

# A market opportunities survey for value-added utilization of cassava-based products in Uganda

Part II: Supply chain analysis constraints and opportunities for growth and development

Chris Collison, Kelly Wanda,  
Andrew Muganga, and Shaun Ferris

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ASARECA  
Monograph 4



## About ASARECA

The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is a nonpolitical organization of the national agricultural research institutes (NARIs) of ten countries: Burundi, D.R. Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda. It aims at increasing the efficiency of agricultural research in the region so as to facilitate economic growth, food security, and export competitiveness through productive and sustainable agriculture.

### Background

The background to regional collaboration in agricultural research can be traced to the early 1980s when scientists from the national programs began working together. To run these networks, regional steering committees were put in place to consider and approve annual work plans. Membership was drawn from the national coordinators for research, as well as the scientists from the international research centers. With time, these early networks evolved and came to be regarded as one way of achieving economies of scale and facilitating technology spill-overs across national boundaries. It was upon this that the idea of a regional association was initiated and built.

Given the many commodities and factors which each national system had to handle and the need for increased efficiency and effectiveness in utilizing scarce resources, it was agreed that a regional strategy for agricultural research and research-related training be implemented. So, in September 1994, the Memorandum of Agreement that established ASARECA was signed and in October, that same year, the Executive Secretariat became operational and is based in Entebbe, Uganda. The directors of the national agricultural research institutes in the ten member countries constitute the Committee of Directors, which is the highest governing body. The Committee provides policy oversight while the Executive Secretariat services it and implements its decisions under the guidance of the Chairman.

### Research Networks

ASARECA carries out its activities through regional research networks, programs, and projects. Twelve of these are currently operational with seven due to begin operations in the next several months. However, it is important to note that before ASARECA came into existence, there was already some collaborative research within the region. This was brought under the ambit of ASARECA when it was established and it is carried out by the first-generation networks. These are the research networks on potato and sweetpotato, agroforestry, root crops, and beans. The second-generation networks are those established in the 1990s; they are the research networks on banana, postharvest processing, animal agriculture, maize and wheat, highlands, technology transfer, agricultural policy analysis, and electronic connectivity. The new networks under planning are those on rice, plant genetic resources, sorghum and millet, soil and water conservation, coffee, agricultural information, and strengthening the capacity of NARIs to manage regional programs.

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**Part II: Supply chain analysis  
Constraints and oppourtunities for  
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**Chris Collinson, Kelly Wanda, Andrew Muganga, and  
Shaun Ferris**

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ISBN 978-131-212-2

Printed in Nigeria by IITA

Correct citation: Chris Collinson, Kelly Wanda, Andrew Muganga, and Shaun Ferris: A market opportunities survey for value-added utilization of cassava-based products in Uganda. Part II: Supply chain analysis constraints and oppourtunities for growth and development. ASARECA/ IITA Monograph 4 IITA, Ibadan, Nigeria.

## Preface

This project was designed to develop a case study “protocol” or methodology for undertaking a rapid national market analysis of the supply and demand for a specific commodity. The need for this type of information was based on the anticipated increase in market sector studies that will be undertaken by the new ASARECA commodity-based networks as part of their shift towards more market-oriented research.

In this study, the target crop was cassava and the methodology was based on that developed by Holzmann, for rapid market surveys (RMA). The project was divided into two parts. This document provides the study on the supply chain for the commodity, analyzing the agents involved in the supply chain from the producer to the consumer, and the long-term price trends for the crop in its various forms. The demand study method is presented in the ASARECA Monograph 3. The document provides the reader with a rationale for the analysis and some evaluation of the future developed as part of a technical support activity between two ASARECA networks (FOODNET and EARRNET) and the National Agricultural Research Organization of Uganda (NARO).

DFID’s Crop Postharvest Program, DFID’s bilateral aid section in Kampala, and the East African Research Network funded the research.

The technical support for the study was provided by the Natural Resources Institute, UK. The project was sponsored with an NRI administered DFID grant.

One of the difficulties we encountered during this research was reconciling the diverse objectives of the participating funding agencies and research organizations. DFID, represented both by its Ugandan bilateral aid section and by the Crop Postharvest Program, wished to know where to invest future cassava research and technical cooperation funds. By contrast, the International Institute of Tropical Agriculture (IITA) and the ASARECA network FOODNET and EARNET wished to use the research as a model for food marketing research throughout the region. Finally, Uganda’s national research establishment wished to find markets for the excess cassava production caused as a side effect of the successful dissemination of new disease-resistant cassava varieties.

Meeting for the first time as the research team, we reflected that over-production is in reality a short-term imbalance that will be corrected by appropriate farmer supply responses. We therefore preferred to focus the research on ways in which the various cassava commodity systems can contribute to greater growth and development within Uganda. The objectives of DFID and IITA would be served in the process.

Such a large area of research prompted early prioritization of the work. We decided to split the research into two parts, one that would examine constraints and opportunities within traditional cassava marketing chains, and another that would investigate the potential for increasing the use of cassava-based raw materials in Ugandan manufacturing industries. This report presents findings from our research into traditional cassava marketing.

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## Acronyms

ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
NARO	National Agricultural Research Organization (NARO)
FOODNET	regional network conducting research on marketing and postharvest research
EARRNET	Eastern African Regional Research Network
NRI	Natural Resources Institute, UK
CPHRP	Crop Postharvest Research Program
DFID	Department for International Development (UK government)

## Project Summary

This report presents research into constraints and opportunities within the supply chain for traditional fresh and dried cassava marketing in Uganda.

### Key findings

- Dried cassava flour is an important food staple for particular groups of poor consumers within Kampala. Real cassava flour prices in Kampala are volatile and increasing in the long term, suggesting that food security among sections of the urban poor may be threatened.
- Improving the flow of market information would increase dried cassava marketing efficiency. This would lead to better spatial integration between urban markets (thereby reducing the absolute levels and volatility of consumer prices, and increasing marketing opportunities for farmers), and to a reduction of transaction costs throughout the marketing chain, particularly to the benefit of farmers.
- Efficiency could also be improved by increasing liquidity within the dried cassava trading chain. Greater capital availability would allow wholesalers and retailers to expand the scale of their businesses and spread their overhead costs over a greater volume of trade. Food retailing in general has poor cost efficiency, and consequently, consumer food prices are much higher than necessary. In the case of cassava flour, retailers add approximately 36% to the price in between buying and selling, yet the greatest part of this margin is accounted for by overhead costs. Retailing is a simple service and should not cost consumers so highly.
- Product quality is not a problem during the dry season, when optimal drying conditions permit sufficient dried cassava production that is of adequate quality and affordable to urban consumers. However, during the wet season, good quality flour becomes expensive, not only because of low levels of interseasonal storage but also because farmers are unable to dry cassava roots effectively. Appropriate drying technologies might improve the situation, but they would have to be both nonlabor and noncapital intensive to find favor within prevailing farming systems.
- Current market facilities constrain wholesaling efficiency. Competition with alternative land uses limits business expansion, maintains high rents, and creates congestion and pollution.
- There is no evidence that any group within the dried cassava trading chain makes unjustifiably large profits. On the contrary, excessive competition at the retail level appears to squeeze profits to the extent that individual retail outlets operate at an inefficiently small scale.
- Fresh cassava trading is driven by the high perishability of the roots and by the price premium that consumers are willing to pay for freshness.

- Large marketing cost savings could be realized if current methods for reducing the perishability of cassava roots can be adapted to meet the requirements of Uganda's fresh cassava trade.
- Recent cassava breeding research has neglected widespread consumer preferences for medium-sized, sweet varieties.
- Transport charges between farms and assembly points are over ten times more expensive than interurban transport charges. Although this finding was made in the context of dried cassava trading, it probably applies to most domestically-marketed farm produce, and this indicates the importance of public investment in reducing the costs of community level transport.
- Lending to the food marketing sector is not only constrained by high transaction costs and poor loan security but also by conservative attitudes among potential borrowers.

## Recommendations

Many of the constraints that apply to fresh and dried cassava trading are common to other types of food marketing in Uganda. Examining cassava marketing in isolation can therefore lead to less than optimal research impact. The following are suggested as avenues of general food marketing research and technical assistance.

- *Formal lending to the food marketing sector.* This research should concentrate on finding innovative lending practices that will reduce costs and risks to both lenders and borrowers. Ideally, it should involve traders, commercial lenders, government policy personnel, and legal experts.
- *Capturing economies of scale within food wholesaling and retailing.* Building on the work into improved lending, this research should be broad-ranging and include investigation into capital, business skill, entrepreneurial, cultural, and infrastructural constraints. An understanding of the relevant constraints will allow policy makers to develop strategies to encourage larger scale wholesaling and retailing.
- *Improved market facility planning.* If Kampala's urban authority is willing to cooperate, we recommend assistance aimed at improving the planning of Kampala markets, with the ultimate aim of reducing marketing costs, improving sanitation, and reducing congestion in the city center. The work should engage urban planners and traders in a collaborative approach. Clearly, markets such as 'Kaleswe' need significant improvement to reduce congestion, improve sanitation, and provide a more organized commercial environment.

The final two recommendations apply specifically to technical innovation within cassava marketing systems.

- *Drying technology.* We do not recommend spending research funds on developing ways for drying cassava roots at the farm level. New drying techniques would only find relevance during the three months of the wet season. Furthermore, in order to find favor among farmers, drying innovations would have to satisfy the impossible combination of being nonlabor and noncapital intensive. We do, however, recom-

mend further research on the financial viability of drying innovations at the village assembler level of the marketing chain, where capital constraints are lower. Village assemblers handle greater volumes of chips and may therefore be able to exploit economies of scale in the drying process.

- *Fresh cassava storage.* We recommend research into the feasibility of adapting CIAT/NRI fresh cassava storage technology for use by Ugandan traders. Costs and benefits to the traders should form the central theme of the research.

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## **Part II: Supply chain analysis constraints and opportunities for growth and development**

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### **Introduction**

The focus of the research was on types of cassava trade that enjoy the greatest concentration of marketing services. Inevitably, this meant looking most closely at rural to urban flows. We do not mean to dismiss the importance of rural to rural flows, but merely wish to point out that flows to urban areas are more complicated and dynamic, and therefore provide the opportunity for higher impact innovations.

The choice of which cassava products to research was simple. By far the most valuable trade is in dried and fresh cassava. Our research methodology combined a series of interviews of key marketing chain participants<sup>1</sup> with analysis of secondary information, mostly price and consumption data. The research was conducted intermittently between November 1999 and February 2000.

Rapid reconnaissance methods were used in conducting a diagnostic study of the cassava subsector in Uganda. The Ugandan study illustrates how rapid reconnaissance methods can offer a quick and effective means of learning about complex food marketing system interrelationships, understanding constraints and opportunities, and generating information which can be used in designing follow-up research. The following sections briefly review the background of the Uganda study and describe the planning and implementation of data collection activities.

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<sup>1</sup>Fieldwork for this research was conducted in Hoima, Iganga, Kampala, Kamuli, Lira, Masindi, Soroti, Kulu, Jinja, and Kaliro. A total of 16 travelling traders, 31 wholesalers and retailers, and 8 millers were interviewed.

## Methodology

The research design focused on a subsector approach. The technique relies on informal interviews with key informants; direct observation of critical stages in the production–transformation–distribution sequence and reliance on sound secondary data sources whenever possible.

Following a literature review and interviews with key government and development organization informants, a list of questions (guidelines) focusing on marketing activities was developed for use during subsequent fieldwork. This was done for each type of marketing chain participant that a priori information had identified. (see Annex 3). The guidelines provided a set of questions, which were posed to all informants at a particular level of the marketing system, for purposes of consistency and uniformity. Optional questions or sequence of questions were later formulated so that additional or promising areas of inquiry could be pursued.

The semistructured informal interview guidelines were not written up in the form of a formal questionnaire. Rather, they were drawn up as checklists of key issues and topics.

Before field data collection, of the checklists was pretested. This led to further revision of these lists to make sure that important issues had not been left out.

The sample was purposively selected to include respondents from each of the following categories: rural assemblers, travelling traders, wholesalers, and processors. Informal interviews were then conducted with them. Frequently, one interview led to the next as researchers followed the flow of cassava down the marketing channel.

Most respondents were contacted at their places of work. Researchers were careful to identify themselves and to explain the purpose of their visit. Interviews were informal. However, researchers carried the checklist to make sure that important points would not be overlooked. Also, to speed the interviews and minimize interruptions, answers were not recorded in writing during interviewing. Instead, important data were recorded in summary form in field notebooks, sometimes during interviews, but more often soon afterward. This effort to keep the interviews informal seemed to encourage frankness on the part of the respondents.

### Information collation

Responses from each interview were carefully summarized in tabular form and compared with the responses from other interviews (see Annex). This approach was reinforced by research team meetings designed to:

- ensure that all the gathered information had been summarized
- identify gaps in the information
- start forming hypotheses about constraints and opportunities within the marketing system

The design of follow-up fieldwork led directly from this process. The researchers also used the team meetings to refine their understanding of the roles, responsibilities, and links within the marketing chain. The team developed flow diagrams of the chains, indicating which transactions were the most common. The importance of soliciting and discussing a critical part of the analytical process.

### **Follow-up fieldwork**

Follow-up fieldwork was conducted in phases to allow the research team to discuss the most recent findings and direct the next phase of fieldwork. This allowed the researcher to focus on the issues that were emerging as the most important. Among other research avenues, the team took this opportunity to quantify costs and margins within the trading chain using a case-study approach.

### **Analysis**

Most of the quantitative analysis was conducted using secondary data from IITA and government sources. The most complicated analysis was conducted on prices. Details of the methodologies are summarized in Trotter (1992). Primary data on costs and margins required careful sifting and averaging to create a realistic picture of profitability within the trading chain.

### **Report writing**

Having previously developed a draft report outline to help focus the research on the relevant issues, the research leader wrote the final report. The writing inevitably exposed further gaps in information. These were filled by further rounds of fieldwork. The ability to do this at this stage of the research highlighted the flexibility that had been designed into the research methodology.

### **Rationale of the method**

From a methodological point of view, the Uganda study was noteworthy in two respects. First, the conceptual framework used to identify key research issues and to organize data collection activities was broad. Instead of restricting the field of inquiry to a narrowly defined set of potential marketing problems, the approach focused on a wide range of issues. Armed with a view of the big picture, researchers could more easily distinguish between factors that decisively influence market performance, and those that may be interesting but not crucial.

Secondly, given the extremely broad conceptual framework, the research methods were necessarily extensive rather than intensive. Conventional research methods such as probability sampling, and formal questionnaire interviewing were absent. Instead they were replaced by a set of more flexible approaches to acquiring information, including informal interviewing of key informants, direct observation of marketing activities, participant observation, and reliance on secondary data sources.

This approach can be very practical when resources are scarce. In spite of limited time, money, and personnel, studies can still be carried out using this technique of informal

semistructured interviewing. As this study in Uganda made clear, this approach can be useful when researchers want to gain a broad understanding of a commodity subsector in a relatively short time, with the goal of identifying system constraints in order to better target follow-up research and policy, financial, and technical innovation.

Flexibility is another important aspect of the informal interview method. The interviewer enjoys the opportunity to observe the informant and the context in which he or she is responding. Questions can be repeated or their meanings explained in case the respondent does not understand. In fact, a well-designed informal interview guide will allow researchers to probe, follow-up on unexpected or unclear responses, and pursue promising lines of inquiry. Thus, in the case of an obscure, irrelevant, or incomplete response, the interviewer can press for additional information.

Agricultural marketing researchers know how difficult it is to design a formal questionnaire that captures precisely and in a reliable way quantitative information. The more complex and heterogeneous the marketing system, the greater the extent to which this applies. However, structured informal interviews can generate valuable information about food system, participants' behavior, motivations, intentions, and planned future behavior.

Apart from providing qualitative data, informal interviews, if designed properly can also generate precise quantitative data, albeit for small samples. They can be a useful vehicle for collecting information on variables, such as volumes, prices, which vary significantly in magnitude within and across seasons or other reference periods. Structured informal interviews can generate precise, reliable information on marketing costs, purchase and sale prices, transacted volumes, processed output, and other continuous variables over relatively short recall periods.

This technique gives the researcher more control than a formal survey administered by an enumerator. This is because the researcher himself or a well-trained research assistant actually conducts the interviews. In addition, the higher up the marketing chain the participant interviewed, the harder it is to obtain useful and reliable information. It is difficult to match wits with wholesale traders, who are hesitant about committing themselves and are ever on the lookout for government tax collectors disguised as impartial researchers. In quite a few cases, agroprocessors refused to be interviewed, especially if they were approached by enumerators or young, junior analysts.

## The marketing environment

This section provides background information on the policy, demographic, and economic environments in which cassava trading operates.

### Demography

Uganda's current estimated population in 2002 census was 24 million growing at approximately 2.5% per annum. 16% of the population currently lives in urban areas. By 2010, this proportion is forecast to rise to 22%. These figures underline the growing importance that food production and marketing have in feeding Uganda's population.

### Consumer incomes

Over the last ten years, per capita GDP measured in constant prices has risen by an average of 3.2 % per annum, suggesting that food demand has risen not only because of population increases but also through an income effect. Although we could find no information on changes in income distribution, anecdotal evidence suggests that there is a growing middle-class population in major cities such as Kampala. Though currently small, this group will become increasingly important as consumers.

### Government policy

In the first draft of the proposed government "Plan for the modernization of agriculture" (PMA), the authors write: *"Government is committed to ensuring that all commercial activities in agriculture such as production, processing, trading, supply of inputs, exports and imports are carried out entirely by the private sector. The government's role in these subsectors will continue to be mainly limited to setting policies, rules, and regulations"*. The document also describes current and proposed schemes for improving public and private services to the agribusiness sector, including investments in rural transport infrastructure, a rationalization of rural lending and better contract enforcement legislation. The PMA clearly reflects the government's belief in the private sector's important role in liberalized marketing structures.

### Manufacturing industry

In 1997, manufacturing industry contributed 9% to total GDP. Nine years previously it contributed just 5.4%. This small but growing manufacturing base will demand increasingly large quantities of raw materials. Most of this demand is currently satisfied by imports, which by comparison with local supplies, are cheap and reliably available. Nevertheless, the future may hold some promise for locally-sourced raw materials, including those derived from cassava.

## **Financial markets**

Farmers and small businesses are poorly served by formal lending institutions. Poor branch coverage in rural areas contributes to high lending costs and poor loan recovery rates. Even for larger businesses, borrowing is not a particularly attractive option. Real rates of interest in 2000 were as high as 18%, while nominal rates are approximately 17% above the government's base lending rate. Government observers believe that these high rates are the result of inefficiency within the commercial banking sector and the high risk of loan default.

# Cassava flour

## Consumption and prices

Cassava flour is milled from sun-dried pieces of cassava root, usually referred to as chips. While fresh cassava perishes within five days, its flour can be stored for several months. It is usually consumed by mixing it in high proportions with millet flour (a relatively expensive product) to produce a more nutritious and tasty food staple.

**Table 1. Regional estimates of cassava flour consumption in 1997.**

Region	Quantity purchased (tonnes)	Per capita quantity purchased (kg)	Quantity consumed from own production (tonnes)	Per capita consumption from own production (kg)
Central	14,700	2.55	7,500	1.31
Eastern	34,000	6.61	45,900	8.93
Western	17,500	3.09	26,900	4.77
Northern	21,900	5.64	11,200	2.88
Total	88,100	4.31	91,500	4.48

Source: Author's estimates using data from 1996/97 Uganda National Household Survey.

**Table 2. Rural/urban estimates of cassava flour consumption 1997.**

	Quantity purchased in 1997 (tonnes)	Per capita quantity purchased in 1997 (kg)	Consumption from own production in 1997 (tonnes)	Per capita consumption from own production in 1997 (kg)
Rural	75 200	4.38	90 600	5.28
Urban	12 900	3.94	900	0.28

Source: Author's estimates using data from 1996/97 Uganda National Household Survey.

Tables 1 and 2 give estimates of cassava flour consumption in 1997. The figures were derived from data collected during the 1996/1997 Uganda Household Monitoring Survey.

A warning must be attached to these estimates. The Ugandan Household Surveys use a recall period of seven days and interview each household just once. Furthermore, all interviews tend to occur within the same month. Estimating annual figures from such data therefore runs the risk of introducing bias due to seasonal variations in consumption. A second problem occurs because not all the units used in the surveys are standardized. This is more of a problem with fresh cassava data, for which consumption is usually recorded in heaps of unspecified weight. Heap weights vary between both regions and seasons.

However, while the absolute values of estimates should be treated with a degree of caution, their relative sizes should still represent an accurate picture of comparative levels of consumption between regions and between rural and urban areas.

Clearly, consumers in Central Region are on average the least fond of cassava flour, a finding easily explained by the region's traditional preference for *matooke* (a food staple prepared from bananas). However, urban areas within the region have seen significant immigration from the war-affected Northern Region, where cassava consumption is more common. Consequently, consumption in Central Region has almost certainly increased over the last decade and may still be rising.

Eastern Region's preference for cassava is evident. While cassava is often seen as a food security crop in Central and Western Regions, it is an important part of eastern consumers' regular diet. The same is true of northern diets, although the region's figure for "per-capita consumption from own production" gives the impression that this may not be true, particularly in view of cassava's ability to thrive in the generally less fertile soils of the north. An explanation may be the risk of producing one's own food in an area where rebel raids on villages often target food. If this explanation is valid, it highlights the important role that food trade has played in maintaining a degree of food security in the region (note the high level of per capita cassava flour purchases).

Table 2 reveals that per capita consumption of cassava flour is more important in rural than in urban areas, a reflection, no doubt, of the greater choice of foods available in most towns. This does not indicate that cassava flour plays an insignificant role in urban diets. When measured on a calorific basis, it is among the cheapest carbohydrate sources, and therefore helps poor urban residents to eke out their food budgets. As a consequence, wealthier urban consumers often regard cassava flour as a poor person's food, and prefer more expensive staples such as maize flour and rice.

Cassava flour consumers generally prefer a white, nonodorous product that is produced from well-dried cassava pieces. Some preference exists for yellow-brown flour produced from fermented cassava pieces, although both this type of flour and off-white flour milled from mouldy cassava pieces trade at a 20 to 25% discount compared with the white variety.

Figure 1 shows selected real (adjusted for inflation) retail food prices for Kampala between September 1989 and January 2000 (data source: Bureau of Statistics). The middle price series is for cassava flour. Two comparisons are worth drawing with the other series for *matooke* and millet flour. Firstly, cassava flour prices have been more susceptible to price shocks. The two obvious price spikes, the first in 1992/1993 and the second in 1997/1998, were both caused by a combination of the cassava mosaic virus and abnormal weather conditions. The second notable comparison is that while *matooke* and millet flour prices (and indeed most other major food staple prices) showed no significant long-term trend over the ten year period, cassava flour prices have increased (the trend is statistically significant at the 5% level:  $t = 4.48$ ). A plausible explanation for this positive trend is the effect that refugees from the north have had on food demand in Kampala. As impoverished northerners have arrived in the capital, demand for cassava flour has almost certainly increased. If supply had not kept pace, prices would have inevitably risen.

Whatever the cause of the trend, there must be considerable concern over food security in Kampala. Given that cassava flour prices are not only increasing in the long term but are also volatile, Kampala's poor consumers are in a particularly vulnerable position.

Figure 2 shows seasonal retail price movements for cassava flour in Kampala. The grand seasonal index (GSI) displayed on the graph was computed from data gathered by the Ugandan Bureau of Statistics. GSIs show seasonal patterns that remain once random, cyclical, and trend elements have been removed from price series (details of the calculation appear in appendix A). Unfortunately for our purposes, the Bureau of Statistics only collects

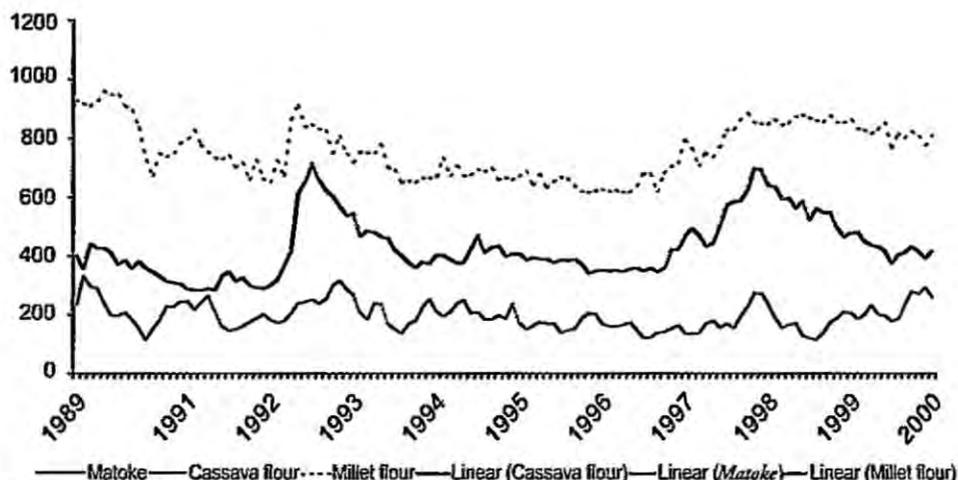


Figure 1. Real retail food staple price (Kampala 9/89 to 1/00). All prices in constant January 2000 Ush/kg.

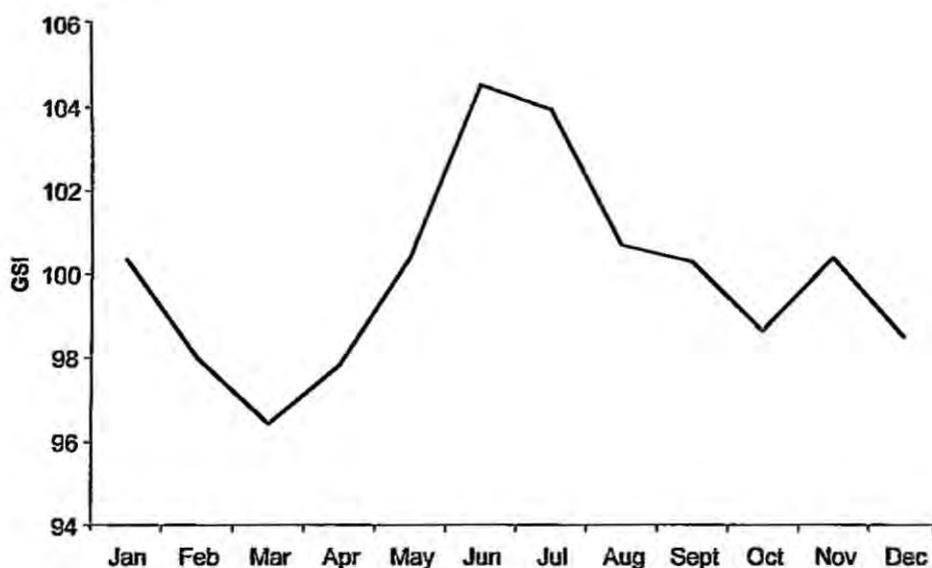


Figure 2. GSI from Kampala retail price.

cassava flour retail price data for Kampala, Mbarara, and Gulu. Of these, only Kampala is a major consumer market. The applicability of the results to other parts of Uganda is therefore in question.

The GSI methodology permits statistical testing of the existence of seasonal price movements. In our case, the tests failed to prove that the GSI for cassava flour in Kampala varies significantly from its mean value. However, given that statistical testing is notoriously conservative, and that the pattern in Figure 2 lends itself to plausible explanation, the following observations are worth making:

1. Prices decline between January and March. This period corresponds with the dry season, when sun-drying conditions are optimal. Volumes of good quality dried cassava chips reaching the market are correspondingly high, leading to decreasing prices.
2. Between March and June, prices rise. Rains in many parts of the country start in March and continue until May/June. Not only is effective sun-drying particularly difficult and labor intensive during this period, but farmers, the principal dryers of cassava, exploit the rains for planting, thereby creating a labor scarcity for non-agricultural activities. The combination of these factors causes a market shortage of good quality cassava flour and drives prices upwards.
3. Prices decline again from June until October. The return of better sun-drying conditions in June coincides with the major harvest periods for maize and millet. Unlike cassava which can be harvested throughout the year, maize and millet are seasonal crops, and, in the absence of widespread interseasonal storage, their prices during and soon after harvest are considerably lower than at other times of the year. As preferred food staples for many consumers, maize and millet are substituted into diets at the expense of cassava flour.

The issue of substitutability is worth further consideration. As already noted, *matooke* is the preferred food staple in the Western and Central Regions, whose combined populations constitute well over half of Uganda's total population. Considerable concern exists over declining banana yields caused by soil degradation in these regions. Although evidence from Figure 1 does not support the notion that *matooke* prices have subsequently increased, there is an expectation that they might in the future. Putting aside the possibility that higher banana prices would trigger greater fertilizer usage (from near zero current levels), there remains the prospect that cassava flour might replace *matooke* in many peoples' diets. However, consumer perceptions usually have very strong momenta, and cassava flour's low status as a food-security staple is therefore unlikely to change quickly. In the near future, any substitution that arises through declining banana yields in Central and Eastern Regions is likely to favor higher status food staples such as sweetpotato.

Long-term cassava flour consumption trends are difficult to predict. The return of peace and therefore of some degree of prosperity in the north and other war affected parts of the country would no doubt increase demand. Population increases will also have a positive effect. However, as real consumer incomes rise, expenditure on inferior goods, of which cassava flour is almost certainly one, will decline. The long-term future of cassava flour

consumption is therefore unclear. In the medium term however, cassava flour will remain an important food staple.

### **Description of trading**

The main supply areas of dried cassava to Kampala are Apac in the north, and Kumi, Soroti, and Pallisa in the east. Although Hoima in the west supplies lower volumes, quality is generally higher, thereby giving traders who source their cassava from Hoima an instant advantage in price negotiations. Other supply areas become important in the wet season. Chips from Paidha in northwest Uganda, although too distant from Kampala to be competitive during the dry season, start to arrive during the wet season due to the general scarcity of dried cassava. Imports from the Democratic Republic of Congo and Tanzania also reach the Kampala markets during this period.

Figure 3 reveals the complexity of dried cassava marketing<sup>2</sup>. The number of links in the chain reflects the many services that are required to deliver cassava flour to consumers. From harvest to purchase at the local store, cassava must be dried, bulked (in other words, assembled into tradable quantities), transported, stored, milled, and finally retailed at convenient locations for consumers. The roles of each marketing chain participant, and a description of their relationships and transactions with other participants are given below.

**Farmers.** Farmers harvest, peel, and dry cassava roots. They have several marketing options. Using their own transport they can sell directly to rural retailers, rural consumers, or if they are near major district level towns, to wholesalers. Alternatively they can sell to travelling traders (who provide links with major consumer markets) or village assemblers. Farmers rarely extend credit to their customers, and will only do so for traders with whom they have built a long-standing trading relationship.

**Village assemblers.** These individuals typically have access to more capital than their village neighbors. They use these financial resources and their local knowledge to bulk cassava chips from the surrounding area. Customers are willing to pay for this service because they would otherwise have to spend time and money assembling sufficient quantities of cassava chips to justify the cost of transport to the next stage in the marketing chain. The village assemblers also relieve their customers of the burden of quality controlling the small quantities of chips typically offered by farmers. To some extent, the assemblers also sort chips into a high quality white, well dried grade and a lower quality discolored grade, sifting for extraneous matter in the process. Buyers often place orders with trusted village assemblers. Once the required quantities have been gathered, the assemblers contact the buyers, who invariably arrange their own transport. The assemblers often receive cash advances to fund their activities. Their customers are usually wholesalers from local towns or travelling traders.

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<sup>2</sup>The information used to construct the diagram was gathered through fieldwork in 10 districts.

**District level wholesalers.** These traders, who operate in district level towns, serve retailers in their local area and to a limited extent also supply chips and flour to wholesalers in major consumer markets in cities such as Kampala and Jinja. Their primary roles are to arrange the transformation of chips into flour (usually using the services of specialized millers), and to store the flour in volumes sufficient to enable their customers to purchase their requirements in a timely fashion. In a lesser role, district-level wholesalers provide another level of bulking between the farmer and the major consumer markets. Speculative storage to benefit from interseasonal price movements is rarely practiced because of poor liquidity and high risk (these constraints are examined in more detail in section 3).

Few district level wholesalers are specialized in dried cassava. Typically, they deal in at least two other food products, commonly maize and millet. The more progressive wholesalers concentrate on cassava chips and flour in the wet season, when sourcing for quality

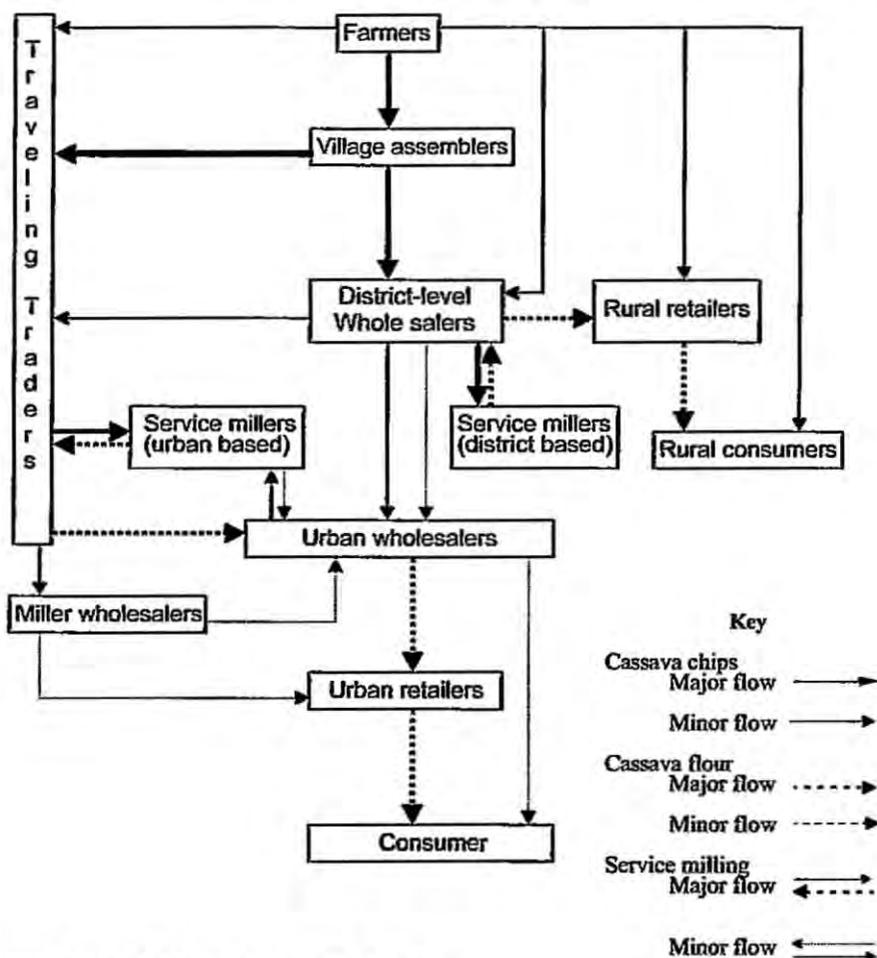


Figure 3. The dried cassava trading chain.

chips is a problem yet profits are highest. The less ambitious traders sell more cassava flour during the dry season, when supplies are abundant.

Few wholesalers secure credit from their sellers, yet many feel compelled to offer credit to their buyers in order to maintain trading relationship.

When selling to wholesalers in larger towns, the district-level wholesalers rely on customers to arrange collection of the flour. Traveling traders also provide a link between small and large towns.

**Traveling traders.** These traders supply the greatest volume of cassava flour to large urban consumer markets. They turn over their capital rapidly by minimizing the length of time between purchase and sale. By avoiding storage, they both limit the risk that prices will move against them and avoid significant overhead costs. Most commonly, such traders buy from several village assemblers in one trip, and hire vehicles to transport the chips to the urban centers, where they pay for milling and sell flour to wholesalers. Traveling traders tend to specialize in just one food product.

**Urban wholesalers.** Urban wholesalers share most of the characteristics of their district-level counterparts. The major differences are location and scale. The former distinction is obvious, yet it is the urban wholesalers' location within major markets that allow them to operate on a larger scale. Whereas district level wholesalers may trade between five and fifteen 100-kg sacks of cassava flour in one week, urban wholesalers commonly sell between 50 and 100 sacks.

**Miller/wholesalers.** A number of specialist businesses in major towns like Jinja, Lira, and Kampala combine cassava flour milling with wholesaling. These efficiently run operations purchase either directly from village assemblers via agents or from traveling traders. Their average weekly turnover is usually in the range of 10 to 15t and milling losses reportedly amount to no more than 2%.

**Service millers.** Such businesses do not engage in trade but merely provide milling services. In rural areas and the smaller district towns, millers often use small petrol- or diesel-powered mills, and do not specialize in milling any one commodity. In large towns, millers are often specialized and run electricity-powered mills.

**Urban retailers.** The majority of food retailing in urban areas is characterized by a large number of small, nonspecialized stores, which sell small quantities of numerous products, often trading food and other goods such as pens and razor blades.

### **Dried cassava marketing efficiency**

In a recent concept paper published as part of FAO's "Food into Cities" collection, Gideon Onumah and Michael Hubbard (1999) sensibly pointed out that:

“[In developing countries,] food marketing chains to cities do not perform efficiently the basic marketing functions of collection (i.e., bulking of produce from farmers), handling, transporting, storage, processing, wholesaling, and retailing. The result is:

- Wider seasonal variation in supplies and prices than is necessary
- Urban consumers pay relatively more for food while producer prices remain low, thus discouraging farmers from increasing output
- Health and environmental risks due to food product contamination, traffic and market waste.”

To this list, we could usefully add two more points. Firstly, poor marketing efficiency worsens food insecurity in times of food shortage. This is true both in urban and rural areas. Secondly, improved marketing efficiency allows trading networks to extend into remote and therefore marginalized production areas.

Marketing efficiency can be measured in several ways. For the purposes of this report, we have concentrated on the following:

- *Spatial integration.* Do prices in different towns move in sympathy with each other? A well integrated national food marketing system leads to efficient distribution which responds to demand. Good spatial integration relies both on good physical communications between markets and good information flows on prices and market conditions.
- *Information flow.* Is sufficient and appropriate market information available to all participants in the marketing chain? Are participants able to make appropriate use of the information?
- *Innovation.* Do participants innovate in order to minimize costs (including those associated with risk), increase productivity, improve quality, and supply new or underexploited markets?
- *Scale of operation.* Do participants operate on a scale that allows them to minimize costs? In other words, do farmers, traders, and processors exploit economies of scale?
- *Competitiveness.* Does the appropriate level of competition exist in order to promote cost minimization and innovation? Too much competition, usually termed “atomistic competition”, can be just as inefficient as too little competition.
- *Costs and margins.* Properly interpreted, costs and margins reveal information on marketing inefficiency, excess profits, and constraints within the marketing chain. This section of the report examines the efficiency of Uganda’s dried cassava marketing chain using these indicators as subheadings.

**Table 3. Correlation coefficients for cassava flour prices in nine towns.**

	Kampala	Kumi	Lira	Soroti	Masindi	Kamuli	Jinja	Apach	Luwero
Kampala	1.00	<i>0.69</i>	<i>0.57</i>	<i>0.57</i>	<i>0.53</i>	<i>0.74</i>	<i>0.58</i>	<i>0.75</i>	<i>0.66</i>
Kumi		1.00	<i>0.73</i>	<i>0.79</i>	<i>0.76</i>	<b>0.81</b>	<b>0.81</b>	<i>0.72</i>	<i>0.77</i>
Lira			1.00	<i>0.69</i>	<i>0.48</i>	<i>0.75</i>	<i>0.63</i>	<i>0.60</i>	<i>0.71</i>
Soroti				1.00	<i>0.68</i>	<i>0.76</i>	<i>0.66</i>	<i>0.74</i>	<i>0.58</i>
Masindi					1.00	<i>0.49</i>	<i>0.56</i>	<i>0.52</i>	<i>0.58</i>
Kamuli						1.00	<b>0.82</b>	<b>0.84</b>	<i>0.58</i>
Jinja							1.00	<i>0.59</i>	<i>0.59</i>
Apach								1.00	<i>0.52</i>
Luwero									1.00

### Spatial integration

Correlation coefficients provide a simple measure of how two variables move in sympathy with each other. Table 3 provides correlation coefficients for cassava flour prices in nine Ugandan towns<sup>3</sup>. Each town's price movements are compared with movements in the eight other towns (values close to 1 indicate high correlation, while those close to 0 indicate no correlation). Following the arbitrary conventional practice, coefficients of over 0.8 (bold in Table 3) are regarded as exhibiting high correlation, while coefficients between 0.6 and 0.8 (italics in Table 3) are said to show moderate levels of correlation. The coefficients were calculated using monthly cassava flour retail prices gathered by IITA and the Ugandan Bureau of Statistics between January 1998 and September 1999. The prices were deflated using the national CPI.

Kampala's correlation coefficients with other towns are disappointingly low. This is probably caused by data deficiencies. During its data gathering exercise, IITA did not collect prices in Kampala. To compensate for this, we included Kampala price data gathered by the Bureau of Statistics (the Bureau has consistently collected cassava flour data in just two towns, Kampala and Mbarara). The methodologies that the two organizations use for gathering price data are quite different and consequently, the price series are not directly comparable. Despite this, the Bureau's Kampala prices show moderate correlation with IITA prices in Kumi, Kamuli, Luwero, and Apach, towns located in areas that supply large quantities of dried cassava to Kampala. Kumi is either moderately or highly correlated with all other towns, a finding that underlines Kumi District's importance as a major dried cassava supplier. While its trade in dried cassava may not be physically integrated with

<sup>3</sup>Although criticism has been leveled at the use of correlation coefficients for measuring the extent to which two markets are integrated, none of the criticism is so serious that careful interpretation is incapable of avoiding the pitfalls (Trotter 1992). The most significant criticism is that a high correlation coefficient may give the impression that two markets are well integrated, when in fact there is no physical flow of produce between them. In this case, the interpretation is that the two markets respond to prices in a third location, usually a major consumer market.

trade in all of the other towns, the high degrees of correlation in such cases are probably the result of response to prices in third towns, most likely Kampala and Jinja, which both have large consumer demand.

In summary, although our analysis reveals moderate to strong market integration between many towns, there is clearly room for improvement. Greater integration will help to reduce both the absolute level of consumer prices and their volatility. Farmers would gain through increased marketing opportunities.

**Information flow.** Given that there is currently little formal dissemination of market information in Uganda, we were not surprised to find that farmers and traders receive information either first hand or by talking to other participants in the marketing chain. As expected, those traders who provide links between towns have access to the best information. A worrying consequence of the generally poor flow of information is distrust. Price negotiations, particularly between individuals who have not built long-standing trading relationships, can take up to one hour to conclude. This is almost always because the seller, in the absence of up-to-date information, fears being cheated by the buyer. The consequence is that transaction costs are higher than they need to be. Farmers generally have the poorest access to information.

**Innovation.** There is very little innovation within the dried cassava marketing chain. Few participants seek technical and market information that would allow them to reduce costs, increase profitability and exploit new market opportunities (such as those potentially offered in neighboring countries). If entrepreneurship does exist within the chain, it is almost certainly stifled by low levels of liquidity, expensive transport, and poor information flows.

**Scale of operation.** Of the participants interviewed for this research, only the larger wholesalers, traveling traders, and miller/wholesalers could be said to exploit economies of scale. All other groups, particularly farmers and retailers, operate on such a small scale and with such a lack of specialization, that costs are much higher than necessary. However, scale and specialization are subject to constraints, of which low liquidity and high risk are the most significant. Low levels of managerial and business skill may also be relevant.

**Competitiveness.** Too little competition within dried cassava marketing is certainly not a problem; many people compete with each other at every stage of the chain. However, observations during field work suggested that there may be too much competition, particularly at the retail level, where net incomes are so severely squeezed that no funds are available for expanding the scale of business and thereby improving cost efficiency and profitability. More evidence on this is revealed in the next section.

## **Costs and margins**

Table 4 gives an example of costs and margins in dried cassava trading between rural and urban areas. It summarizes a chain that starts with a farmer selling cassava chips to a village

assembler. A traveling trader collects the chips from the assembler, arranges transport to the urban market, contracts a miller to transform the chips into flour, and sells the flour to an urban wholesaler, who stores it for an average of two weeks. Retailers then buy from the wholesaler and sell to the public. While this chain is not the only way dried cassava is traded, it describes what we believe is common practice for rural to urban trade. Variations on this chain still encounter the same costs, although to whom they fall and what margins such people enjoy, depends very much on the exact trading arrangement.

The cost and price information used to construct Table 4 were gathered during fieldwork conducted in February 2000. Consequently, Table 4 provides a snapshot of trading during the dry season. The situation during the wet season is somewhat different because, as mentioned before, a general scarcity of chips drives prices upwards. Evidence from the GSI calculations suggests that retail prices in Kampala rise by an average of 8.4% between March and June. By contrast, most traders interviewed for this research claimed that prices rise by between 10 and 15%. Whichever is correct<sup>4</sup>, it appears that prices in the wet season do not rise uniformly throughout the chain. Most traders claim that flour is more profitable per kilogram during the wet season, suggesting that gross margins increase during this high price period.

Seasons aside, there are a few points worth making about Table 4. All traders in the chain appear to earn similar net margins. However, overall net incomes vary significantly between different types of traders. Traveling traders' and urban wholesalers' turnovers are much higher than those of either village assemblers or retailers. For example, a traveling trader may trade 100 bags a week, needing one trip to source this quantity. His weekly net income would be approximately 130 000 US\$. By contrast, a retailer may sell only one bag a week, making less than 3000 US\$. Naturally, the retailer will profit on limited sales of many other items, but the size of the difference in respective net incomes is clear.

Turning the focus to gross margins (the difference between purchase and selling price), traveling traders and retailers appear to benefit the most. However, their high margins are matched by high costs. In the case of the traveling trader, all costs are variable (i.e., they are proportional to the amount of flour traded). While some of the costs appear high, an increase in scale of trade is unlikely to reduce costs per kilogram significantly<sup>5</sup>. By contrast, the largest proportion of retailers' costs are overheads (mostly store rental), with the consequence that an increase in retailers' volume of trade will bring down the retail cost of trading flour. Given that retailers add approximately 36% to the price of flour in between buying and selling it, a reduction in this margin through increased cost efficiency will benefit consumers considerably.

Retailers are of course constrained by lack of capital and probably also by poor business skills and risk averseness. Innovative solutions to these constraints will have to be found if consumers and entrepreneurial retailers are to benefit from retail economies of scale.

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<sup>4</sup>The difference is probably connected with quality. During the wet season, flour quality generally deteriorates. Consequently, the quality of the flour sampled by Bureau of Statistics personnel during the dry season is higher than that of the flour sampled in the wet season. In effect, Bureau staff measure the prices of different grades of product in the two seasons (giving rise to an understated rise in the GSI). By contrast, traders almost certainly measure the rise in prices using consistent grades of flour.

<sup>5</sup>Economies of scale could probably be realized through the use of larger capacity vehicles, although the scope for this must surely be limited.

**Table 4. Dried cassava trading costs and margins.**

	Ush100kg	% of selling price
<b>Farmer</b>		
Selling price	10 000	
<b>Village assembler</b>		
Purchase price	10 000	
Selling price	12 000	
Gross margin	2 000	16.7
<b>Costs</b>		
Transport	1 176	
Net margin	824	6.9
<b>Travelling trader</b>		
Purchase price*	12 245	
Selling price*	20 000	
Gross margin	7 755	38.8
<b>Costs</b>		
Miscellaneous labor	700	
Transport	3 529	
Milling	1 000	
Packaging	500	
District levy ("loading fee")	200	
Market levy	500	
Total costs	6 429	
Net margin**	1 326	6.6
<b>Urban wholesaler</b>		
Purchase price*	20 000	
Selling price*	22 000	
Gross margin	2 000	9.1
<b>Costs</b>		
Overheads	250	
Capital	150	
Total costs	400	
Net margin**	1 600	8.0
<b>Urban retailer</b>		
Purchase price*	22 000	
Selling price*	30 000	
Gross margin	8 000	26.7
<b>Costs</b>		
Overhead	4 875	
Variable	300	
Total costs	5 175	
Net margin**	2 825	9.4

\*Equivalent flour price after adjusting for 2% milling losses.

\*\* Before income tax and payment of trading licence.

Similar arguments can be made for wholesaling, although the scope for exploiting economies of scale is more limited. Larger warehouses would however bring down overhead costs of storage.

In conclusion, the figures in Table 4 reveal a situation where no one is making excessive profits from trading dried cassava but where significant cost efficiencies could be realized.

## Interseasonal storage

During our fieldwork, several wholesalers claimed that they deliberately held stocks in order to take advantage of interseasonal price movements. Others claimed that they would engage in this kind of storage if they had sufficient capital.

Figure 4 is basically the same graph as Figure 2, except that the GSI of Kampala retail prices is joined by 95% confidence intervals (the upper and lower lines). Strictly speaking, the intervals should be interpreted as meaning that we are 95% confident that the actual value of each month's GSI lies between the upper and lower limits set by the interval. Another interpretation is that the intervals, widely spaced as they are, give an indication of the unpredictable nature of seasonal dried cassava prices movements. This uncertainty leads to risk for any trader who is holding speculative stocks. Setting aside the problems of risk and insufficient capital, on average, would storing between seasons be profitable? The answer, from the ballpark figures that we have gathered, appears to be an emphatic no.

The maximum seasonal price increase according to our GSI calculations is 8.4% for the period between March and June<sup>6</sup>. As indicated in footnote 3, this is probably an understatement of the true seasonal price increase. By contrast to our GSI figure, traders reported seasonal increases in the order of 10–15%. Given the unpredictability of seasonal price movements, a 10% rise over three months is probably a reasonably safe figure.

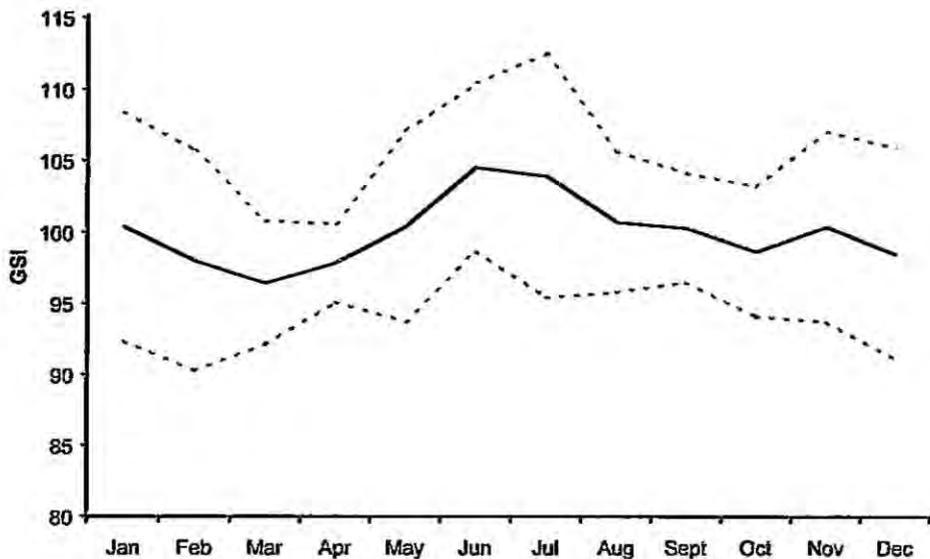
If a wholesaler purchases a 100-kg bag of flour for 20 000 USh in March, he could reasonably expect to sell it three months later for 22 000 USh. His costs are related to working capital and physical storage. The real cost of capital in Uganda is estimated at approximately 1.5% per month, which compounded over three months is approximately 4.6%. The cost of tying up the trader's capital for the storage period is therefore 4.6% of 20 000 = 920 USh. The physical cost of storing a bag for three months is approximately another 3000 USh, making a total carry cost of 3920 USh. The trader could therefore expect to lose 1920 USh. In fact, on the basis of these rough figures, the trader would not profit unless the three month price rise reached 20%.

### Market facilities

A common feature of Ugandan cassava flour wholesale markets is that they are in the center of towns and often compete for space with other activities such as food retailing. Limited space leads to high rents and few opportunities for individuals to expand their wholesale

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<sup>6</sup>In the absence of a sufficiently long wholesale price series, we have had to make the assumption that retail price movements, as displayed in figure X, mirror wholesale price movements. This is probably a realistic assumption, given that correlation coefficients of retail and wholesale prices in the short period for which we have data, lie between 0.76 and 0.94 for several different locations.



**Figure 4. GSI from Kampala cassava flour retail price.**

businesses. Sanitary conditions are far from optimal due to the inadequate provision of public utilities. Furthermore, the regular flow of delivery trucks creates additional congestion and pollution. These conditions apply not only to the cassava flour trade but equally to wholesale markets for all types of domestically produced food crops.

There is a clear need for better planned wholesale markets, placed in areas where conflicting land uses are minimal. The new markets should provide affordable facilities that will optimize the efficiency of food delivery and storage, while maintaining good sanitary conditions and easy access for retailers. The development of such markets can only be achieved by close consultation between urban authorities and traders (Onumah and Hubbard 1999).

### **Cassava flour quality**

As a general rule, poor flour quality is not a problem during the dry season. Sun-drying conditions are optimal for producing a grade of white, dry flour that consumers can afford. Urban manufacturers of pancakes often require a premium grade of flour, which has no discoloration or odor. Such demand is supplied on special order by urban wholesalers, who employ labor to scrub cassava chips and then sun dry them. The flour milled from these chips commands a premium of up to 100 US\$ per kg over standard flour, although overall demand is limited.

Flour quality declines significantly during the wet season, which, in combination with a general scarcity of chips of all grades, leads to the higher wet season prices discussed previously in this report. In theory, significant benefits could be derived from a technology that could dry cassava effectively during the wet season. Farmers (the principal dryers of

cassava) would gain more income, urban consumer prices would be lower in the wet season, and national food security would improve. In practice however, an appropriate technology may prove elusive. Drying would have to be noncapital intensive because farmers have little cash, and would also have to be nonlabor intensive because farmers are busy in the wet season with other activities, principally planting. These constraints would provide a major challenge to technologists.

An alternative approach may be to encourage drying innovation among village assemblers. Capital is less of a constraint at this level of the trading chain and the higher volumes of chips that assemblers handle would help to bring down drying costs. The profitability of this activity should of course be assessed before any moves towards technology adaptation and promotion are made.

## Fresh cassava

### Consumption and prices

This section of the report concentrates on the flow of fresh cassava between rural supply areas and major consumption markets, principally in Kampala. This flow is particularly dynamic and involves a heavy concentration of marketing services. Rural to rural flows are by comparison, much more diffuse.

Unfortunately for our purposes, the data source that yielded consumption data for dried cassava can not be used to provide a similar insight to fresh cassava consumption. While the source (the 1996/1997 Ugandan Household Survey) records fresh cassava purchases and consumption from own production, it uses heaps of unspecified weight as the most common unit of measurement. Heaps vary in size between urban and rural areas, and also according to region and season. We could find no credible conversion factors to transform heaps into weights<sup>7</sup>, and therefore are unable to provide fresh cassava consumption figures.

Our fieldwork among fresh cassava traders revealed that urban consumers tend to prefer sweet flavored, medium-sized cassava roots. Many of the new mosaic disease-resistant varieties are reportedly unpopular due to their bitter taste. From the traders' point of view, roots that perish least quickly are preferable. Several traders expressed preference for roots with an outer bark-like skin that peels away easily to reveal a thick, often reddish, inner skin.

We could find no evidence of retail price seasonality. Figure 5 shows the GSI of fresh cassava retail prices in Kampala. The upper and lower lines give the 95% confidence interval. Under testing, seasonality is rejected for all months. The same result is returned for Jinja, Mbale, and Massaka. Supporting evidence for these findings came from interviews with several fresh cassava retailers in Kampala, who note no seasonality in demand from their customers.

By contrast, supply does vary seasonally. Harvesting during the dry season is particularly labor intensive and often results in broken roots. No such problems exist in the wet season, and consequently supply tends to be higher.

Figure 6 shows real fresh prices between September 1989 and January 2000. There is clearly a positive long-term price trend (statistically significant at the 5% level:  $t = 4.66$ ). We can not provide a definitive reason for this, although increased demand caused by urbanization is almost certainly a factor. Perhaps more importantly, anecdotal evidence gathered from traders suggests that reserves of fresh cassava cultivated nearest to Kampala have been overexploited. Supplies are now sourced from further afield, thereby adding to transport costs and hence the retail price of fresh cassava.

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<sup>7</sup>We rejected data from Kayiso (1993) as implausible.

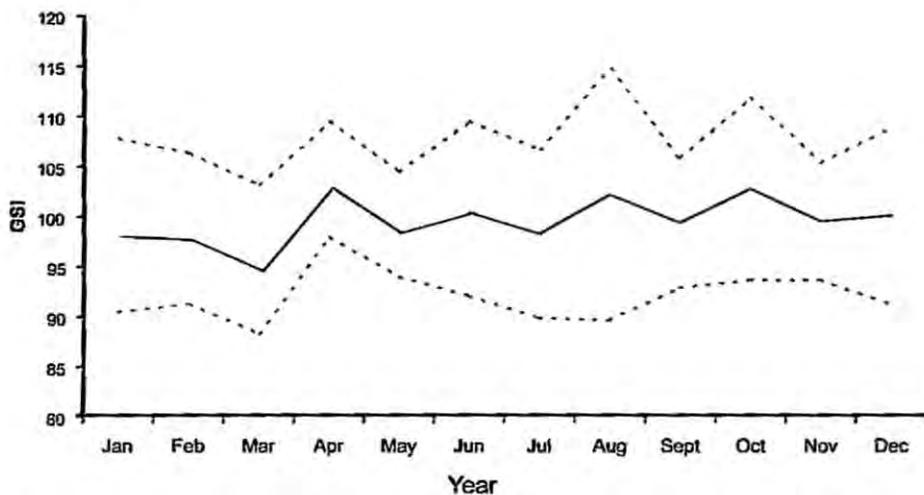


Figure 5. Fresh cassava retail price GSI for Kampala.

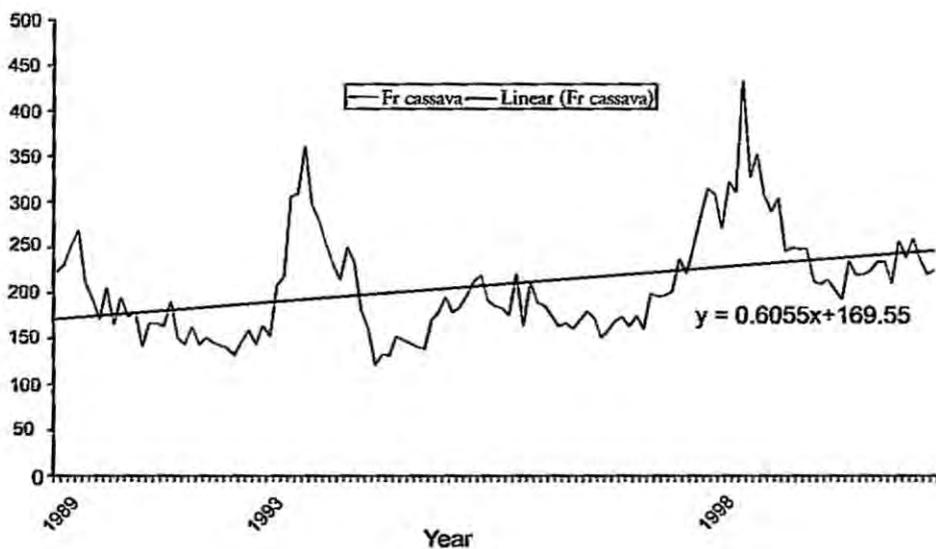


Figure 6. Real retail fresh cassava prices.

## **Description of trading**

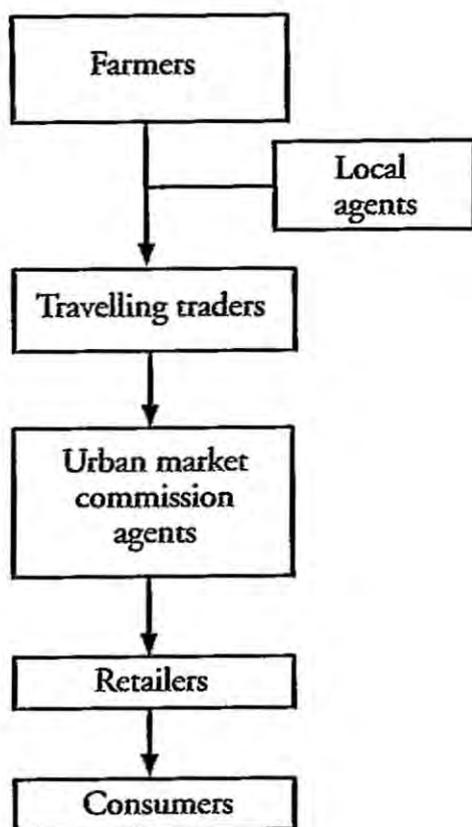
Fresh cassava trading is dynamic and highly streamlined by comparison with dried cassava trading. It is driven by the perishability of cassava roots, which necessitates swift movement from the farm to the consumer, with a minimal number of transactions. Traders are forced to discount their prices heavily if the cassava reaches the market two to three days after harvest. After five days, the roots are unsaleable.

Figure 7 indicates the simplicity of the trading chain. The role of farmers is restricted to growing the cassava and negotiating a price either with traveling traders or their agents. If traveling traders use local agents, they contact them before arriving and give instructions to find suitable supplies of cassava. Local agents merely provide a service and at no point do they take possession of the cassava. Once contacted with news that their agents have complied with their instructions, the traveling traders hire transport, often from Kampala or the other major consumer towns, and travel to the farms. Once there, the traders hire labor to harvest and load the cassava on to the hired truck. Many traders follow traditional practices by negotiating to buy whole gardens before the cassava has been uprooted. Despite sampling for yield, traders clearly take a considerable risk that the number and size of harvested tubers will be smaller than expected when the original price was struck. More progressive traders have adopted the practice of agreeing on a price once the roots have been harvested.

Roots are either loaded loosely onto the trucks, or in some cases, medium-sized roots (the most marketable size) are bagged before loading. After payment of a local levy, the traders travel with the cassava to the urban market, usually preferring to travel at night to avoid police road blocks. Police routinely stop trucks on the excuse that they are overloaded. While this is invariably true, payment of a bribe is usually sufficient to convince policemen to allow the truck to pass.

Traders arrive at the Kampala markets as early as 2.00am, at which time a crowd of retailers has already gathered. (The fact that traders and retailers are willing to keep such inconvenient hours is perhaps an indication of the profitability of fresh cassava trading). Traveling traders usually hand responsibility for selling the cassava to commission agents, who, for a fee, use their knowledge of local market conditions to negotiate sales. The latter sell to the public either within the confines of the market in which the cassava has arrived, or transport the roots to outlets scattered throughout the city.

Fresh cassava prices vary on a daily basis. While demand is usually constant, the arrival of a large number of traveling traders in a particular Kampala market can drive down prices. Conversely, a lower than average number of traveling traders will cause prices to rise. This daily variation creates price risk for traders, who can not predict market prices when they negotiate purchase prices with farmers. Another problem that unpredictable market conditions create for traveling traders is uncertainty over the ability to sell before the cassava spoils. If many traders arrive at a market, several will be obliged to find alternative markets within Kampala. This increases both the cost of transport and the possibility that the trader will be forced to discount his sales due to root deterioration. The areas that supply the majority of Kampala's fresh cassava are Hoima in the west, Lira and Apac in the north, and Soroti and Pallisa in the east.



**Figure 7. The fresh cassava trading chain.**

## Fresh cassava marketing efficiency

### Spatial integration

Table 5 gives correlation coefficients between real fresh cassava retail price series in Kampala, Jinja, Mbale, and Masaka. All but two of the coefficients show moderate integration between the towns. However, given the perishability of cassava roots, in reality, we would not expect these markets (or any others) to be physically integrated. Instead, the moderate degrees of correlation shown in table 5 are more likely to indicate that transport town's experience similar supply and demand pattern.

**Information flows.** Of all the fresh cassava marketing chain participants, farmers possess the least up-to-date market information. Thus disadvantaged, farmers often prolong price negotiations with traders in an attempt to avoid being cheated.

Traveling traders lack sufficient information on daily market conditions and therefore rely on commission agents to transact deals for them. Given the prevailing volatility of daily prices and the swiftness of the trade, delivering relevant and timely information to traders would be virtually impossible.

**Innovation.** During our fieldwork, we unearthed evidence that traveling traders who regularly supply Kampala's Kasubi market cooperate to regulate the supply of fresh cassava. This is not to say that they artificially restrict supply<sup>8</sup>, but merely agree to space their arrivals in the market evenly throughout the week, thereby avoiding volatile daily prices. The cooperation also extends to the creation of an informal revolving credit fund, to which traders contribute and then utilize on a rotating basis. These examples of innovation in fresh cassava marketing underline the dynamism of the system. Similar innovation is conspicuously absent in the dried cassava marketing chain.

**Table 5. Correlation coefficients between real retail fresh cassava prices in four Ugandan towns.**

	Kampala	Jinja	Mbale	Masaka
Kampala	1	0.78	0.65	0.72
Jinja		1	0.68	0.57
Mbale			1	0.50
Masaka				1

Source: Author's calculations using CPI data.

<sup>8</sup>If they did, buyers would simply go to other markets within Kampala.

**Scale of operation.** As well as being limited by poor liquidity, the scale on which fresh cassava is marketed is also limited by perishability. Traders have a severely restricted period in which to assemble fresh cassava and transport it to market before their investment starts to lose value.

**Competitiveness.** The fresh cassava trade appears to be sufficiently lucrative because it attracts a large number of participants. In fact, it is in a state where there is neither too much nor too little competition. More evidence is presented on this in the section on costs and margins.

### Costs and margins

Table 6 was constructed using data collected during fieldwork and assumptions that appear in appendix 2. It is designed to be representative of fresh cassava trading between rural areas and Kampala throughout the year. The only variables that change according to season are the farmgate buying price and the cost of harvesting, both of which are higher in the dry season. We have included average annual values in the table.

**Table 6. Cost and margin within the fresh cassava trading chain.**

	Ush 100 kg	% of selling price
<b>Farmer</b>		
Selling price	6000	
<b>Traveling trader</b>		
Purchase price*	6000	
Selling price*	20 000	
Gross margin	14 000	70.0
<b>Costs</b>		
Miscellaneous labor	2500	
Transport	7500	
Packaging material	500	
District levy ("loading fee")	250	
Police roadblocks	300	
Market levy	500	
Commission agent fee	700	
Total costs	12 250	
Net margin**	1750	8.8
<b>Urban retailer</b>		
Purchase price*	20 000	
Selling price*	24 000	
Gross margin	4000	16.7

\* Equivalent flour price after adjusting for 29% milling losses.

\*\* Before income tax and payment of trading licence.

Table 6 reveals no evidence that excessive profits are being earned by participants in the trading chain. Although traveling traders enjoy a large gross margin, once their costs have been deducted, profitability is quite modest. Furthermore, their net returns should be seen in the context of the risks they take, both in terms of uncertain market prices (which on a daily basis can vary by as much as the trader's net margin) and perishability. On average though, assuming that the traders sell between 30 and 60 bags a week, their net incomes are reasonably high by Ugandan standards.

We did not have an opportunity to measure retail costs during our fieldwork. However, given the unsophisticated nature of fresh cassava retailing, the single largest costs are likely to be transport from the market to the retail outlet, and the rent on the outlet itself. While this means that net margins are probably relatively large, the very small volumes that retailers sell severely limit overall net income. As with cassava flour retailing, lack of scale appears to be a major cause of inefficiency at the fresh cassava retailing level.

### **Market facilities**

The small trucks and pick-ups that bring fresh cassava to Kampala's markets arrive and park in open spaces within the market boundaries. Selling is conducted in a confused and crowded environment. Traders often complain of theft and of being cheated by the commission agents. Conditions at Kasubi market are better and it has become popular among many traveling traders. It is located on the outskirts of Kampala, and therefore attracts fewer "hangers-on". Theft is reportedly much less common, and long-standing relationships between traveling traders and their commission agents have helped to build an atmosphere of trust. The example of Kasubi points the way for future development of fresh cassava markets.

### **Tackling the perishability problem**

If the perishability of fresh cassava could be reduced, the fresh cassava trading chain could become considerably more efficient. The following would occur:

- The risk of spoilage would decrease. Traders would be willing to accept lower net margins.
- Transport costs would decrease. Lower perishability would open up the possibility of bulking greater quantities of fresh roots, making possible the use of more cost-effective large-scale transport.
- Price discovery would improve. The less frenetic pace at which the trade could be conducted would allow traders to access better price information and possibly avoid having to use commission agents.
- Daily price volatility would decrease. Supply from rural areas would become steadier and there would be a greater degree of integration between markets in nearby towns.
- Cassava farmers in remote areas would gain greater market access, and the burden on increasingly over-exploited production areas nearer to Kampala would be reduced.

In the 1980s, the Centro Internacional de Agricultura Tropical (CIAT) developed storage technology that increased fresh cassava shelf life from three days to between two and three weeks. The technology relies on the selection of good quality roots, which are bagged in polythene as soon after harvest as possible. The high humidity that develops in the bags significantly reduces perishability but also promotes fungal growth. The latter is controlled by dipping the roots in fungicide before bagging. The commercial application of this technology to supply Colombian supermarkets with fresh roots failed. The reasons why are not entirely clear, although high costs of using the technology have been suggested. A more intriguing alternative explanation is that individuals who had vested interests in maintaining the status quo of the fresh cassava trade, applied pressure on the technology adherents to cease their activities.

NRI subsequently adapted the technology for use in Ghana and Tanzania. Storage costs were reduced by avoiding the use of fungicides and by simplifying packaging requirements. Although uptake has been patchy, NRI staff involved in the project have confidence in the technique's efficacy and believe that insufficient resources were spent on promoting it to the intended beneficiaries.

If simple fresh storage techniques prove effective in the Ugandan fresh cassava trading context, then at least some of the efficiencies outlined above could be realized. Ultimately, reducing the cost of fresh cassava marketing would benefit farmers, traders, and consumers.

## Marketing constraints

While previous sections of this report have identified constraints specific to fresh and dried cassava trading, this section examines a few general constraints that we believe are relevant to the majority of food marketing in Uganda. However, rather than repeat what a growing literature on the subject has already concluded<sup>9</sup>, we intend merely to present the new insights that our fieldwork provided.

### Liquidity

As previously noted, liquidity problems limit the scale of individual trading businesses, leading to significant cost inefficiencies at the retail and wholesale levels. Very few traders interviewed during our surveys reported access to formal credit, although most claimed to borrow informally at no interest from friends and family. Even if more formal credit was available, caution among traders might limit its uptake. Several traders regarded formal loans as risky because of interest and principal payments. This attitude may reveal that business performance is patchy, leading to periods when formal loans could not be serviced, but may also indicate that periodic demand for money to pay domestic bills would compete with loan repayments.

Ultimately, increasing the amount of capital available to traders can only be achieved through an increase in affordable (low interest rate) lending, which in turn relies upon low transaction costs and good loan security. These ideal conditions for lending to small businesses are far from being achieved in Uganda. One approach is being followed by USAID, which acts as a loan guarantor for traders who borrow from commercial banks. Perhaps a more sustainable solution would be to provide both the encouragement and the correct legal environment for the formation of trader associations. Formal lenders could reduce their transaction costs by lending to the association rather than to a number of small-scale traders. Loan security could be improved if the association possesses physical assets (such as a warehouse) or if members' stock can be collateralized by holding it in secure warehouses (inventory credit). Both approaches would require tightening legislation to allow lenders to seize the collateralized assets of defaulting borrowers.

### Transport

Of the marketing costs identified within our cost and margin estimates, transport charges are among the highest. Our fieldwork revealed three relevant factors. Firstly, transport shortages are more severe in some areas than in others. For example, fresh cassava traders find little difficulty hiring trucks in Kampala, yet are often unable to hire trucks elsewhere. Secondly, there are type-specific as well as general shortages; finding the appropriate size of vehicle is not always possible. Thirdly, transport costs between farms and the assembly point are

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<sup>9</sup>Notably, Kleih et al. (1999) and Ferris and Robbins (1999).

disproportionately high. For dried cassava, this initial part of the journey costs between 1.2 and 2.4 USh/kg/km whereas transport between the assembly point and the market costs approximately 0.1 to 0.14 USh/kg/km. Local transport will always be more expensive than long-distance transport but in this case, the large discrepancy in costs suggests that public investments in “community access” routes and intermediate forms of transport should be appraised alongside investment in feeder and trunk roads. It may be that the benefit cost ratios of the former types of investment are higher.

## Key findings

### Dried cassava

- Cassava flour is an important food staple for particular consumer groups within Kampala's poor population. Real cassava flour prices in Kampala are volatile and increasing in the long term, suggesting that food-security among these groups may be threatened.
- Dried cassava marketing efficiency could be increased by improving the flow of market information. This would lead to better spatial integration between urban markets (thereby reducing the absolute levels and volatility of consumer prices, and increasing marketing opportunities for farmers), and to a reduction of transaction costs throughout the marketing chain, particularly to the benefit of farmers.
- Efficiency could also be improved by increasing liquidity within the dried cassava trading chain. Greater capital availability would allow wholesalers and retailers to expand the scale of their businesses and spread their overhead costs over a greater volume of trade. Food retailing in general has poor cost efficiency, and consequently, consumer food prices are much higher than necessary. In the case of cassava flour, retailers add approximately 36% to the price of flour in between buying and selling, yet the greatest part of this margin is accounted for by overhead costs. Retailing is a simple service and should not cost consumers so highly.
- Product quality is not a problem during the dry season, when optimal drying conditions allow sufficient production of dried cassava that is of adequate quality and affordable to urban consumers. However, during the wet season, good quality flour becomes expensive, not only because of low levels of interseasonal storage but also because farmers are unable to dry cassava roots effectively. Appropriate drying technologies might improve the situation, but they would have to be both nonlabor and noncapital intensive to find favor within prevailing farming systems. Promoting efficient methods of drying at the village assembler level of the trading chain may provide a solution.
- Current market facilities constrain wholesaling efficiency. Competition with alternative land uses limits business expansion, maintains high rents, and creates congestion and pollution.
- There is no evidence that any group within the trading chain makes unjustifiably large profits. On the contrary, excessive competition at the retail level appears to squeeze profits to the extent that individual retail outlets operate at an inefficiently small scale.

### **Fresh cassava**

- Fresh cassava trading is driven by the high perishability of the roots and by the price premia that consumers are willing to pay for freshness.
- Large marketing cost savings could be realized if current methods for reducing the perishability of cassava roots can be adapted to meet the requirements of Uganda's fresh cassava trade.
- Recent cassava breeding research has neglected widespread consumer preferences for medium-sized, sweet varieties.

### **General findings**

- Transport charges between farms and assembly points are more than ten times more expensive than interurban transport charges. Although this finding was made in the context of dried cassava trading, it probably applies to all domestically marketed farm produce, and emphasizes the importance of public investment in reducing the costs of community level transport.
- Lending to the food marketing sector is not only constrained by high transaction costs and poor loan security but also by conservative attitudes among potential borrowers.

## Recommendations

Many of the constraints that apply to fresh and dried cassava trading are common to other types of food marketing in Uganda. Examining cassava marketing in isolation can therefore lead to less than optimal research impact. The following are suggested as avenues of general food marketing research and technical assistance.

- **Formal lending to the food marketing sector.** This research should concentrate on finding innovative lending practices that will reduce costs and risks to both lenders and borrowers. Ideally, it should involve traders, commercial lenders, government policy personnel, and legal experts. Suggestions for improving the legal lending environment should form a central part of the research.
- **Capturing economies of scale within food wholesaling and retailing.** Building on the work into improved lending, this research should be broad ranging and include investigation into capital, business skill, entrepreneurial, cultural, and infrastructural constraints. An understanding of the relevant constraints will allow policymakers to develop strategies to encourage larger scale wholesaling and retailing.
- **Improved market facility planning.** If Kampala's urban authority is willing to cooperate, we recommend development assistance aimed at improving the planning of Kampala's markets, with the ultimate aim of reducing marketing costs, improving sanitation, and reducing congestion in the city center. The work should engage urban planners and traders in a collaborative approach.

The final two recommendations apply specifically to technical innovation within cassava marketing systems.

- **Drying technology.** We do not recommend spending research funds on developing ways for drying cassava roots at the farm level. New drying techniques would only find relevance during the three months of the wet season. Furthermore, in order to find favor among farmers, drying innovations would have to satisfy the impossible combination of being nonlabor and noncapital intensive. We do, however, recommend further research on the financial viability of drying innovations at the village assembler level of the marketing chain, where capital constraints are lower. Village assemblers handle greater volumes of chips and may therefore be able to exploit economies of scale in the drying process.
- **Fresh cassava storage.** We recommend research into the feasibility of adapting CIAT/NRI fresh cassava storage technology for use by Ugandan traders. Costs and benefits to the traders should form the central theme of the research.

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Annex 1. Grand seasonal index calculations for Kampala cassava flour retail prices.

	Monthly index of moving averages											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1989						106.9	107.08	98.154	103.2	92.303	112.94	109.08
1990	117.09	110.9	100.33	102.95	94.458	100.43	95.664	97.406	98.477	98.962	99.036	96.77
1991	94.968	93.042	93.145	96.576	93.739	108.14	112.19	101.02	100.94	88.27	79.534	70.946
1992	68.203	67.974	77.637	89.994	128.01	130.15	137.35	120.7	110.52	106.98	101.23	97.129
1993	100.98	88.913	95.307	99.443	100.67	102.46	97.84	93.318	91.063	88.999	95.642	95.583
1994	103.2	101.7	97.583	95.908	97.313	107.29	114.57	97.848	100.65	103.2	96.214	99.532
1995	100.54	97.959	100.7	101	101.51	99.242	99.746	100.12	103.25	100.93	95.661	98.592
1996	98.708	98.824	98.941	98.824	100.18	97.936	92.757	92.347	89.385	91.696	104.31	100.95
1997	106.56	105.55	98.652	90.197	89.233	94.916	102.4	100.88	99.718	105.42	118.26	116.82
1998	107.99	105.78	97.548	98.506	94.656	101.18	91.435	100.49	101.03	104.94	96.342	94.739
1999	100.59	104.54	99.903	100.2	99.215	95.872	86.863					
N	10	10	10	10	10	11	11	10	10	10	10	10
Mean	99.882	97.518	95.975	97.36	99.899	104.05	103.45	100.23	99.825	98.171	99.916	98.013
SD	12.687	12.236	6.8513	4.3291	10.591	9.7541	14.155	7.8038	6.042	7.2117	10.573	11.732
SE(mean)	4.0118	3.8693	2.1666	1.369	3.3492	2.941	4.2678	2.4678	1.9107	2.2805	3.3434	3.7101
T (null mean = 100)	-0.029	-0.641	-1.858	-1.928	-0.03	1.3762	0.8074	0.0922	-0.092	-0.802	-0.025	-0.535

## Annex 2. Dried cassava trading costs and margins.

Assumptions		
Weight of bag of chips (kg)		85
Weight of bag of flour (kg)		100
Milling losses		0.02
Transport (farm to village assembler Ush/bag of chips)		1000
Transport (village to wholesaler Ush/bag of chips)		3000
Loading fee/bag of chips		200
Real cost of capital per month		0.015
Average wholesale storage period (months)		0.5
Monthly rent on wholesale store (Ush)		100 000
Average wholesale store utilization (bags)		100
Cassava flour share of wholesale overheads		0.5
Monthly rent on retail store (Ush)		100 000
Retail turnover (100-kg bags/month)		4
Other overhead costs (Ush per month)		30 000
Cassava flour share of retail overheads		0.15
Costs and margins within the dried cassava trading chain		
	Ush/100kg	% of selling price
<b>Farmer</b>		
Selling price	10 000	
<b>Village assembler</b>		
Purchase price	10 000	
Selling price	12 000	
Gross margin	2 000	16.7%
<b>Costs</b>		
Transport	1 176	
Net margin	824	6.9%
<b>Traveling trader</b>		
Purchase price*	12 245	
Selling price*	20 000	
Gross margin	7 755	38.8%

## Annex 2. cont. Dried cassava trading costs and margins.

Costs	Costs and margins within the dried cassava trading chain	
	Ush/100kg	% of selling price
Miscellaneous labor	700	
Transport	3529	
Milling	1000	
Packaging	500	
District levy ("loading fee")	200	
Market levy	500	
Total costs	6429	
Net margin**	1326	6.6
<b>Urban wholesaler</b>		
Purchase price*	20000	
Selling price*	22000	
Gross margin	2000	9.1
Costs		
Overheads	250	
Capital	150	
Total costs	400	
Net margin**	1600	8.0
<b>Urban retailer</b>		
Purchase price*	22000	
Selling price*	30000	
Gross margin	8000	26.7
Costs		
Overhead	4875	
Variable	300	
Total costs	5175	
Net margin**	2825	9.4

\*Equivalent flour price after adjusting for 2% milling losses.

\*\*Before income tax and payment of trading licence.

### Annex 3. Methodologies for wholesalers (both assembly wholesalers and distributing wholesalers)

Issue	Primary information	Secondary information
Description of wholesaling activities	<ul style="list-style-type: none"> <li>• how long have you been in business as wholesaler?</li> <li>• is it a family business?</li> <li>• how long do you intend to remain in the wholesaling business?</li> </ul>	
Specialization (remember that this question relates to economies of scale and risk strategies)	<ul style="list-style-type: none"> <li>• how many products do you trade in?</li> <li>• what are these products?</li> <li>• why do you trade in these particular products?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• specialization</li> <li>• economies of scale</li> <li>• risk strategies among wholesalers</li> </ul>
Description of trading and product flows	<ul style="list-style-type: none"> <li>• describe how the cassava product reaches you from the farmer.</li> <li>• describe what happens to the cassava product after you have sold it.</li> <li>• what are the main areas of production of the cassava product?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• trading chains for different cassava products</li> <li>• geographical product flows</li> </ul>
Price formation (among others, this will give us an indication of transaction costs)	<ul style="list-style-type: none"> <li>• what factors do you take into account when you negotiate prices with people who sell cassava product to you?</li> <li>• what factors do you take into account when you negotiate prices with people who buy cassava product from you?</li> <li>• how long do price negotiations usually take?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transaction costs</li> </ul>
Price risk	<ul style="list-style-type: none"> <li>• how stable are cassava product buying prices?</li> <li>• how stable are cassava product selling prices?</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly/weekly time series wholesale selling prices (for different regions/towns). We can then assess price volatility.</li> </ul>
Volumes traded	<ul style="list-style-type: none"> <li>• in a typical week, how much cassava product do you sell? (ask to see records if they exist)</li> <li>• does the amount of cassava product that you trade vary much on a weekly basis?</li> <li>• if yes, why?</li> <li>• does the amount of cassava product vary much between the wet and dry seasons?</li> <li>• if yes, why?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• urban household consumption (then use extrapolation to derive total consumed)</li> <li>• others?</li> </ul>
Exporters	<ul style="list-style-type: none"> <li>• are you aware of any wholesalers who export cassava product to neighboring countries?</li> <li>• If yes, how important do you think this kind of trade is?</li> <li>• try to get names and contact details</li> </ul>	
Market risk	<ul style="list-style-type: none"> <li>• do you experience problems in finding people who sell cassava product to you?</li> <li>• if yes, why?</li> <li>• do you experience problems in finding people who buy cassava product from you?</li> <li>• if yes, why?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transport failures (main routes that become impassable)</li> <li>• oversupplied cassava product markets</li> </ul>

### Annex 3. (contd)

Issue	Primary information	Secondary information
Quality	<ul style="list-style-type: none"> <li>• observation: feel, smell, appearance</li> <li>• what are the best methods and conditions for storing cassava product?</li> <li>• how does the trader assess quality before buying the cassava product?</li> <li>• when selling, do you receive higher prices for cassava products of higher quality?</li> <li>• when buying, do you offer a higher price for higher quality cassava product?</li> <li>• what quality attributes receive the best prices?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• actual storage practices</li> <li>• existence of quality price premia</li> <li>• the degree to which price incentives extend along the chain</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• on average, how long do you store the cassava product before you sell it?</li> <li>• if the wholesaler stores for long periods, ask why? (This will reveal if the trader stores seasonally in order to make a profit)</li> <li>• if the wholesaler does not store for long periods, ask why not? (this will reveal whether the reasons are related to price, liquidity or technical storage issues)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• weekly/monthly time series wholesale price data (from which to derive seasonal price patterns)</li> </ul>
Storage risk	<ul style="list-style-type: none"> <li>• do you experience cassava product storage losses?</li> <li>• if yes, what are the major causes of cassava product storage losses (both in terms of quality and quantity)?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• storage losses</li> </ul>
Profitability	<ul style="list-style-type: none"> <li>• how profitable is cassava product trading compared with other products</li> <li>• what is the current difference between your buying and selling price of cassava product?</li> <li>• what is the usual difference in your buying and selling prices? (NB if the difference varies greatly, the wholesaler's answer will reveal information on price risk)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• profit margins</li> <li>• trading margins (difference between buying and selling prices)</li> </ul>
Handling, sorting, and packaging	<ul style="list-style-type: none"> <li>• observation: does the trader sell the product in different quality grades?</li> <li>• do you buy the cassava product in different grades?</li> <li>• do you sort the cassava product into different grades?</li> <li>• what sort of packaging do you use?</li> <li>• why do you use that type of packaging?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• grading</li> <li>• packing materials</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• do you operate your own truck or pick-up van?</li> <li>• if yes, do you transport just for yourself or do you transport for other people as well?</li> <li>• if the wholesaler only transports for himself, ask why do you operate your own transport?</li> <li>• if you feel that it is appropriate, ask questions relating to transporters.</li> </ul>	
Liquidity	<ul style="list-style-type: none"> <li>• do you use credit or borrowed money? (refer to our list of different types of credit, covering both formal and informal sources)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• availability of credit, both for fixed and working capital for wholesalers</li> </ul>
Sources of credit:	<ul style="list-style-type: none"> <li>• if yes, try to distinguish between money that is being borrowed for fixed capital (storage shed) and for working capital (stocks)</li> <li>• if the wholesaler does not use credit, ask is credit or borrowed money available to you? (try to distinguish between credit for fixed capital and for working capital)</li> <li>• if yes, why don't you use credit or borrowed money?</li> </ul>	
	<ul style="list-style-type: none"> <li>• Bank</li> <li>• Association/ Group/ Union</li> <li>• Microcredit institution</li> <li>• Friends and relatives</li> <li>• Trading partner</li> <li>• Informal money lender</li> </ul>	

### Annex 3. (contd)

Issue	Primary information	Secondary information
<p>Credit to buyers (this will inform us on the extent to which trust exists in the chain and also give insights to the existence of inter-locking markets)</p> <p>Credit from sellers (this will inform us on the extent to which there is trust in the chain and also give us an insight to the existence of interlocking markets)</p>	<ul style="list-style-type: none"> <li>• Do you offer credit to the people who buy cassava product from you?</li> <li>• if yes, why do you let them have credit?</li>   <li>• do you receive credit from the people who sell cassava product to you?</li> <li>• if yes, why do they let you have credit?</li> </ul>	
<p>Competition (remember that we will be able to judge competitiveness through profit margins)</p>	<ul style="list-style-type: none"> <li>• observation: does the number of and activity among wholesalers give the impression that competition is strong?</li> <li>• are there any conditions that you have to fulfill before you enter wholesaling? (question relates to barriers to entry)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• wholesale margins</li> </ul>
<p>Institutional constraints (remember that this includes cultural constraints)</p>	<ul style="list-style-type: none"> <li>• how do the actions of the government/local authorities/trade associations affect your business?</li> <li>• how do you choose the people that you do business with?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• excessive institutional constraints on business</li> </ul>
<p>Spatial market integration</p>	<ul style="list-style-type: none"> <li>• given a particular period, do prices in different towns usually move in the same direction?</li> <li>• please describe what influences prices in different towns</li> </ul> <p>Note: these questions might be more appropriate for inter-urban traveling traders.</p>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• cross sectional and time series wholesale prices (can test for integration using correlation coefficients or other more complex techniques such as cointegration)</li> </ul>
<p>Skills</p>	<ul style="list-style-type: none"> <li>• observation: does the wholesaler keep business/trading records?</li> <li>• how did you learn to become a wholesaler?</li> <li>• have you ever received any business training?</li> <li>• what is the highest level of education that you attained?</li> </ul>	
<p>Innovation</p>	<p>Try to discover whether the trader actively participates in:</p> <ul style="list-style-type: none"> <li>• trader associations (get description of associations)</li> <li>• seeking to supply new markets</li> <li>• responding to changes in market requirements</li> <li>• vertical integration</li> <li>• interlocking markets</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• Innovation among wholesalers.</li> </ul>
<p>Information</p>	<ul style="list-style-type: none"> <li>• how do you obtain information on:             <ul style="list-style-type: none"> <li>- prices in your own market</li> <li>- prices, supply, and demand in other markets</li> <li>- improved storage techniques</li> <li>- others?</li> </ul> </li> </ul>	

## Methodologies for traders.

Issue	Primary information	Secondary information
Description of traveling trading activities	<ul style="list-style-type: none"> <li>how long have you been in business as a traveling trader?</li> <li>is it a family business?</li> <li>how long do you intend to remain in the traveling trading business?</li> </ul>	
Specialization (Remember that this question relates to economies of scale and risk strategies)	<ul style="list-style-type: none"> <li>how many products do you trade in?</li> <li>what are these products?</li> <li>why do you trade in these particular products?</li> </ul>	<p>Available information on:</p> <ul style="list-style-type: none"> <li>specialization</li> <li>economies of scale</li> <li>risk strategies among traveling traders</li> </ul>
Description of trading and product flows	<ul style="list-style-type: none"> <li>describe where you buy cassava product(s)</li> <li>describe where you sell the "cassava product(s)"</li> </ul>	<p>Available information on:</p> <ul style="list-style-type: none"> <li>trading chains for different cassava products</li> <li>geographical product flows</li> </ul>
Price formation (among others, this indicates transaction costs)	<ul style="list-style-type: none"> <li>what factors do you consider when negotiating prices with people you buy cassava product(s) from?</li> <li>what factors do you consider when negotiating prices with people you sell cassava product(s) to?</li> <li>how long do price negotiations usually take?</li> </ul>	<p>Available information on:</p> <ul style="list-style-type: none"> <li>transaction costs</li> </ul>
Price risk	<ul style="list-style-type: none"> <li>how stable are cassava product buying prices?</li> <li>how stable are cassava product selling prices?</li> </ul>	<ul style="list-style-type: none"> <li>monthly/weekly time series data on wholesale buying and selling prices (for different regions/towns). Price volatility can then be assessed</li> </ul>
Volumes traded	<ul style="list-style-type: none"> <li>in a typical week, how much cassava product do you sell? (ask to see records if they exist)</li> <li>does the amount of cassava product that you trade in vary very much on a weekly basis?</li> <li>if yes, why?</li> <li>does the amount of cassava product vary much between the wet and dry seasons?</li> <li>if yes, why?</li> </ul>	<p>Available information on:</p> <ul style="list-style-type: none"> <li>urban household consumption (then use extrapolation to derive total consumed)</li> <li>others?</li> </ul>
Exporters	<ul style="list-style-type: none"> <li>are you aware of any traders exporting cassava products to neighboring countries?</li> <li>if yes, how important do you think this kind of trade is?</li> <li>try to get names and contact details</li> </ul>	<ul style="list-style-type: none"> <li>Uganda Chamber of Commerce</li> <li>Uganda Export Promotion Council</li> <li>Uganda Revenue Authority</li> </ul>
Market risk	<ul style="list-style-type: none"> <li>do you experience problems in finding people who sell cassava product to you?</li> <li>if yes, why?</li> <li>do you experience problems in finding people who buy cassava product from you?</li> <li>if yes, why?</li> </ul>	<p>Available information on:</p> <ul style="list-style-type: none"> <li>transport failures (main routes that become impassable)</li> <li>over-supplied cassava product markets</li> </ul>
Price risk	<ul style="list-style-type: none"> <li>how stable is the buying price of cassava products i.e. chips, flour, starch, fresh cassava, etc.?</li> <li>how stable is the selling price of cassava products as in above?</li> </ul>	<p>Time series data of buying and selling prices:</p> <ul style="list-style-type: none"> <li>monthly</li> <li>weekly</li> </ul>

## Methodologies for traders (contd)

Issue	Primary information	Secondary information
Quality	<ul style="list-style-type: none"> <li>• Observation: feel, smell, appearance</li> <li>• what are the best methods and conditions for transporting cassava product?</li> <li>• how does the trader assess quality before buying the cassava product?</li> <li>• when selling, do you receive higher prices for cassava products of higher quality?</li> <li>• when buying, do you offer a higher price for higher quality cassava product?</li> <li>• what quality attributes receive the best prices?</li> </ul>	Available information on: <ul style="list-style-type: none"> <li>• actual transport practices</li> <li>• existence of quality price premium</li> <li>• the degree to which price incentives extend along the chain</li> </ul>
Transport risk	<ul style="list-style-type: none"> <li>• do you experience cassava product transport losses?</li> <li>• if yes, what are the major causes of cassava product transport losses (both in terms of quality and quantity)?</li> <li>• What is the cost per bag?</li> </ul>	Available information on: <ul style="list-style-type: none"> <li>• modes of transport</li> </ul>
Profitability	<ul style="list-style-type: none"> <li>• how profitable is cassava product trading compared with other products?</li> <li>• what is the current difference between your buying and selling price of cassava product?</li> <li>• What is the usual difference in your buying and selling prices? (NB if the difference varies greatly, the trader's answer will reveal information on price risk)</li> </ul>	Available information on: <ul style="list-style-type: none"> <li>• profit margins</li> <li>• trading margins (difference between buying and selling prices)</li> </ul>
Handling, sorting, and packaging	<ul style="list-style-type: none"> <li>• observation: does the trader sell the product in different quality grades?</li> <li>• do you buy the cassava product in different grades?</li> <li>• do you sort the cassava product into different grades?</li> <li>• what sort of packaging do you use?</li> <li>• why do you use that type of packaging?</li> </ul>	Available information on: <ul style="list-style-type: none"> <li>• grading</li> <li>• packaging materials</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• do you operate your own truck or pick-up?</li> <li>• if yes, do you transport just for yourself or do you transport for other traders/people as well?</li> <li>• if the trader only transports for himself, ask why do you operate your own transport?</li> <li>• if you feel that it is appropriate, ask questions relating to transporters</li> </ul>	
Liquidity Sources of credit	<ul style="list-style-type: none"> <li>• do you use credit or borrowed money? (refer to our list of different types of credit, covering both formal and informal sources)</li> <li>• if yes, try to distinguish between money that is being borrowed for fixed capital (storage shed) and for working capital (stocks)</li> <li>• if the trader does not use credit, is credit or borrowed money available? (try to distinguish between credit for fixed capital and for working capital)</li> <li>• If yes, why don't you use credit or borrowed money?</li> </ul>	Available information on: <ul style="list-style-type: none"> <li>• Microfinance institutions offering credit, both for fixed and working capital for traders</li> </ul>
<ul style="list-style-type: none"> <li>• Bank</li> <li>• Association/Group/Union</li> <li>• Microcredit institution</li> <li>• Friends and relatives</li> <li>• Trading partner</li> <li>• Informal money lender</li> </ul>		

## Methodologies for traders (contd)

Issue	Primary information	Secondary information
Credit to buyers (this will inform us on the extent to which trust exists in the chain and also give insights to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>do you offer credit to the people who buy cassava product from you?</li> <li>if yes, why do you let them have credit?</li> </ul>	
Credit from sellers (this will inform us on the extent to which there is trust in the chain and also give us an insight to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>do you receive credit from the people who sell cassava product to you?</li> <li>if yes, why do they let you have credit?</li> </ul>	
Competition (remember that we will be able to judge competitiveness through profit margins)	<ul style="list-style-type: none"> <li>observation: does the number of, and activity among traders give the impression that competition is strong?</li> <li>are there any conditions that you have to fulfill before you 'enter' wholesaling? (question relates to barriers to entry)</li> </ul>	Available information on <ul style="list-style-type: none"> <li>trading margins</li> </ul>
Institutional constraints (remember that this includes cultural constraints)	<ul style="list-style-type: none"> <li>how do the actions of the government/local authorities/trade associations affect your business?</li> <li>how do you choose the people that you do business with?</li> </ul>	Available information on <ul style="list-style-type: none"> <li>excessive institutional constraints on business</li> </ul>
Spatial market integration	<ul style="list-style-type: none"> <li>given any particular period, do prices in different towns usually move in the same direction?</li> <li>describe what influences prices in different towns/villages</li> </ul> Note: these questions might be more appropriate for inter-urban traveling traders.	Available data on <ul style="list-style-type: none"> <li>cross sectional and time series wholesale prices (can test for integration using correlation coefficients or other more complex techniques such as cointegration)</li> </ul>
Skills	<ul style="list-style-type: none"> <li>observation: does the trader keep business/trading records?</li> <li>how did you learn to become a traveling trader?</li> <li>have you ever received any business training?</li> <li>what is the highest level of education that you attained?</li> </ul>	
Innovation	Discover whether the trader actively participates in: <ul style="list-style-type: none"> <li>trader associations (get description of associations)</li> <li>seeking to supply new markets</li> <li>responding to changes in market requirements</li> <li>vertical integration</li> <li>interlocking markets</li> </ul>	Available information on <ul style="list-style-type: none"> <li>innovation among traveling traders</li> </ul>
Information	How do you obtain information on: <ul style="list-style-type: none"> <li>prices in your own market</li> <li>prices, supply and demand in other markets</li> <li>others?</li> </ul>	

## Methodologies for retailers

Issue	Primary information	Secondary information
Description of retailer activities	<ul style="list-style-type: none"> <li>• how long have you been in business as retailer?</li> <li>• is it a family business?</li> <li>• how long do you intend to remain in the wholesaling business?</li> </ul>	
Specialization (remember that this question relates to economies of scale and risk strategies)	<ul style="list-style-type: none"> <li>• how many products do you trade in?</li> <li>• What are the products?</li> <li>• why do you trade in these particular products?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• specialization</li> <li>• economies of scale,</li> <li>• risk strategies among retailers</li> </ul>
Description of trading and product flows	<ul style="list-style-type: none"> <li>• describe how the cassava product reaches you from the wholesaler</li> <li>• describe what happens to the cassava product after you have sold it</li> <li>• what are the main areas of production of the cassava product?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• trading chains for different cassava products</li> <li>• geographical product flows</li> </ul>
Price formation (among others, this will give us an indication of transaction costs)	<ul style="list-style-type: none"> <li>• what factors do you take into account when you negotiate prices with people who sell cassava product to you?</li> <li>• what factors do you take into account when you negotiate prices with people who buy cassava product from you?</li> <li>• how long do price negotiations usually take?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transaction costs</li> </ul>
Price risk	<ul style="list-style-type: none"> <li>• how stable are cassava product buying prices?</li> <li>• how stable are cassava product selling prices?</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly/weekly time series retail selling prices (for different regions/towns). We can then assess price volatility</li> </ul>
Volumes traded	<ul style="list-style-type: none"> <li>• in a typical week, how much cassava product do you sell? (ask to see records if they exist)</li> <li>• does the amount of cassava product that you trade in vary much on a weekly basis? If yes, why?</li> <li>• does the amount of cassava product vary much between the wet and dry seasons?</li> <li>• if yes, why?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• urban household consumption (then use extrapolation to derive total consumed)</li> <li>• others?</li> </ul>
Exporters	<ul style="list-style-type: none"> <li>• are you aware of any retailers who export cassava product to neighboring countries?</li> <li>• If yes, how important do you think this kind of trade is?</li> <li>• try to get names and contact details</li> </ul>	
Market risk	<ul style="list-style-type: none"> <li>• do you experience problems in finding people who sell cassava product to you?</li> <li>• if yes, why?</li> <li>• do you experience problems in finding people who buy cassava product from you?</li> <li>• if yes, why?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transport failures (main routes that become impassable)</li> <li>• over-supplied cassava product markets</li> </ul>

## Methodologies for retailers (contd)

Issue	Primary information	Secondary information
Quality	<ul style="list-style-type: none"> <li>• observation: feel, smell, appearance</li> <li>• what are the best methods and conditions for storing cassava product?</li> <li>• how does the trader assess quality before buying the cassava product?</li> <li>• when selling, do you receive higher prices for cassava products of higher quality?</li> <li>• when buying, do you offer a higher price for higher quality cassava product?</li> <li>• what quality attributes receive the best prices?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• actual storage practices</li> <li>• existence of quality price premia</li> <li>• the degree to which price incentives extend along the chain</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• on average, how long do you store the cassava product before you sell it?</li> <li>• if the retailer stores for long periods, ask why? (This will reveal if the trader stores seasonally in order to make a profit)</li> <li>• if the retailer does not store for long periods, ask why not? (this will reveal whether the reasons are related to price, liquidity, or technical storage issues)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• weekly/monthly time series wholesale price data (from which to derive seasonal price patterns)</li> </ul>
Storage risk	<ul style="list-style-type: none"> <li>• do you experience cassava product storage losses?</li> <li>• if yes, what are the major causes of cassava product storage losses (both in terms of quality and quantity)?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• storage losses</li> </ul>
Profitability	<ul style="list-style-type: none"> <li>• how profitable is cassava product trading compared with other products</li> <li>• what is the current difference between your buying and selling price of cassava product?</li> <li>• what is the usual difference in your buying and selling prices? (NB if the difference varies greatly, the trader's answer will reveal information on price risk)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• profit margins</li> <li>• retail margins (difference between buying and selling prices)</li> </ul>
Handling, sorting, and packaging	<ul style="list-style-type: none"> <li>• observation: does the retailer sell the product in different quality grades?</li> <li>• do you buy the cassava product in different grades?</li> <li>• do you sort the cassava product into different grades?</li> <li>• what sort of packaging do you use?</li> <li>• why do you use that type of packaging?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• grading</li> <li>• packing materials</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• do you operate your own truck or pick-up van?</li> <li>• if yes, do you transport just for yourself or do you transport for other people as well?</li> <li>• if the retailer only transports for himself, ask why do you operate your own transport?</li> <li>• if you feel that it is appropriate, ask questions relating to transporters</li> </ul>	
Liquidity	<ul style="list-style-type: none"> <li>• do you use credit or borrowed money? (refer to our list of different types of credit, covering both formal and informal sources)</li> <li>• if yes, try to distinguish between money that is being borrowed for fixed capital (storage shed) and for working capital (stocks)</li> <li>• if the retailer does not use credit, ask if credit or borrowed money is available to you (try to distinguish between credit for fixed capital and for working capital)</li> <li>• if yes, ask why don't you use credit or borrowed money?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>• availability of credit, both for fixed and working capital for retailers</li> </ul>
Sources of credit:	<ul style="list-style-type: none"> <li>• Bank</li> <li>• Association/Group/Union</li> <li>• Microcredit institution</li> <li>• Friends and relatives</li> <li>• Trading partner</li> <li>• Informal money lender</li> </ul>	

## Methodologies for retailers (contd)

Issue	Primary information	Secondary information
Credit to buyers (this will inform us on the extent to which trust exists in the chain and also give insights to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>Do you offer credit to the people who buy cassava product from you?</li> <li>if yes, why do you let them have credit?</li> </ul>	
Credit from sellers (this will inform us on the extent to which there is trust in the chain and also give us an insight to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>do you receive credit from the people who sell cassava product to you?</li> <li>if yes, why do they let you have credit?</li> </ul>	
Competition (remember that we will be able to judge competitiveness through profit margins)	<ul style="list-style-type: none"> <li>observation: does the number of, and activity among retailer give the impression that competition is strong?</li> <li>are there any conditions that you have to fulfill before you enter wholesaling? (question relates to barriers to entry)</li> </ul>	Data on: <ul style="list-style-type: none"> <li>retail margins</li> </ul>
Institutional constraints (remember that this includes cultural constraints)	<ul style="list-style-type: none"> <li>how do the actions of the government/local council/trade associations affect your business?</li> <li>how do you choose the people that you do business with?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>excessive institutional constraints on business</li> </ul>
Spatial market integration	<ul style="list-style-type: none"> <li>given a particular period, do prices in different towns usually move in the same direction?</li> <li>please describe what influences prices in different towns</li> </ul> Note: these questions might be more appropriate for inter-urban traveling traders.	Data on: <ul style="list-style-type: none"> <li>cross sectional and time series wholesale prices (can test for integration using correlation coefficients or other more complex techniques such as cointegration)</li> </ul>
Skills	<ul style="list-style-type: none"> <li>observation: does the retailer keep business/trading records?</li> <li>how did you learn to become a wholesaler</li> <li>have you ever received any business training?</li> <li>what is the highest level of education that you attained?</li> </ul>	
Innovation	Try to discover whether the retailer actively participates in: <ul style="list-style-type: none"> <li>trader associations (get description of associations)</li> <li>seeking to supply new markets</li> <li>responding to changes in market requirements</li> <li>vertical integration</li> <li>interlocking markets</li> </ul>	Data on: <ul style="list-style-type: none"> <li>Innovation among retailers</li> </ul>
Information	<ul style="list-style-type: none"> <li>how do you obtain information on:               <ul style="list-style-type: none"> <li>prices in your own market</li> <li>prices, supply, and demand in other markets</li> <li>improved storage techniques</li> <li>others?</li> </ul> </li> </ul>	

## Methodologies for processors

The processors are categorized into two: primary processing which include flour milling, brewing, and gin making; and secondary processing which includes starch production, bakeries, etc.

Issue	Primary information	Secondary information
Description of processing activities	<ul style="list-style-type: none"> <li>• how long have you been a processor?</li> <li>• is it a family business?</li> <li>• how long do you intend to remain in the processing business?</li> </ul>	
Specialization (remember that this question relates to economies of scale and risk strategies)	<ul style="list-style-type: none"> <li>• how many cassava products do you produce?</li> <li>• what are the products?</li> <li>• why do you produce these particular products?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• specialization</li> <li>• economies of scale</li> <li>• risk strategies among processors</li> </ul>
Description of trading and product flows	<ul style="list-style-type: none"> <li>• describe how the raw material(s) reach you.</li> <li>• describe what happens to the cassava product after you have sold it.</li> <li>• what are the main supply areas of the raw materials?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• trading chains for different cassava products</li> <li>• geographical product flows</li> </ul>
Price formation (among others, this will give us an indication of transaction costs)	<ul style="list-style-type: none"> <li>• what factors do you take into account when you negotiate prices with people who sell to you raw materials for making cassava product?</li> <li>• what factors do you take into account when you negotiate prices with people who buy cassava product from you?</li> <li>• how long does it take you to negotiate the price between suppliers raw materials and buyers of cassava products?</li> <li>• how do you negotiate terms of credit and what are the costs of enforcing these contracts?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transaction costs</li> </ul>
Price risk	<ul style="list-style-type: none"> <li>• how stable are processing raw material buying prices?</li> <li>• how stable are cassava product selling prices?</li> </ul>	<ul style="list-style-type: none"> <li>• monthly/weekly time series of wholesale selling prices (for different regions/towns). We can then assess price volatility</li> </ul>
Volumes traded	<ul style="list-style-type: none"> <li>• in a typical week, how much cassava product do you sell? (Ask to see records if they exist)</li> <li>• does the amount of cassava product that you trade vary very much on a weekly basis?</li> <li>• if yes, why? does the amount of cassava product vary much between the wet and dry seasons?</li> <li>• if yes, why?</li> <li>• what is the volume of cassava product produced in last week/month/season/year? (ask to see records where available).</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• urban household consumption (then use extrapolation to derive total consumed)</li> <li>• others?</li> </ul>
Technical efficiency	<ul style="list-style-type: none"> <li>• do you experience processing losses?</li> <li>• if yes, what is the magnitude?</li> <li>• what is the capacity utilization of the machines used?</li> </ul>	<ul style="list-style-type: none"> <li>• Data on: rated utilization of machines from dealers, e.g., IITA for cassava processing equipment.</li> </ul>

## Methodologies for processors (contd)

Issue	Primary information	Secondary information
Processing risks	<ul style="list-style-type: none"> <li>• how stable is the power supply?</li> <li>• how stable is the supply of raw materials?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• load shedding</li> </ul>
Exporters	<ul style="list-style-type: none"> <li>• are you aware of any processors that export cassava product to neighboring countries?</li> <li>• if yes, how important do you think this kind of trade is?</li> <li>• try to get names and contact details</li> </ul>	<ul style="list-style-type: none"> <li>• Data on: exports from Uganda National Chamber of Commerce</li> <li>• URA</li> <li>• Export Promotion Council</li> </ul>
Market risk	<ul style="list-style-type: none"> <li>• do you experience problems in finding raw materials?</li> <li>• if yes, why?</li> <li>• do you experience problems in finding people who buy "cassava product" from you?</li> <li>• if yes, why?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• transport failures (main routes that become impassable)</li> <li>• oversupplied cassava product markets</li> </ul>
Quality	<ul style="list-style-type: none"> <li>• observation: feel, smell, appearance</li> <li>• what are the best methods and conditions for storing cassava product?</li> <li>• when selling, do you receive higher prices for cassava products of higher quality?</li> <li>• what quality attributes receive the best prices?</li> </ul>	Data on <ul style="list-style-type: none"> <li>• actual storage practices</li> <li>• existence of quality price premium</li> <li>• the degree to which price incentives extend along the chain</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• on average, how long do you store the cassava product before you sell it?</li> <li>• if the processor stores for long periods, ask why? (This will reveal if the processor stores seasonally in order to make a profit)</li> <li>• if the processor does not store for long periods, ask why not? (this will reveal whether the reasons are related to price, liquidity or technical storage issues)</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• weekly/monthly time series wholesale price data. (from which to derive seasonal price patterns)</li> </ul>
Storage risk	<ul style="list-style-type: none"> <li>• do you experience cassava product storage losses?</li> <li>• if yes, what are the major causes of cassava product storage losses (both in terms of quality and quantity)?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• storage losses</li> </ul>
Profitability	<ul style="list-style-type: none"> <li>• how profitable is cassava product processing compared with other products?</li> <li>• What is the current difference between your buying and selling price of cassava product? how do we account for added value here?</li> <li>• What is the usual difference in your buying and selling prices? (if the difference varies greatly, the processor's answer will reveal information on price risk)</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• profit margins</li> <li>• trading margins (difference between buying and selling prices)</li> </ul>
Handling, sorting, and packaging	<ul style="list-style-type: none"> <li>• observation: does the processor sell the product in different quality grades?</li> <li>• do you buy the raw materials for making cassava product in different grades?</li> <li>• do you sort the cassava product into different grades?</li> <li>• what sort of packaging do you use?</li> <li>• why do you use that type of packaging?</li> </ul>	Data on: <ul style="list-style-type: none"> <li>• grading</li> <li>• packing materials</li> </ul>

## Methodologies for processors (contd)

Issue	Primary information	Secondary information
Transportation	<ul style="list-style-type: none"> <li>do you transport the raw materials or the processed products at all?</li> <li>if yes, do you transport just for yourself or do you transport for other people as well?</li> <li>if the processor only transports for himself, ask why do you operate your own transport?</li> <li>if you feel that it is appropriate, ask questions relating to transporters</li> </ul>	
Liquidity	<ul style="list-style-type: none"> <li>do you use credit or borrowed money? (refer to our list of different types of credit, covering both formal and informal sources)</li> <li>if yes, try to distinguish between money that is being borrowed for fixed capital (processing equipment, production shed, drying platform) and for working capital (raw materials, marketing, milling, and transporting costs)</li> <li>if the processor does not use credit, ask if credit or borrowed money available (try to distinguish between credit for fixed capital and for working capital)</li> <li>if yes, ask why don't you use credit or borrowed money?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>availability of credit, both for fixed and working capital for processors</li> <li>contact EDF microfinance for small-scale processors</li> </ul>
<p>Sources of credit:</p> <ul style="list-style-type: none"> <li>Bank</li> <li>Association/Group/Union</li> <li>Microcredit institution</li> <li>Friends and relatives</li> <li>Trading partner</li> <li>Informal money lender</li> </ul>		
Credit to buyers (this will inform us on the extent to which trust exists in the chain and also give insights to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>do you offer credit to the people who buy cassava product from you?</li> <li>if yes, why do you let them have credit?</li> </ul>	
Credit from sellers (this will inform us on the extent to which there is trust in the chain and also give us an insight to the existence of interlocking markets)	<ul style="list-style-type: none"> <li>do you receive credit from the people who sell raw materials used for making cassava product to you?</li> <li>if yes, why do they let you have credit?</li> </ul>	<p>Available information on:</p>
Competition (remember that we will be able to judge competitiveness through profit margins)	<ul style="list-style-type: none"> <li>observation: does the number of and activity among processors give the impression that competition is strong?</li> <li>are there any conditions that you have to fulfill before you enter processing? (question relates to barriers to entry)</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>processor margins</li> </ul>
Institutional constraints (remember that this includes cultural constraints)	<ul style="list-style-type: none"> <li>how do the actions of the government/local authorities/trade associations/individuals/religious groups affect your business?</li> </ul> <p>These relate to taxes, licence fees, local taxes, etc.</p> <ul style="list-style-type: none"> <li>how do you choose the people that you do business with?</li> </ul>	<p>Data on:</p> <ul style="list-style-type: none"> <li>excessive institutional constraints on processors</li> </ul>

## Methodologies for processors (contd)

Issue	Primary information	Secondary information
Skills	<p>Observation:</p> <ul style="list-style-type: none"><li>• does the processor keep business/processing records?</li><li>• how did you learn to become a processor?</li><li>• have you ever received any special training in processing?</li><li>• what is the highest level of education that you attained?</li><li>• do you keep records on financial and production activities?</li></ul>	
Innovation	<p>Try to discover whether the processor actively participates in:</p> <ul style="list-style-type: none"><li>• producers associations (get description of associations)</li><li>• seeking to supply new markets</li><li>• responding to changes in market requirements (including quality)</li><li>• vertical integration</li><li>• interlocking markets</li><li>• knowledge of cost minimization and profit maximization</li></ul>	<p>Data on:</p> <ul style="list-style-type: none"><li>• innovation among processors</li></ul>
Information	<p>How do you obtain information on:</p> <ul style="list-style-type: none"><li>• grades and quality of products required in the market (high, medium, low)?</li><li>• prices in your own market?</li><li>• prices, supply, and demand in other markets?</li><li>• improved storage techniques?</li><li>• others?</li></ul>	

## About FOODNET

The FOODNET project is a regional agricultural research and development network focusing on market-oriented research and sales of value-added agricultural products.

The overall project goal is to strengthen regional capacity in value-added, agro-enterprise technologies for increased income, improved nutrition, and sustainable food security in eastern and central Africa.

The project purpose is to identify market opportunities for existing and novel, value-added products, and optimize appropriate postharvest technologies to enhance the income-generating capacity of small- and medium-scale entrepreneurs from the private sector and promote products to improve nutrition.

FOODNET project partners are ASARECA networks, national programs, universities, international agricultural research centers, NGOs, CBOs, farmers, processors, manufacturers, and other agricultural sector stakeholders within the ASARECA region.

Researchers working with FOODNET use market survey techniques to identify market opportunities and work in close collaboration with a range of public and private sector partners to develop agroenterprise projects, using innovative postharvest technologies and products to supply both new and existing markets.

Agroenterprise activities will be developed using commercial models through the integration of market studies, improved technologies, and the development of partnerships with the various agents involved in the production to sales marketing chain.

To build capacity in this type of research, the network seeks to strengthen links between the private and public sector agencies and provide regional training in market studies and agroenterprise development to accelerate the process of change towards market-oriented research.

### **Project objectives are to:**

- Identify market opportunities for increased sales of value-added products.
- Identify varieties with specific nutritional/processing qualities for germplasm enhancement.
- Identify, adapt, and promote improved postharvest technologies with private sector partners.
- Diversify product range from locally available crops for market expansion and improved nutrition.
- Provide training to strengthen the capacity of the network to deliver profitable agroenterprises.
- Develop postharvest information systems for increased access and exchange of information.
- Catalyze the process of change from production to market-oriented research in partnership with ASARECA networks and private sector partners.
- Enhance local, regional, intercenter, and international cooperation in postharvest activities.

## About IITA

The International Institute of Tropical Agriculture (IITA) was founded in 1967 as an international agricultural research institute with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers known as the Consultative Group on International Agricultural Research (CGIAR), formed in 1971.

IITA's mission is to enhance the food security, income, and well-being of resource-poor people primarily in the humid and subhumid zones of sub-Saharan Africa, by conducting research and related activities to increase agricultural production, improve food systems, and sustainably manage natural resources, in partnership with national and international stakeholders. To this end, IITA conducts research, germplasm conservation, training, and information exchange activities in partnership with regional bodies and national programs including universities, NGOs, and the private sector. The research agenda addresses crop improvement, plant health, and resource and crop management within a food systems framework and targeted at the identified needs of three major agroecological zones: the savannas, the humid forests, and the midaltitudes. Research focuses on smallholder cropping and postharvest systems and on the following food crops: cassava, cowpea, maize, plantain and banana, soybean, and yam.