are the poorest in all the country (Table 4).

Statistics for cassava and sweetpotato production in the Eastern and Northern regions in 1997 indicate that the slight upturn in cassava output has been accompanied by a similar rebound for sweetpotato (Figure 2). That suggests farmers are producing more of **both** crops rather than opting for one over the other.

Price trends

Fresh cassava and sweetpotato, along with matooke, serve as substitutes in

Table 3. Food crop production in the Eastern and Northern regions of Uganda, 1987-89 vs. 1994-96.¹

Crop	1987-89				1994-96			
	Production (000 t)		%		Production (000 t)		%	
	East	North	East	North	East	North	East	North
Matooke (cooking banana)	1,024	138	28.7	7.3	1,401	222	36.1	9.9
Sweetpotato	631	349	17.7	18.5	794	500	20.5	22.4
Cassava	1,198	854	33.6	45.5	782	656	20.1	29.4
Maize	186	105	5.2	5.6	345	247	8.9	11.1
Millet	259	167	7.3	8.9	261	212	6.7	9.5
Potato	9	2	0.2	0.1	84	17	2.2	0.7
Beans	122	77	3.4	4.1	84	107	2.2	4.8
Sorghum	85	142	2.4	7.6	8	211	2.2	9.5
Groundnuts	49	46	1.4	2.4	46	59	1.2	2.6
Total	3,563	1,880			3,882	2,230		

Source: Ministry of Agriculture.

¹Eastern Region includes the districts of Kapchorwa, Mbale, Katakwi, Kumi, Pallisa, Tororo, Busia, Bugiri, Soroti, Kamuli, Iganga, and Jinja; Northern Region includes the districts of Arua, Moyo, Adjumani, Kitgum, Kotido, Nebbi, Gulu, Apac, Lira, and Moroto.

Ugandan diets (Bashaasha et al., 1995). Prices for these two crops have tended to move together in recent years (Figure 2). With changes in production, however, relative prices for sweetpotato vs cassava have shifted. In a number of urban markets, sweetpotato has become cheaper than cassava, reflecting the drop in cassava production and the increase in sweetpotato output (Figure 2). That suggests urban consumers may be inclined to eat more sweetpotato, particularly those with limited food budgets.

Consumption

Roots and tubers, including matooke, account for some 44% of the average daily caloric intake of 2194 kcal in Uganda (FAO STAT, 1998). The decline in cassava production and the concomitant rise in matooke and sweetpotato output have shifted the percentage that each commodity contributes to the diet. Sweetpotato's share declined from 12% in 1984-86 to 10% in 1994-96. Cassava's share shrank from 19% to 10%.

Diets in Uganda differ by region and by time of year. Matooke, for example, is much more important in the area around Kampala for agronomic and cultural reasons (Mwesigwa, 1995). Sweetpotato assumes greater relative importance in parts of the Eastern and Northern regions and generally in July, August, and September, during and immediately after peak harvest, and during seasonal shortages of other crops (Bashaasha et al., 1995; Smit, 1997). Recent shifts in production certainly suggest sweetpotato's increasing importance in regional diets, particularly in the Northern Region.

The last decade has witnessed the emergence of sharp differences between rural and urban food expenditures (Table 5). Rural food expenditures were two-thirds of urban expenditures in 1989/90. They had dropped to nearly half of urban expenditures by 1993/94. Inasmuch as 85% of the population resides in the countryside, the national average nevertheless remained closely tied to expenditure levels in rural areas.

Table 4. Regional and selected district human development and poverty indices, 1996.

Region	Human development index ^a	Human poverty index ^b
Central	0.4970	31.2
Eastern	0.3620	40.0
Kamuli	0.3353	52.9
Soroti	0.3230	52.0
Kumi	0.2985	51.0
Iganga	0.3661	48.4
Northern	0.3170	45.7
Kitgum	0.2644	59.5
Gulu	0.3179	53.2
Lira	0.3496	51.5
Apac	0.3670	46.9
Western	0.3730	39.3
Uganda	0.4046	39.3

Source: UNDP, 1999.

^a The human development index (HDI) measures human progress on the basis of achievement in three broad indicators: longevity, educational attainment, and standard of living. Longevity is measured by life expectancy at birth, educational attainment by a combination of adult literacy and school enrolment ratio, and standard of living by real GDP per capita (PPPS). The HDI is an aggregation of these key indicators. The index ranges from 0 to 1 where 0 indicates total absence of development and 1 indicates the highest level of development.

^b Poverty is interpreted to mean total deprivation in a range of human capabilities. The three types of deprivation used in computing the human poverty index are only representative, but they capture a wide range of dimensions of life that matter most. The first aspect of deprivation relates to survival – the vulnerability to death at a relatively early age. The second relates to knowledge – being excluded from the world of reading and communication. The third relates to a decent standard of living.

Recent household expenditure surveys also provide information on the size and evolution of monetary outlays for sweetpotato and cassava (Table 5). They recorded not only cash purchases for food but imputed expenditure equivalents for own-produced food, especially in rural areas. Moreover, all figures are in nominal US dollars, i.e., with no adjustment for inflation. For sweetpotato, rural outlays increased both percentage-wise and nominally. Urban expenditures declined percentage-wise but rose slightly nominally. Total expenditures on food rose much more rapidly in the cities than in the countryside between 1989/90 and 1993/94. Cassava expenditures followed a similar pattern, but the nominal increases in rural areas were more modest. Consequently, expenditures

on sweetpotato in rural areas both percentage-wise and nominally were higher than for cassava in 1993/94, thereby effectively reversing the situation that existed in 1989/90. For cassava, the percentage decline in expenditures in urban areas was less pronounced than for sweetpotato, but not enough to compensate for the more modest rise in rural areas. As a result, the average percentage of total food expenditures devoted to cassava nationwide declined, whereas that for sweetpotato remained constant.

Conclusions and Recommendations

Sweetpotato production has steadily increased in Uganda over the last 10-15 yr. The increase in sweetpotato output,

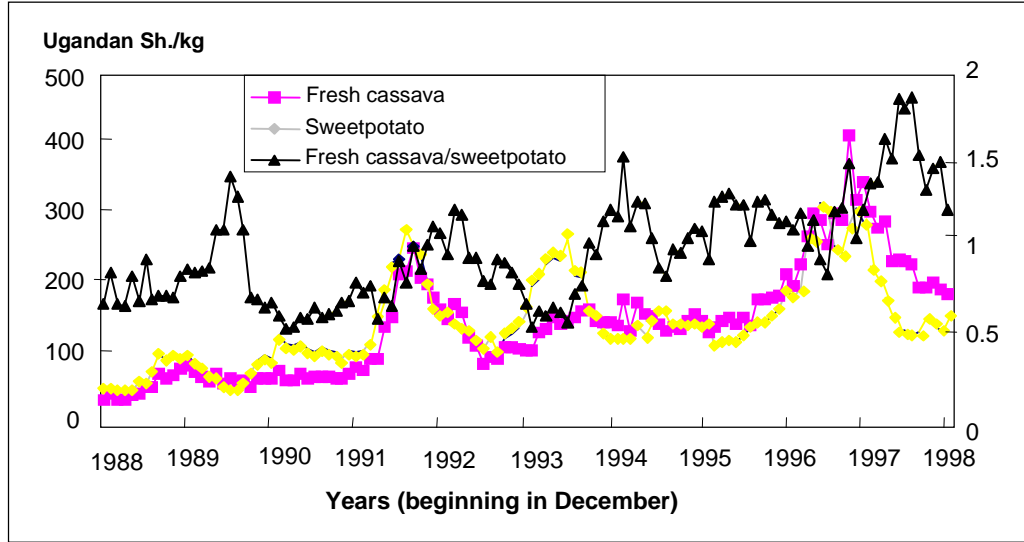


Figure 2. Trend of nominal and relative monthly prices for fresh cassava and sweetpotato prices in Kampala, Uganda, December 1988 to December 1998. Source: Statistics Department, Ministry of Finance, Planning and Economic Development, as presented in Ferris et al., 1999.

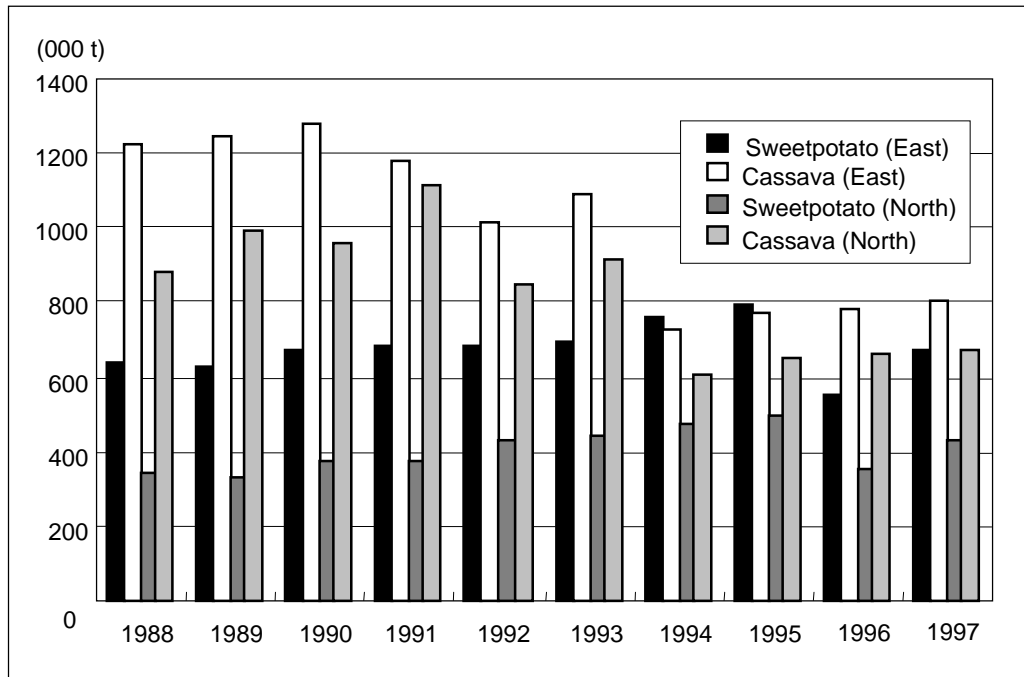


Figure 3. Cassava and sweetpotato production in Eastern and Northern Regions of Uganda, 1988-97. Source: Ministry of Agriculture.

Table 5. Expenditures on roots and tubers as a percentage of total food expenditures, Uganda. ^a

	1989/90			1993/94		
	Urban	Rural	National	Urban	Rural	National
Food expenditure (000 Uganda Sh.)	31.57	22.23	23.45	75.66	33.26	39.59
Total roots and tubers	8.0	14.4	13.3	10.9	24.1	19.7
Potatoes	0.8	0.9	0.9	0.8	0.7	0.7
Sweetpotato	3.7	6.4	5.9	2.1	7.7	5.9
Cassava	3.4	6.9	6.3	1.9	7.3	5.5
Yams	0.1	0.3	0.3			
Yams/other tubers				0.0	0.0	0.0
Matooke (cooking banana)			6.0	8.4	7.6	

Source: ROU, 1994; 1997.
^aAll monetary figures are in nominal Uganda Sh.; includes cash and imputed expenditures on own-produced food. (1993/94 US\$1 = Uganda Sh. 1,100)

however, represents only a minor percentage of the total decline in cassava production. The data further show that the precipitous drop in cassava output in certain districts was only weakly related to changes in sweetpotato production. But at the regional level, particularly the poorer Northern Region, the shift to sweetpotato in response to the decline in cassava output was more pronounced. The recent rebound in cassava production has been accompanied by increases in sweetpotato output. Average monthly retail prices over the last 10 yr for Kampala, the capital, and four regional urban markets indicate that sweetpotato and cassava prices tend to move together. More important, sweetpotato is now less expensive than cassava. Food expenditures for sweetpotato in rural areas have also increased.

The impacts of the various trends in the role of sweetpotato in Ugandan food systems then are as follow:

- Sweetpotato has achieved a higher relative and absolute importance in cropping systems, given the simultaneous sharp decline in cassava production.

- Sweetpotato has increased in importance as a source of cash income, with lower relative prices currently making sweetpotato more competitive with cassava.
- The decline in cassava production has seen sweetpotato play a greater role in ensuring food security in the country, especially in those areas where the crop is a staple.

The bulk of the increase in sweetpotato output has been achieved as a result of increases in area planted (FAOSTAT, April 1999). Hence, the introduction and diffusion of improved germplasm has the potential to increase sweetpotato output and yields, lower costs per kilo harvested, and help to make sweetpotato even more competitive in the years to come. Increased availability and lower relative prices for sweetpotato enhance the prospects for economically viable processing activities.

Further work on product development offers the prospect of providing growers/processors with alternative markets and therefore an added incentive to adopt yield-increasing technology. Production and sale of processed sweetpotato products can

contribute even more than in the recent past to generating value-added income for retention in rural areas. That is especially true for the Eastern and Northern regions where farm households have few alternative sources of income and the incidence of rural poverty is most acute.

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