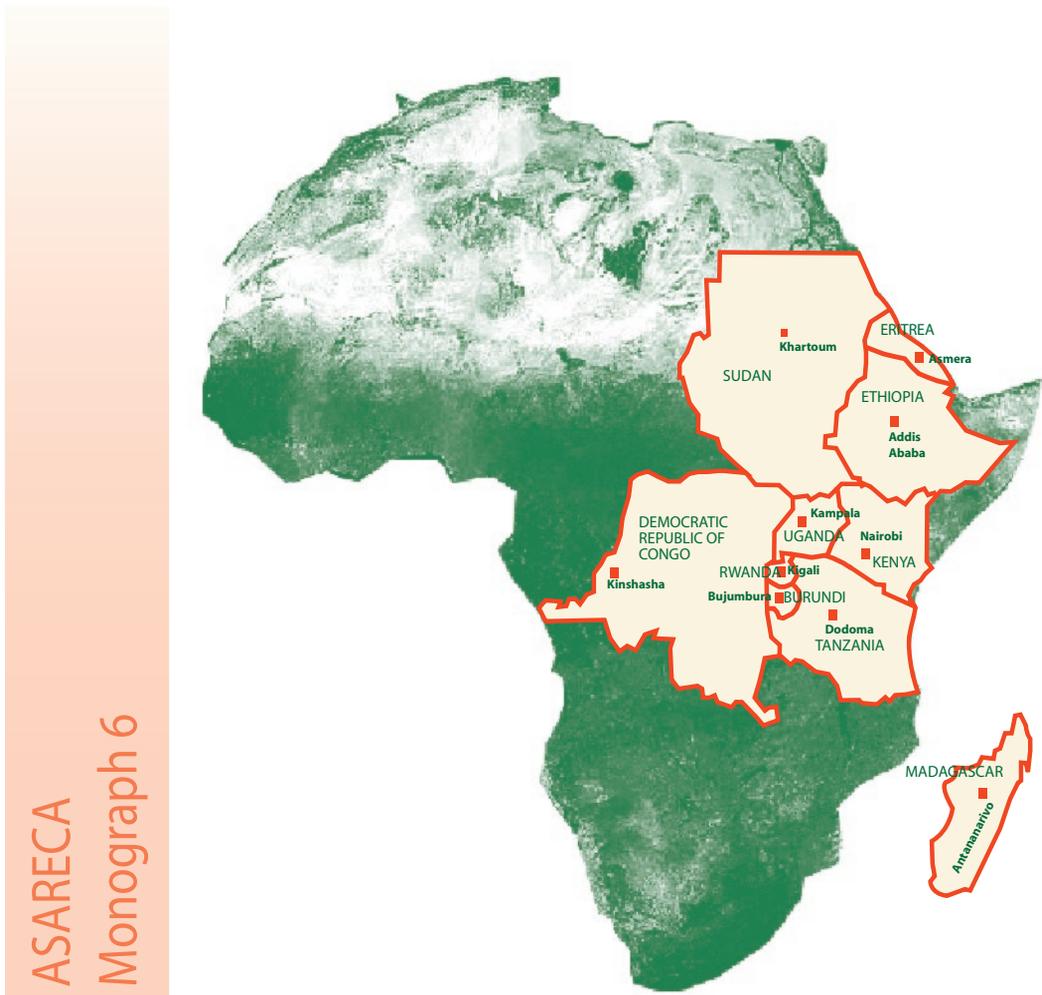


Transaction Cost Analysis for Selected Crops with Export Potential in Uganda

C. Collinson, U. Kleih, D. Burnett, A. Muganga,
J. Jagwe, and R.S.B. Ferris



Association for Strengthening
Agricultural Research in Eastern
and Central Africa



Foodnet

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International Institute of
Tropical Agriculture

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R.S.B. Ferris

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Acronyms and abbreviations

AT	appropriate technology
CARE	Co-operative for Relief Everywhere, NGO
CTA	Technical Centre for Agricultural and Rural Co-operation, ACP-EU
CDO	Cotton Development Authority
CIF	cost, insurance and freight
CMB	Coffee Marketing Board
COMPETE	This is a bilateral project funded by USAID—Uganda to support increased competitiveness of specific commodities, particular those export-based. Implemented by Carana Associates.
COP	cost of production
DAO	District Agricultural Officer
DANIDA	Danish International Development Agency
DCO	District Commercial Officer
DDA	Dairy Development Authority
DFID	Department for International Development (UK)
FAO	Food and Agriculture Organization
FAQ	fair average quality
FCE	farmer controlled enterprises
FEWS	Famine Early Warning System
FOB	free on board
FOR	free on rail
FOT	free on truck
GoU	Government of Uganda
ICA	International Coffee Agreement
IDEA	Investment in Developing Export Agriculture, USAID-funded
IITA	International Institute for Tropical Agriculture
IMT	intermediate means of transportation
LIBOR	London Interbank Offered Rate
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoFPED	Ministry of Finance, Planning and Economic Development
MIS	market information services
MTTI	Ministry of Trade, Tourism, and Industry
MTCS	Medium Term Competitiveness Strategy
MWTC	Ministry of Works, Transport and Communications
NAADS	National Agricultural Advisory Services
NALG	Nakisenhe Adult Literacy Group
NARO	National Agricultural Research Organisation
NGO	nongovernmental organization

NRI	Natural Resources Institute (UK)
PAF	Poverty alleviation fund
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernisation of Agriculture
RAFU	Road Agency Formation Unit
RBD	refined, bleached, and deodorized
RSDP	Road Sector Development Program
SAARI	Serere Agricultural and Animal Production Research Institute
SGS	Société Générale de Surveillance
SPEED	Bilateral finances project funded by USAID—Uganda and implemented by Chemonics.
SSA	sub-Saharan Africa
TOR	terms of reference
UCDA	Uganda Coffee Development Authority
UEB	Uganda Electricity Board
UGCEA	Uganda Cotton Exporters Association
UGEA	Uganda Grain Exporters Association
UGT	Uganda Grain Traders Limited
UNCA	Uganda National Coffee Association
UNTF	Uganda Coffee Trade Federation
UNDP	United Nations Development Program
UNFA	Uganda National Farmers Association
UNGA	(Swahili) Flour. The main milling company in Kenya, now operated by Seaboard.
URTD	Uganda Rural Training and Development, NGO
USAID	United States Agency for International Development
WRF	warehouse receipt financing
Exchange Rate (February 2002) US\$1 = Ush 1730	

Note:

Cess: a kind of rate or tax. Now the term used for specific types of export taxation that are used to fund commodity promotion/regulatory boards.

Executive summary

The Transaction Cost Analysis study was commissioned by the Ministry of Finance, Planning and Economic Development (MoFPED) on behalf of the Marketing and Agroprocessing Subcommittee of the Secretariat for the Plan for the Modernisation of Agriculture (PMA). It was carried out between 14 January 2002 and 11 March 2002 by a consultancy team from the Natural Resources Institute (NRI), UK and IITA's Eastern and Southern Africa Center (IITA–ESARC), Kampala.

The study focused on the analysis of marketing and transaction costs¹ along the marketing chain, from the farm gate to tertiary markets (domestic and export), of the following six key strategic commodities/product groups identified by the PMA: cassava, coffee, cotton, dairy products, fish, and maize.

The key objective of the study was to recommend implementation plans that would overcome constraints to marketing and processing efficiency and improve farm-gate prices to smallholders. The improvement of prices received by poor farmers is a specific aim related to the broader strategy of the PMA that emerged from the Poverty Eradication Action Plan (PEAP), encouraging the growth of commercial farming amongst the rural poor and halting a shift to subsistence agriculture.

Our terms of reference covered the baseline assessment of marketing, processing, and transaction costs, tactics, and strategies for improving efficiency, the assessment of alternative approaches to reducing costs, the recommendation of an implementation plan to the PMA, and further technical assistance studies.

Following a review of relevant literature and inception activities in Kampala, we carried out field visits in key regions of the country relevant to the study's six subject commodities/product groups. Our analysis, findings, and recommendations are the result of fieldwork and consultations with key stakeholders in the public and private sectors. Numerous interviews were conducted with representatives of government, public sector monitoring and regulatory bodies, agricultural research institutions, private sector businesses, farmers' groups, and individual small-scale farmers.

The final report contains an introduction, followed by a section on marketing and transaction cost issues that are common to two or more of the six commodities covered in the study, i.e., crosscutting issues. Commodity-specific sections follow, dealing with supply and demand, the marketing chain, marketing cost analysis, constraints and opportunities

¹According to neoclassical economics and more recently, new institutional economics, transaction costs relate to the nonprice costs of making a commercial exchange. So, for instance, the expenses incurred in finding someone to trade with, time spent negotiating a deal, and the costs involved in ensuring that contracts are honored, all fall within the general category of transaction costs. In the traditional sense, agricultural marketing refers to the activities involved in taking a product from the farm gate and delivering it in the form, at the time, and to the place that the buyer requires. Such costs are, therefore, incurred through handling, transport, storage, processing, packaging, market fees, risk management, brokerage, export handling, and others.

to marketing and transaction cost efficiency, the raising of farmers' incomes, a summary of findings, and a recommended implementation plan. The study's key findings and recommendations were presented at a stakeholders' workshop held in Kampala on 15 March 2002, and are summarized hereunder.

The rest of this summary is organized as follows. The next section gives brief overviews of the key findings from our fieldwork and analysis. The final section (Recommendations and Action Plans) is presented in the form of a matrix, in which our recommendations are prioritized, justified, and assigned implementation activities.

Key findings

Crosscutting issues

Those issues affecting transaction cost efficiency and common across the spectrum of the commodities covered by the study are, for the most part, the subject of existing action by the Government of Uganda (GoU), and support by the donor community. Key areas requiring ongoing and additional support are as follows.

Producer bargaining power

Poor farmers can improve their bargaining power by grouping to pool their produce, thus achieving economies of scale in their transactions and marketing activities. The formation of farmers' marketing groups (also known as Farmer Controlled Enterprises or FCEs) enables produce to be sold to stakeholders further up the marketing chain, eliminating at least one level of middlemen and thus achieving better net farm-gate prices. Furthermore, FCEs encourage the improvement and standardization of quality to meet the more onerous contractual quality specifications demanded by larger buyers. Research conducted in Uganda and other countries in sub-Saharan Africa reveals the following attributes common to successful FCEs.

- Groups evolve from within the farming community and are self-selecting.
- Groups are genuinely democratic.
- Group activities are relatively simple, and within the capacity and capability of the members.

Without the development and involvement of FCEs in the marketing of all the strategic commodity and product groups that were the subject of the study, we believe that it will be very difficult for improved transaction cost efficiencies to result in better farm-gate prices.

Road infrastructure and transport

Much progress has been made on improving main roads, feeder roads, and in maintenance and administrative efficiency. However, further action is required in the following areas.

- Improvement of urban and community access roads.
- Maximization of vehicle operating efficiency.

- Consolidation of institutional changes at district level.
- Introduction of intermediate means of transport to reduce rural transport costs.

Poor maintenance or the lack of rural access roads to farming communities, together with unsuitable and insufficient intermediate transport, particularly during the rainy season, can result in postharvest crop losses due to farmers' inability to access markets regularly.

Inland international freight

Uganda, as a landlocked country, faces severe problems in maintaining its competitiveness in the export market due to the high cost of inland international freight and forwarding. This issue particularly affects the transaction cost efficiency of commodities such as coffee and cotton. Freight rates to Mombasa have declined substantially over the last five years, due mainly to an increase in competition among shipping and forwarding companies. However, the high cost of internal international freight remains a very significant element in export marketing costs. In both the coffee and cotton sectors, further reductions in internal international freight and forwarding costs will benefit farm-gate prices. However, progress in this area is largely dependent on greater efficiencies in the operation of the Ugandan and Kenyan railway networks. Although the privatization of Uganda Railways is proceeding, cooperation at the regional level is necessary to realize significant transaction cost efficiencies. The combination of export volumes and the negotiation of joint freight agreements by exporters also offer the opportunity of effecting overall freight cost reductions in the cotton and coffee sectors. In this context, the negotiation of optimal rates for air freight is also the key to transaction cost efficiency in the fish sector.

Finance for agricultural trade and agribusiness

The high cost of borrowing and the unavailability of long-term finance are a severe constraint to transaction cost efficiency and to investment in the agriculture, livestock, and fisheries sectors. The problem of access to finance being most severe in rural areas, high interest rates together with high margins between borrowing and lending rates suggest inefficiency in the banking sector. This is an area requiring further investigation.

Market information

It is encouraging that schemes and programs to improve and disseminate market price information to rural areas are currently in place and expanding. For example, IITA–Foodnet through its Micro-MIS service, and the recently introduced MTN phone market information service both have the aim of providing information to rural areas and to farmers in particular. In the case of export commodities such as cotton and coffee, prices at the farm-gate level are not transparent. Further information should be made available to farmers to enable them to understand how bodies such as the Cotton Development Organization (CDO) and the Uganda Coffee Development Authority (UCDA) calculate indicative levels.

Electricity supplies

Whilst cost and availability of supply were identified as basic problems in many areas of the country, the unreliability of supply, necessitating the provision of standby generator facilities, is a major constraint in some sectors. The processing and storage of perishable products such as fish and milk require reliable cold stores, and the installation of new generating capacity in rural areas by both the GoU and the private sector is to be encouraged.

Local taxation

Systems of rural taxation have been identified in a recent academic paper as a major market distortional factor in primary product trade. This area, whilst undoubtedly a contributory factor in transaction cost inefficiency, should not, in our opinion, be exaggerated. Therefore, we have not given it a high priority in implementing the PMA.

Contract enforcement

Improved contract enforcement regulations, particularly at rural level, will reduce trading risks and encourage greater transaction cost efficiency. The GoU is addressing this issue through its medium-term competitiveness strategy, and institutional arrangements need to be put in place to assist in the spread of contract benefits to rural areas, where adoption is likely to be slower than in urban environments.

Commodity-specific issues

The comments above regarding crosscutting issues; findings, and recommendations are generally applicable to the specific commodity findings detailed below.

Cassava

Cassava is a major staple food in Uganda and consumed either in dried flour or fresh form. Its importance as a contribution to food security outweighs its role as an income generating commercial crop. The current market situation is characterized by glut, with very low farm-gate prices. Farmers receive only approximately 15–25% of the final retail price in Kampala, which is the country's most important urban market. In common with other nontraditional export agricultural crops, factors that contribute to this situation include the lack of economies of scale at producer and retailer levels, marketing and transaction cost inefficiencies in transport, processing, and postharvest handling. Compared to dry cassava, the marketing chain for fresh roots is more streamlined. This is primarily due to the perishable nature of fresh roots.

Coffee

World prices for *robusta* coffee have been historically low and declining since the collapse of the economic clauses of the International Coffee Agreement in 1989. This situation has also been exacerbated by oversupply caused, particularly, by the expansion of *robusta* production in Vietnam. One result of long-term low prices is that stakeholders are

encouraged to make greater efforts to improve market efficiency and reduce transaction costs in order to maintain margins. This situation is evident in Uganda where, for the most part, coffee supply chains are reasonably competitive and efficient. The limited time available during the study did not reveal any specific areas within the supply chain where the potential exists for major and significant reductions to transaction costs. However, low producer prices near or below cost of production threaten the long-term sustainability of the sector. Therefore, the best opportunities for cost reductions come from general improvements in internal and inland international transport costs, and a refocus of marketing strategy to include the exploitation of the growing speciality (organic, shade/bird friendly, fair trade and gourmet) coffee markets, and the potential for washed robustas. Following the liberalization of the sector in the 1990, there are no particularly significant policy, regulatory, and institutional constraints within the coffee sector, and the UCDA is playing a valuable role in monitoring, regulating, and promoting the industry. It was found that the price formation at farm-gate level is currently not properly explained or transparent.

Cotton

Cotton production at current national average yields and farm-gate prices is unprofitable for farmers in many parts of the country and future profitability will be dependent on improved efficiencies in production, marketing, and processing, enabling economically viable farm-gate prices to be paid. The profitability of the cotton enterprise to farmers is essential for long-term sustainability and expansion and we consider that this is the key issue facing the sector. Farm-gate prices are not transparent and the indicative price advised by the CDO remains in force for a whole season despite fluctuations in global levels.

Substantial national ginnery overcapacity exists and factory units tend to be old with, in many cases, outdated technology. A national strategy for the rationalization of the size and location of ginneries is essential to achieve sustainability and growth of the sector.

The value-added sector is very small, underfinanced, and unable to take advantage of the opportunities presenting themselves in the textile and oil-milling sectors.

Dairy products

With one or possibly two exceptions, Uganda's formal dairy processing factories are currently unprofitable. A return to profitability in this sector is dependent on increasing the utilized capacity of processing factories. The distribution costs of the informal sector are considerably lower than those experienced by the formal sector and lessons can be learned by the formal sector in this regard.

Profitability in the informal milk wholesale sector is restricted to those operators who have invested in urban-based milk-cooling facilities.

Little is known with certainty about dairy consumption in terms of volumes, consumer preferences, perceptions, and willingness to pay for value-added products.

The export of Ugandan UHT milk is constrained by quality problems mainly caused by the company's financial losses and consequent inability to maintain standards.

Farmers' associations that bulk and cool milk can be financially viable in certain geographic locations.

Fish

Insufficient information exists on domestic and regional trade in fresh and processed fish.

Most fishermen are in weak bargaining positions due to their remote locations and inability to store fish. The only sustainable way of improving fishermen's bargaining positions is to encourage marketing associations.

Profits in the transport boat business are high, even when adjusted for risk. This suggests the existence of anticompetitive practices at this level of the supply chain, although how practices are maintained is not clear. However, competition in other parts of the supply chain appears to be healthy.

Postharvest rejection rates for export are coming down and are probably not as high as generally perceived. However, there is almost certainly still room for improvement at all levels of the supply chain in terms of fish handling and storage.

Several export processors are experimenting with ways of adding greater value to their outputs. In time, all factories will have to adopt similar practices to remain competitive.

Large amounts of export revenues from fish, flowers, and fresh produce are lost to Uganda because air freight rates are not competitive. Rates can be significantly reduced if competition between scheduled carriers can be increased and the cost structure at Entebbe can be reduced.

Maize

Whilst maize is not a traditional staple food crop for Uganda's population, it plays an important part in the rural and urban diet and has the potential to become more popular. Following the liberalization of the grain sector, there are no significant policy, regulatory, or institutional constraints to the development of the sector. However, in order to realize the potential to develop a vibrant domestic and export market, it will be necessary to institute a formal maize marketing structure. This will involve finance for investment and working capital, the establishment of national standards, and a suitable regulatory framework for the introduction of an authoritative price determination point, e.g., a commodity exchange and warehouse receipt-financing techniques.

Recommendations and action plans

Prioritization of the recommendations is given, using the following key.

- A: Highest priority, either because of the direct and large benefit that farmers will experience or because of the recommendation's critical importance to policy-making.
- B: Medium priority. Farmers will benefit from implementation but other initiatives need to be taken before the full impact can be felt.
- C: Lowest priority. The impact on farmers will not be great, at least in the current marketing environment.

Crosscutting issues				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	Farmer organization	Government support for the creation of farmer-controlled enterprises (FCEs).	<p>Increased farm-gate/ landing-site prices through enhanced farmer/fishermen bargaining power and value added.</p> <p>Although difficult to achieve in practice, effective farmer organization would have a direct impact on raising farmer /fishermen's incomes and encouraging a more commercial approach to production.</p>	<p>PMA, National Agricultural Advisory Services (NAADS), Uganda National Farmers Association (UNFA), subsector development authorities, and other responsible organizations meet to resolve the apparent overlap in roles and activities regarding support to farmer/fishermen's organizations. The meeting should decide the most appropriate approach to coordinating support. The options are:</p> <ol style="list-style-type: none"> 1. "One size fits all" —one organization that caters for all renewable natural resource sectors and subsectors. <ul style="list-style-type: none"> • an organization for each subsector. • a combination of the above with appropriate linkages and defined roles. 2. With PMA support, NAADS and subsector development authorities develop and deliver a campaign designed to raise awareness among farmers and fishermen of the benefits of group-controlled enterprises. 3. Simultaneously, NAADS and its development authority partners seek donor support for a coordinated program of capacity building among farmer/fishermen-controlled enterprises. 4. National and international expert organizations invited to tender for a program that would design and deliver capacity building services and fit in with the coordinating structure decided in "1" above. The principle of voluntary association among farmers/fishermen would be paramount.

Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	Transport	Community access roads should be given priority in future programs for transport infrastructure investment programs.	<p>Research conducted in several sub-Saharan countries by the Transport Research Laboratory UK reveals that the cost-effectiveness (reduction in transport costs per unit investment) of community access roads is greater than for any other type of road, including trunk and feeder roads.</p> <p>The benefits to farmers of investment in community access roads will be felt directly through greater market access and decreased transport costs.</p>	<p>The PMA commissions research to gather evidence of the cost-effectiveness of investments in community access roads in Uganda.</p> <p>The PMA uses the research findings to lobby the Ministry of Works, Housing and Communications (MWHC), the World Bank, and other donors to give greater emphasis to community access roads in future investment plans.</p>
A	Transport	Intermediate means of transport (IMT) should be encouraged.	<p>At the village level, head loading is time-consuming and limited in range, while four-wheeled motorized transport is usually prohibitively expensive. The introduction of IMT (such as bicycles, pack animals, animal-drawn carts, motorcycles, and single-axle tractors) has the potential to increase market access and reduce marketing costs to farmers.</p>	<p>PMA sponsors a series of practical IMT demonstrations around the country, raising awareness of the possibilities of increasing the efficiency of village-level transport. PMA and supporting donors create a fund designed to support workable business plans submitted by potential IMT service providers.</p>
A	Inland international freight	Regional cooperation with Kenya and Tanzania on rail and ferry policy should be established.	<p>A seamless rail and ferry network will unlock further substantial efficiencies in inland freight handling and transport. The purpose for the PMA would be increased farm-gate prices to producers of exported commodities that have efficient and competitive domestic supply chains (e.g., coffee).</p> <p>The impact on farmers will be indirect but should be felt quickly in the coffee and, probably, cotton sectors.</p>	<p>MoFPED and the World Bank (or possibly the African Development Bank) coordinate an interorganizational rail and ferry task force involving Uganda Railways (or the private management company) and the Ministry of Works.</p> <p>The task force initially reviews proposals on regional rail and ferry integration made in the 1999 consultant's privatization report (available from Uganda Railways).</p> <p>The task force develops practical proposals for greater cooperation/integration between Ugandan, Kenyan, and Tanzanian rail and ferry organizations. Funding a feasibility study may be required.</p> <p>With the backing of the World Bank HQ in Washington, proposals shared with counterpart organizations in Kenya and Tanzania under the banner of the East African Community (EAC).</p> <p>Senior-level conference organized by the EAC and backed by the World Bank.</p> <p>Optional—Issue of privatization of Port of Mombasa raised with Kenyan government (if handled correctly, privatization would lead to further substantial cost efficiencies, part of which would be passed back to producers).</p>

Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	International air freight	Implementation of Civil Aviation Authority (CAA) air freight cost reduction strategy	<p>Substantial reductions in the cost of air freight to make Entebbe at least as competitive as other international airports in the region.</p> <p>This applies particularly to the Ugandan fisheries industry but also to the horticultural industry (which has the potential to be a major employer in Uganda).</p>	<p>MoFPED, Ministry of Works, CAA, and the “export competitiveness strategy” donors (World Bank, EC, USAID, and DFID) meet to discuss how CAA plans for reducing air freight charges can be implemented. The plans are outlined in “Expansion of Exports out of Entebbe International Airport” (2000), available from CAA and summarized in this report.</p>
A	Inland international freight	Joint Exporters’ Freight Agreement (JEFA)	<p>The ability to negotiate reduced freight rates with freight forwarders and shipping companies through pooling exports will increase export revenues to Uganda and increase farm-gate prices for commodities that are served by efficient and competitive supply chains.</p> <p>Note that some foreign-owned exporting companies are unlikely to join because of the power they hold in negotiating their own concessionary freight rates. The impact on coffee farmers, for instance, should be quick because of the strong positive correlation between export and farm-gate prices.</p>	<p>PMA, UCDA, Ugandan Cotton Development Organization UCDO, and relevant private sector organizations meet to discuss cooperation in coordinating JEFA proposals. Export Promotion Authority (EPA) approached to assess the possibility of using Export Credit Guarantee Funds to persuade exporters to switch from selling fof/fob Kampala (or ginnery, in the case of cotton) to either fob Mombasa or cif destination port. PMA, UCDA, UCDO, private sector representatives and EPA develop a set of JEFA proposals to put to exporters. Proposals circulated to relevant exporters and shipping companies prior to a workshop.</p>
B	Market information	More information should be disseminated directly to farmers. Information on export commodities should be updated daily, possibly using indicative farm-gate prices for coffee and cotton, based on a voluntary, mutually agreed, and regularly updated formula covering costs from cif to farm gate.	<p>Market information helps to enhance farmers’ bargaining position. However, to have a full effect, improved market information must be complemented by other actions designed to strengthen bargaining position, most notably, the voluntary establishment of FCEs.</p> <p>The information required already exists. The challenge is to deliver it in an affordable manner to farmers.</p>	<p>Foodnet reviews its Macro- and Micro-MIS activities (already planned), and MTN is invited to report on the uptake of its subscriber service. PMA commissions a survey on how farmers use the market information, in what form they prefer it to be delivered, and what improvements they would like to see. PMA commissions a study on the feasibility of introducing farm-gate price formulas for coffee and cotton. PMA uses outputs from 1, 2, and 3 to develop a coherent strategy for government support to market information services.</p>

Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
B	Finance for agricultural trade and agribusiness	Developments in warehouse receipt financing (WRF) proposed under the Export Competitiveness Strategy should be extended to include coffee and cotton.	<p>WRF helps to improve liquidity in rural areas, which in turn means a greater number of business transactions and more opportunities for making profit. The benefits can reach farmers either directly (through the ability to raise finance against their harvested crops and the opportunity to sell produce at the most remunerative time) or indirectly through greater liquidity among traders.</p> <p>One WRF initiative already exists (a UN regional project managed from Nairobi, principally concerned with coffee and cotton) and another is proposed (under the Export Competitiveness Strategy, principally concerned with maize). These initiatives need to be brought together.</p>	<p>1. PMA holds discussions with the UN WRF project, the Ministry of Tourism, Trade and Industry (MTTI) its contact Ministry in Uganda, MoFPED, and the Export Competitiveness Strategy donors (World Bank, EC, USAID and DFID), to integrate approaches to WRF.</p>
C	Rural contract enforcement	In the context of the Medium Term Competitiveness Strategy (MTCS), it is important that institutional arrangements for improved contract enforcement should reach rural levels.	<p>Improved contract enforcement could provide farmers and rural traders with the possibility of using new types of transaction that allow exchange to be dislocated over time and place.</p> <p>However, the importance of introducing contract enforcement should not be overstated. Many other initiatives need to be firmly established before rural contract enforcement becomes a constraint.</p>	Bodies implementing PMA and MTCS should meet periodically to monitor the impact of the new contract enforcement measures in rural areas.

Commodity-specific issues and key findings.

Coffee				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
B	Overseas marketing	Ugandan speciality <i>arabica</i> and washed <i>robusta</i> should be promoted in overseas markets.	<p>Although not strictly within our terms of reference, the creation of strong Ugandan brand images within coffee consumers' minds will help to promote strong positive price differentials for Ugandan quality coffee on London and New York exchanges.</p> <p>Efficiency and competition within the coffee supply chain will mean that the price premiums will be passed on to farmers proportionately.</p>	<ol style="list-style-type: none"> 1. MoFPED and UCDA commission study to investigate how other countries/origins promote their coffees in Europe and the USA. 2. MoFPED and UCDA develop and implement a cost-effective strategy for promoting Ugandan coffee.
A	Review of current proposals	Plans to introduce a Ugandan coffee auction and widespread <i>robusta</i> wet processing should be subjected to critical analysis before the go-ahead.	The intention behind these two initiatives is to stimulate market prices received by farmers. However, we have so far seen no convincing evidence to suggest that this ambition will be turned into practice using these methods.	<ol style="list-style-type: none"> 1. UCDA commissions a feasibility study that will assess the following. <ul style="list-style-type: none"> • The costs and benefits of a voluntary Ugandan coffee auction, paying particular attention to a realistic assessment of the potential volume of transactions and the additional costs that the auction would create. • The international market for washed <i>robusta</i>, focusing on the size of the market, price differential premiums and the danger that increased Ugandan production may influence the current differentials.
B	Centralized pulperies	The centralized pulperies system at the village and urban levels, widely used during the coffee cooperative period, should be assessed for <i>arabica</i> wet milling.	Ensuring high quality is one of the few ways of getting a higher return during current times of depressed coffee prices. Individual farmers are unwilling to invest time in producing better quality <i>arabica</i> because other activities are more remunerative and traders are unlikely to offer price premiums for small quantities of high quality <i>arabica</i> offered at the farm gate. Centralized pulperies may offer potential for exploiting economies of scale in producing higher quality <i>arabica</i> . Pulperies could be under grass-roots control and hence the benefits could fall directly to farmers and their communities.	<ol style="list-style-type: none"> 1. UCDA commissions cost-benefit analysis of introducing centralized pulping for <i>arabica</i> wet milling.

Cotton				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	Ginneries	A feasibility study should be conducted on a national strategy for rationalizing the size and location of ginneries.	<p>Our fieldwork and background reading revealed that substantial underutilized capacity exists within the cotton-ginning sector and that it uses old technology and is inappropriately located in relation to production areas.</p> <p>These causes of inefficiency impose costs on the farmer in terms of lower farm-gate prices.</p> <p>There may be a case for government to provide incentives for moves towards a more rational ginning sector in terms of size and location.</p>	<p>1. MoFPED, Ministry of Agriculture, Animal Industries and Fisheries (MAAIF), and UCDO commission a feasibility study on the rationalization of the ginneries sector, learning from experiences in other countries (for instance, the Sri Lankan tea industry). If the study concludes that rationalization would bring about worthwhile increases in farm-gate prices, guidance should be given on the nature and value of the government incentives that would be required to make industry act.</p> <p>2. MoFPED, MAAIF, PMA, and UCDO review the study report and decide whether or not the recommendations are PMA-compliant in terms of the role of government in effecting commercial change.</p>
A	The role of the UCDO should be assessed to ensure the appropriate level of GoU support to the subsector.		<p>The UCDO was established to resurrect the Uganda's crippled cotton industry. That aim has now largely been achieved.</p> <p>The existence of the UCDO involves a fiscal burden on the cotton industry that ultimately means lower prices for farmers. We believe that the time is now appropriate to review the roles and responsibilities of the UCDO to ensure that they are appropriate and that the industry is getting best value for money.</p>	<p>1. MoFPED and MAAIF commission a study and request the cooperation of UCDO.</p>

Fish				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	Domestic and regional fish trade	Research on trade flows, costs, and margins should be conducted and the results disseminated to policymakers.	Domestic and regional trade in fresh and processed fish is almost certainly large and probably supports the livelihoods of many poor people. However, little is known by policymakers about this trade, and policies designed to curb these activities are currently being made in a knowledge vacuum.	<ol style="list-style-type: none"> 1. The EC and DFID ensure that their current fisheries projects generate the required marketing information on domestic and regional fish trade. 2. Information is disseminated to policymakers within the Department of Fisheries (or the Agency, when it is established). 3. Donor support is given to the process of formulating a rational and pro-poor policy towards domestic and regional fish marketing.
C	Postharvest rejection rates	The possibility of introducing minimum standards for transport boats should be investigated to ensure that rejection rates are kept to a minimum.	<p>The formal fish export industry pays considerably more for its fish than does either the domestic or regional market. Any move towards increasing the proportion of the catch that can be exported therefore has the potential of generating greater incomes for fishermen.</p> <p>However, competition between the transport boat operators is low and consequently higher returns may not be passed proportionately on to fishermen. Any moves towards improving standards of transport boats must therefore not impose financial barriers to entry to the business, thereby further reducing competition.</p>	The Department of Fisheries (or the Agency) investigates the possibility of creating standards that will be cheap to implement and easy to enforce.
B	Postharvest rejection rates	Large European fish importers should be approached to request contributions to a fund that would be used to teach fishermen, transport boat employees, and landing site laborers good practice in storing and handling fish.	Purpose and justification as above.	<ol style="list-style-type: none"> 1. Department of Fisheries seeks assistance from fish exporters in contacting major fish importers. 2. Fund established to train fisheries industry personnel. 3. Training program put out to tender.

Maize				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
A	Maize quality and contracts	A national system of standardized grain quality and contract standards should be implemented.	<p>Although not a major maize consumer itself, Uganda has the natural resources required to produce large quantities of high quality maize for trade within the region. Unfortunately, the current situation is typified by insufficient quantities of poor quality maize that do not meet regional standards.</p> <p>Farmers and traders need incentives to produce better quality maize. The introduction of national maize quality standards that reflect regional requirements will establish price premiums for higher quality maize. It will also help to establish Uganda as a credible regional maize producer and stimulate demand for the Ugandan crop. Maize farmers therefore stand to gain considerably from national standards.</p> <p>Maize standards underpin warehouse receipt financing (which increases rural liquidity) and are a prerequisite for a commodity exchange (which, in the case of maize trading, would decrease transaction costs). Standardized grain contracts bring the same benefits.</p>	<ol style="list-style-type: none"> 1. PMA gives support to the Uganda National Bureau of Standards (UNBS) and Uganda Grain Traders to draft a set of national maize standards that reflect regional trading norms. 2. PMA circulates draft standards within the grain industry for comment. 3. UNBS gazettes agreed grain standards. 4. PMA raises awareness of the new standards and provides training to maize traders in grading. 5. PMA organizes maize industry meeting to decide whether the trade should be self-policing or needs external monitoring and verification.
	Maize commodity exchange	Recommendations for a commodity exchange recently made in the context of the Export Competitiveness Strategy should be acted upon and possibly expanded to include pulses and oilseeds.	<p>Once national standards have been established, the development of Uganda's fragmented regional maize trade would benefit substantially from the introduction of commodity exchange. The effects would be to increase transparency (particularly in terms of quality and price discovery) and decrease transaction costs (in terms of finding trading partners and negotiation).</p> <p>The benefits for farmers should be greatly improved market information, and higher prices through greater demand for Ugandan maize and lower transaction costs.</p>	For an action plan, please refer to Mandl, P. and A. Mukhebi (2002) "Commodity Market Information and Risk Management: the case for a commodity exchange and warehouse receipt system for Uganda". The European Commission: Uganda Delegation.

Dairy products				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
B	Consumption	The Dairy Development Authority (DDA), with assistance from donors that have traditionally supported the sector, should commission consumer market research (CMR).	Growth in domestic consumption is the most likely way in which longterm expansion of the dairy industry will occur. However, dairy product promotion is not currently guided by a good understanding of consumers. CMR would not only aid promotion but also help with product development.	<ol style="list-style-type: none"> 1. DDA seeks support from Assistance Française or Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) to conduct CMR. 2. Results used to guide DDA promotional campaigns. 3. Results also made available to dairy processors to help in the development of their products.
B	Distribution	The formal milk processing sector should explore further links with the informal wholesale and distribution sectors.	<p>Dairy processors can produce high quality healthy milk but usually have to rely on cost-inefficient means of distribution through general grocery retailers. Linkages with the much more efficient informal sectors would help to reduce costs but would probably still not be competitive with purely informal sector milk. Promotion of healthy, high quality milk and improved distribution would therefore have to go hand in hand.</p> <p>In the long term, farmers would benefit from selling into a stable industry that can invest in improved marketing and infrastructure.</p>	<ol style="list-style-type: none"> 1. Once the impact of the DDA's regulation enforcement activities have become clear, DDA convenes a meeting between the dairy processors, relevant donors, and representatives from the group of informal sector traders who have shown willingness to invest in milk storage and distribution facilities. DDA compiles the recommendations from the meeting and presents them to MoFPED with the intention of getting government backing.
A	Farmer associations	The DDA should critically review its plans to create vertically integrated farmer controlled milk collection and distribution associations.	<p>The DDA's motivations for suggesting these associations seem to be (a) to give farmers better incomes, and (b) to make the industry easier to regulate.</p> <p>Unfortunately, evidence from around sub-Saharan Africa suggests that complicated operations such as the one proposed by the DDA are beyond farmers' capacities to manage. Such initiatives tend either to fail or be wrested from the control of farmers by the management.</p>	<ol style="list-style-type: none"> 1. The DDA invites external scrutiny of its plans to establish vertically integrated farmer associations. 2. Subject to the results of the review, the DDA supports simple milk collection farmer associations in favorable areas of the country.

Cassava				
Priority, refer to key	Topic	Recommendation	Purpose and justification	Activities
C	Agroindustry linkages	Awareness of potential agroindustrial uses of cassava should be raised and linkages between cassava producers and potential industrial users should be encouraged.	<p>Several industrial cassava uses are currently being pilot-tested in West Africa. Examples include its use as an animal feed ingredient, as a glue extender, and as a raw material for starch production.</p> <p>Initiatives in Uganda have thus far been few and have had indifferent success. However, there is some optimism that, as Uganda's manufacturing industrial base expands, the demand for domestically produced raw materials will grow.</p> <p>The potential effect on farmers is an increased demand for high yielding varieties of cassava.</p>	<p>PMA gives support to National Agricultural Research Organization (NARO) and/or MAAIF to demonstrate potential cassava uses to manufacturers in a series of practical displays held in appropriate parts of the country.</p> <p>If genuine interest is shown, PMA gives support to NARO and/or MAAIF to create linkages between producers and manufacturers.</p>

Transaction Cost Analysis for Selected Crops with Export Potential in Uganda

Introduction

The motivation for this study comes from the need to implement the Government's Plan for the Modernisation of Agriculture (PMA). As one of the strategies that has emerged from the Poverty Eradication Action Plan (PEAP), the PMA addresses the broad area of rural development by outlining government policy on all aspects of modernizing the agricultural and agroindustrial sectors. Progress has already been made in implementing some areas of the PMA but thus far, marketing and agroprocessing have escaped concerted attention.

With support from the World Bank, the PMA Secretariat and Subcommittee on Agroprocessing and Marketing decided to commission a study on six strategic cash crops: coffee, cotton, fish, maize, cassava, and dairy produce. The overall objective was to recommend plans that the public and private sector could implement to overcome the major constraints affecting the marketing and transformation of these crops.

NRI and IITA subsequently won the contract to conduct the study. We started work on 14 January 2002 and submitted the first draft report on 11 March. Throughout our study, we were conscious of the PMA's objective of improving rural producer incomes. We therefore worked hard to develop implementation plans that would have the maximum effect on raising producer prices.

A note on the meaning of transaction costs

We feel that there may be some confusion over the meaning of "transaction costs". According to neoclassical economics and more recently, new institutional economics, transaction costs relate to the nonprice costs of making a commercial exchange. They can be divided into ex-ante and ex-post costs:

"Ex ante costs involve the costs associated with gathering information about the good or service to be exchanged, and about the other party/parties to the contract. They also include the costs of negotiation and of devising a contract in such a way as to maximize the likelihood of the contracting partner meeting his/her obligations under the contract. Ex-post costs are those associated, first, with monitoring the performance of the contract to ensure that the contracting partner is meeting his/her obligations, and secondly, with enforcing contracts where the contracting partner fails to meet the obligations stipulated in the agreement." Jonathan Kydd (1996). Briefing document for DFID, Wye College, UK.

We believe that a more appropriate label for the costs referred to in the terms of reference would be "marketing and processing costs." In the traditional sense, agricultural marketing and processing refer to the activities involved in taking a product from the farm

gate and delivering it in the form, at the time, and to the place that the buyer requires. Such costs are therefore incurred through handling, transport, storage, processing, packaging, market fees, risk management, brokerage, export handling, and others.

However, we do not wish to play down the importance that transaction costs (as defined here) have in constraining the development of the Ugandan agricultural sector. We have, therefore, studied marketing and processing costs as well as transaction costs.

Overview of the terms of reference and the report structure

The terms of reference for this assignment covered four basic tasks:

1. Baseline assessment of marketing, processing, and transaction costs for coffee, cotton, maize, cassava, dairy products, and fish.
2. Tactics and strategies for improving efficiency.
3. Articulation and assessment of alternative business approaches to reducing marketing, processing, and transaction costs.
4. Recommended implementation plans and technical assistance.

In reporting our work, we have used the following scheme: constraints and opportunities that apply to several, if not all of the six commodities, are discussed in the next report section entitled “Crosscutting issues”. This is followed by six sections, one for each of the study commodities. Each report section is designed so that it can be understood in isolation from the other sections.

Crosscutting Issues

Producer bargaining power and the need for grass-roots organization

The importance of farmer/fishermen's organization is emphasized throughout this report. In the context of marketing and processing, not only can organized producer groups gain better access to services such as finance and capacity building but they can also increase their bargaining power by bulking produce and concentrating on product quality. For perishable products, such as dairy and fish, the ability to prolong shelf life can also confer a greater degree of market leverage for producer groups.

Each commodity section of this report describes the specific circumstances under which producer organizations of different types can operate. However, research conducted by NRI in the late 1990s identified some general conditions for successful "farmer controlled enterprises" (FCEs) in sub-Saharan Africa.

Features of successful FCEs

1. The range of agricultural activities undertaken.

- A close match between the activity and the group's experience and financial capacity.
- Generally involved in relatively simple marketing, input supply, and credit operations involving liaison with market intermediaries higher up the supply chain.
- Tend to begin with a single activity.
- More complex operations, for example, that involve the operation of jointly owned assets or processing, often fail (with some significant exceptions in the case of women's groups).
- Tend to concentrate on relatively high value produce (e.g., seed maize, dried fruit, oil palm, and cotton) rather than low value staples.

2. Internal features.

FCE structure

- Generally built upon preexisting organizations, where members already share considerable trust and familiarity.
- Tend to have a small membership, between ten and thirty members, of relatively homogeneous characteristics.

Member control and participation

- A clear member-driven agenda, which tends to occur more in small-sized groups.
- Strong democratic processes.
- Written constitutions and rules, and record keeping assist in clarifying roles and enhancing transparency.

Relationship to external agents

- Absence of political patronage.
- High degree of self-financing; successful cases were not associated with interest rate subsidies, but with viable business objectives that made subsidies unnecessary.
- External training inputs, particularly when these aim at integrating the group into the wider economy through the development of links with financial and market intermediaries (Coulter et al. 1999).

Among its activities, the recently formed National Agricultural Advisory Service (NAADS) lists the following:

- Developing farmer capacity to demand and manage advisory services.
- Developing farmers' knowledge skills.
- Developing farmer institutions.
- Capacity enhancement of the private sector.
- Increasing farmers' access to technologies.
- Developing information, communication, and marketing systems for farmers.

NAADS clearly holds the development of farmer organizations and the provision of services to them as parts of its primary role. The only recommendation we make in this regard is that NAADS should work closely with industry authorities, trade associations, and farmers' associations because of the specialist sector-specific knowledge that is required for assisting farmers' organizations to become more effective operators in different supply chains.

Road infrastructure and transport

Transport costs figure prominently amongst the marketing costs identified as part of this study. Contributing factors include the difficult condition of feeder roads during the rainy season, lack of motorized vehicles outside main urban centers, an ageing vehicle fleet, and a lack of intermediate means of transportation (IMTs) at village level.

The development of the road network is a key priority of the GoU (PMA 2000). In particular, during the second half of the 1990s, there were major improvements to the national road network, mainly under the Road Sector Development Program (RSDP). This was formulated in agreement with the donor community (i.e., World Bank, DFID, DANIDA, etc.) as a 10-year program starting in 1996. The projected expenditure is US\$1.5 billion (MWTC July 2001).

Major institutional reforms were initiated including the creation of a Road Agency Formation Unit (RAFU) in 1998 as a performance-orientated, semiautonomous organization expected to evolve into the Road Agency by 2003. RAFU is currently in charge of most of the new road development projects and policy and management studies. A road maintenance fund is being established, mainly with revenues from fuel taxes.

Following substantial improvements of the national road network, the emphasis is now shifting towards other priorities, such as district, urban, and community access roads,

and improved vehicle operation. There are plans to replace the original 10-year RSDP with a new US\$2.5 billion program covering the years 2001/2002–2011/2012. Following decentralization, the execution of works on the district and urban roads network is the responsibility of the respective Local Governments. MWTC advises, guides, and monitors the activities undertaken. Other institutional changes include the privatization of road maintenance and the decentralization of the central mechanical workshops.

Motorized transport.

Lorries, trucks, and pickups play an important role in long-distance marketing of agricultural produce. Although the capital cost of lorries is highest, they also have the highest transport cost-effectiveness (i.e., kg/km/US\$). Both capital cost and cost-effectiveness are lower in the case of smaller modes of motorized transportation such as pickup trucks or mini-buses. Nevertheless, in terms of effectiveness the latter are still far ahead of any other means of rural transport, such as ox-carts or two-wheeled tractors and trailers.

Better operational efficiency of motorized vehicles remains a major challenge. Lorries and trucks often have to drive empty to the more remote areas to collect agricultural produce. This significantly increases the transport cost. As a consequence, transport planning is required to improve the efficiency of vehicle operations. For example, coordination between output marketing and farm input supply could be improved. In addition, the average age of the vehicle fleet in Uganda is high (i.e., approximately 10 years), and measures are required to introduce newer vehicles requiring less maintenance.

Government-run tractor schemes have failed in most countries of sub-Saharan Africa including in Uganda. Amongst other things, this was due to lack of profitability of the operations, and management and maintenance problems. Private ownership of two-axle and mono-axle tractors is encouraged in the context of modernizing agriculture (PMA 2000).

Intermediate means of transportation (IMTs). Given the limited quantities, which can be transported, the speed involved, and the maximum distances to be covered, head loading is one of the most expensive means of transportation. At the other end of the spectrum, motorized transport (e.g., trucks, tractor-trailers) is often not profitable in isolated villages. As a consequence, it has been argued that IMTs have an important role to play in this context. For example, Sieber (1997) argues that the shift from head-load to donkey-cart can reduce the transport costs by 60% and the shift to an ox-cart by nearly 90%. The PMA states that more prominence will be given to IMTs such as bicycles, donkeys, and ox-carts (PMA 2000). A research project entitled “Improved food crops” marketing through appropriate transport for poor farmers in Uganda” is due to start with DFID funding in April 2002. The emphasis will be to analyze farmers’ transport needs and to pilot-test appropriate means of transportation. In addition, an international workshop on animal draft power will take place in Jinja, May 2002.

To sum up, the transport sector is one of the four priority sectors of the GoU, the others being health, education (Universal Primary Education), and agriculture, although the latter gained in importance only relatively recently under the PMA. Nearly the entire

donor community has provided substantial financial support to the road and transport sector over the last five years (an estimated US\$0.5 billion) mainly as part of the RSDP. Issues related to the sector are well understood by Government and donors, and the sector is likely to receive major funding in the future. Also, road and transport issues are included in sections of the PMA.

Achievements in the road and transport sector so far are as follows.

- Substantial improvement of the national road network (i.e., national as compared to feeder, and community access roads).
- Improvements of the feeder road system in many parts of the country.
- Institutional changes such as decentralization of responsibilities from the center to district level, privatization of road maintenance, and the creation of RAFU.

Future points of emphasis include the following.

- Construction and maintenance of urban and community access roads.
- Improved efficiency of vehicle operation (e.g., to avoid vehicles having to travel empty to collection points in rural areas; one obvious answer to this problem would be better coordination between agricultural output marketing and farm input supply).
- Consolidation of institutional changes, (e.g., RAFU is due to be inaugurated in 2003, strengthening of road departments at district level).
- Introduction of IMTs such as animal traction and carts.

Inland International freight

Competition among freight and shipping companies has reduced the cost of moving commodities from Uganda to Mombasa by over 40% in the last five years. Whereas there used to be just five shipping companies serving the whole of Uganda, there are now eighteen. Today, coffee can be moved to Mombasa by truck or ferry/rail at US\$75/t, and a 40-foot container of cotton costs about US\$2000. These rates, unimagined a few years ago, have arisen through private sector cost-efficiencies and reductions in profits.

Even though freight rates have come down, they are still large relative to current commodity prices. For instance, fot/for Kampala Screen 15 robusta coffee prices were being quoted during our assignment at between US\$380 and \$390/t. As noted above, the cost of freight to Mombasa is about US\$75/t, so by the time the coffee reached Mombasa, freight accounted for over 16% of the commodity value. Put in terms of what farmers were receiving, US\$75 represented approximately 35% of the farm-gate parchment-equivalent price. This comparison is highly relevant. High levels of competition and efficiency in the coffee supply chain mean that increased fot/for Kampala prices feed through to proportionately higher farm-gate prices. In other words, lower freight prices mean higher farm incomes. The situation in the cotton subsector is the same.

The haulage business now claims that the cost of road transport to the coast is as low as it can possibly go. Whether this is true or not, the most significant constraints to

further reductions in inland freight rates come from inefficiencies in rail transport, both in Uganda and Kenya. In particular, inefficient railway management is reflected in the very long turnaround times both in Kampala and Mombasa. This has three major cost implications. First, it represents a poor use of railway assets, which remain financially unproductive for long periods of time. Secondly, shipping companies charge demurrage on their containers that are stuck in railway sidings. Thirdly, delays in unloading increase commodity finance costs.

The privatization of Ugandan Railways is well underway. A new private sector concession holder has yet to be identified but the process should be complete by the end of 2003. Although current assets will remain in public ownership, railway operations will come entirely under private sector management. The planners behind the privatization process believe that private sector involvement will increase both management efficiency and rates of investment. Despite this, the impact on freight movements to Mombasa will be limited unless similar efficiencies are made in Kenya. In 1999, when the original consultant's report on rail privatization was delivered, a suggestion was made that Ugandan, Kenyan, and Tanzanian railways should be privatized under one company. Although we recognize the political difficulties involved in such an initiative, we recommend that the Government of Uganda gives serious consideration to raising the issue of regional railway privatization at an appropriate intergovernmental forum. Uganda's commodity producers stand to gain much from more efficient regional railways.

Finance for agricultural trade and agribusiness

The high cost of borrowing and unavailability of long-term finance are perennial complaints among Ugandan businessmen. In our view, both problems reflect a conservative attitude that prevails within Ugandan banking.

In recent times, nominal shilling interest rates have been as much as 24% (May 2001, Bank of Uganda figures). Even locally available dollar loans can cost as much as 17% over the London Interbank Offered Rate (LIBOR). Although Uganda is seen as a risky lending environment, these interest rates can hardly be justified alone by the incidence of loan default and nonperformance. Indeed, an industry insider suggested to us that rates of 5 to 6% over LIBOR would be more appropriate for dollar transactions. A more likely explanation is the banking sector's lack of sophistication, which leads to unnecessarily high transaction costs.

The problem of formal loan accessibility is worse in rural areas, where lending risks and loan transaction costs are generally higher. From our field experience, we believe that liquidity in Ugandan commodity trade where large overseas buyers are involved is not a serious constraint, at least within downstream parts of the supply chains. Prefinance is generally found either from within the trade or from international sources. Of the commodities that we studied, these conditions apply principally to coffee, cotton, and fish. In the case of coffee and cotton, current low world prices further reduce the problem.

Nevertheless, warehouse receipt financing (whereby money is lent against inventory held in warehouses that are overseen by independent collateral managers) may have a role

to play in other storable commodities (principally grains) and may also assist local coffee traders who do not have access to international finance. These issues are discussed further in the appropriate commodity sections.

Market information

Since September 1999, the FOODNET project of the International Institute for Tropical Agriculture has operated the national market information service (MIS). The MIS gathers prices of 32 agricultural commodities from 16 districts on a weekly basis, and collects prices and traded volumes for 28 commodities from three major wholesale markets in Kampala on a daily basis. The MIS also collects information on weather conditions and forecasts, road conditions, import and export activities, and regional and international markets for products produced in Uganda.

The market information is disseminated to clients across the country on a weekly 15-minute broadcast via 12 radio stations. These broadcasts cover virtually the entire nation. The market information is also made available to clients by e-mail, fax, telephone, the FOODNET website, newspapers, regular aid project reports, and during regular meetings. Apart from individual farmers and traders, clients include Government Ministries, Famine Early Warning System (FEWS), major trading companies, local government, NGOs, farmers' associations, and other organizations in the agricultural sector.

To accommodate the revolution in information technology and communications (ITCs), the Ugandan MIS has developed a sophisticated Internet site, which is updated with market information on a daily basis. The full price database can be accessed on line and the website has recently been modified, such that it is now possible to query "Kampala's prices today" for Kampala district. This design is also fully compatible with the MTN's new Short Message Service (SMS) server and once tests have been completed, commodity information from Kampala's markets will be available via mobile phones.

Despite the success of the national macro-based service, it is fully recognized that those in most need of market information are the millions of small-scale farmers, processors, and traders who represent the overwhelming majority of participants in the Ugandan agricultural sector. Any organization wishing to provide an appropriate dose of timely and accurate information designed to strengthen the bargaining position of the small actors in the Ugandan agricultural sector is faced with difficulties. The major problems are as follows.

- There are 33 languages spoken in Uganda.
- The level of literacy is just slightly above 50%.
- The understanding of how markets operate is lower than might be expected.

In addition, different groups of market actors need different types of information depending on the crops that they grow, their location, and the degree at which they cooperate with each other. During the past two years, the FOODNET project has also come to realize that farmers need more than just price information: they also need to know about quality, trade opportunities, why markets fluctuate, and how best they can use market information. Because of these problems, IITA-FOODNET has designed and

implemented a new model for providing market information to Uganda's many, scattered, small-scale farmers. IITA-FOODNET has established three such "micro-MIS" pilot projects to test the new model. The service is decentralized and includes the participation of farmers, traders, processors, and retailers as well as local government structures, farmers' unions, and NGOs working in the target areas.

The micro-MIS provides localized information and utilizes the information and analytical skills available at the macro-MIS level. Information is collected from within the pilot sites from the markets in the major towns and agribusiness development centers, regional networks, and NGOs, local and national newspapers, and the macro-MIS.

In this model, data and market information is collected at least twice a week. Data are disseminated in the form of frequent radio broadcasts on FM radio stations, using the local language, and in local newspapers, and by word of mouth. The first site is situated in Eastern Uganda and covers the districts of Bugiri, Iganga, Mbale, Jinja, Kamuli, Tororo, Busia, and Pallisa. In the second pilot site in Lira district, northern Uganda, many farmers have formed themselves into groups but lack the experience to collectively market their products. For this reason, the project includes provision for training farmers in these skills. In the third pilot site, the micro-MIS provides trade facilitation in the form of assistance to organized farmers and traders linking them with larger traders and new, larger markets. The project will concentrate on developing markets for beans and maize in this area.

The success of these projects is being assessed in 2002, with the assistance of the Technical Centre for Agricultural and Rural Cooperation, ACP-EU, (CTA), FAO, and NRI.

Electricity supplies

In the context of our work on agricultural processing and marketing, the constraints associated with electricity supplies apply chiefly to processors and cold chain operators. Analyses of the various power-consuming businesses included in this study revealed that electricity costs accounted for 10 to 18% of total non-raw material operating costs. However, issues related to electricity supplies are not restricted to cost. Availability and reliability are perhaps more important factors.

Taking the issue of reliability first, intermittent power supplies to factories that process highly perishable products such as fish and milk necessitate investment in back-up generators. Although justified by the risk of losing a large amount of working capital (tied up in stock), the costs of owning and running a generator are considerable. For instance, for a small rural-based milk-cooling center that we encountered during our fieldwork, the capital and operating costs associated with its generator are 10% of total non-raw material costs.

Electricity availability is not a problem for existing processors but does, rather obviously, constrain the development of new productive enterprises in areas where electricity is not currently available. However, for the purpose of rural industrialization, the issue of electrification must be considered alongside investment in other forms of infrastructure, especially roads. Without affordable access to raw materials and markets, no amount of electrification will promote new rural-based processing industries.

The three problems of cost, availability, and reliability have their roots in the history of power generation and distribution within Uganda.

“The Uganda Electricity Board (UEB) was established in 1948 as a quasi-independent vertically integrated monopoly, to generate, transmit, distribute, and supply electricity within Uganda and other countries in the region. UEB has long suffered from poor financial performance and operating efficiency, low productivity, inadequate funds for required investments, low tariffs, poor collection, and high losses. As a result, UEB is in a weak position and, by normal standards, close to insolvency.” (World Bank 2001)

In March 2001, the Government divided the UEB into three independent companies to control electricity generation, transmission, and distribution separately. This move, together with substantial investments in extra power generating capacity, is anticipated to remove many of the previously encountered inefficiencies. Rural electrification is receiving particular attention through the World Bank-funded “Energy for Rural Transformation Project” which will support private sector investment in rural power generation and distribution. In view of these developments, we do not see any need to recommend any further actions relating to electricity supplies.

Contract enforcement

All commercial transactions involve contracts, whether written or verbal, formal or informal. When the terms of a contract are performed over a period of time or over a physical distance, institutions that enforce contracts help to reassure the contracting parties that the other side of the bargain will be kept. Where contract enforcement breaks down, the risks of doing business severely restrict the number of people willing to make anything more than the simplest of spot transactions (where exchange occurs instantaneously and in person). In line with higher risk, transaction costs associated with monitoring and enforcing contract performance increase dramatically.

In the past, when business contracts in Uganda have been broken, recourse to the commercial courts has involved very long delays, the possibility of corruption, and a very uncertain outcome even when cases are open-and-shut. Through its Medium Term Competitiveness Strategy, the Government of Uganda is currently taking steps to improve commercial contract law and the associated judicial procedures. If successfully implemented in an agricultural context, it will help to:

- Reduce transaction costs of monitoring and enforcing contracts.
- Reduce risks associated with contractual transactions for all participants in agricultural supply chains.
- Increase the volume of transactions made in rural and urban locations, leading to greater income earning opportunities for poor rural producers and informal sector traders.
- Permit innovative types of transaction. Improved contract enforcement will allow transactions to be dislocated both in terms of place (for instance, contracting parties doing business over the phone) and time (for instance, forward contracts). The latter helps to bring stability and predictability to market prices.

- Increase planning horizons for poor rural producers and informal sector traders.
- Increase poor rural producers' access to markets for credit, physical input, and agricultural services.
- Expand opportunities for contract farming schemes.
- Underpin the enforcement of emerging commodity standards.
- Pave the way for effective commodity exchanges and warehouse receipt financing.

Nevertheless there are some doubts over whether these benefits will spread deeply into rural areas, where commercial law is hard to enforce because of poor awareness and communications. We therefore recommend that the Government investigate institutional arrangements designed to ensure that the commercial benefits envisaged under the Medium Term Competitiveness Strategy reach rural levels.

Local taxation

“... rural families encounter an institutional context that is basically inimical to the expansion of monetary opportunities in rural areas. This is manifested especially by the system of rural taxation that has emerged with fiscal decentralization to local governments . A fundamental contradiction between the goals of PEAP/PMA and decentralized rural taxation is revealed”. (Ellis and Bahiigwa 2001)

So found a recent academic paper on rural livelihoods in Uganda. The “system of rural taxation” referred to is the series of transaction levies and business licenses that local authorities apply to raise tax revenue. These, the authors claim, are market distorting and act as disincentives to business activity.

The authors of the paper take further exception to the system of tax collection, which is delegated to private businesses who win the right to raise revenue through successfully bidding to the local authority, promising to raise a stated amount of tax revenue. The opportunities for corruption in this system are rife, according to the paper.

The experience we gained through our fieldwork suggests that Ellis and Bahiigwa have identified a genuine problem, although they may be overstating its severity. In the case of informal milk trading, transaction levies amount to between 1 and 6% of total costs, depending on where the milk is collected. For a trader taking fresh fish to Kigali, Ugandan taxes amount to less than 1% of total costs. A typical coffee mill pays 1.5% of its costs in local taxes, although a total of a further 4% goes to the Ugandan Revenue Authority and the Uganda Coffee Development Authority. With perhaps the exception of milk trading, local taxation does not seem to be particularly burdensome to the businesses studied during this assignment. However, the burden may be significantly greater for more petty types of trade, where costs and revenues are much lower. Such businesses and transactions are generally the preserve of the poorest members of society.

Ellis and Bahiigwa suggest property-based taxes as fairer way of raising local authority revenue. The principal behind such taxes is that wealthier individuals—those who own more property—should shoulder a greater tax burden. Although we concur with this

more equitable taxation system, we nevertheless point out that raising revenues in this way requires a substantial initial investment in identifying and valuing individuals' property. In practice such a system may be unworkable in many parts of rural Uganda.

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Coffee

Introduction

Coffee, after petroleum, is the most valued commodity in international trade. The annual value of export revenues exceeds US\$10 billion while annual retail sales of coffee are estimated at approximately US\$50 billion. It is a highly labor intensive industry employing an estimated 100 million people in over 60 developing countries. It is often a vital source of export revenues and income to producers, many of whom are smallholders. It is particularly important to African economies and rural livelihoods, where there are some 25 coffee exporting countries.

Two major types of coffee enter world trade, *arabica* and *robusta*. *Arabica* is mainly grown at high altitudes in Latin America and northeastern Africa, and is differentiated from *robusta* by having more aroma, a less bitter taste, and less caffeine. It is primarily used in roasted and ground blends, and forms the bulk of the small, but developing premium speciality market. *Robusta* is primarily grown in Asia and SSA, at low altitudes and in humid conditions. It is used as a “filler” in roasted and ground blends, and in instant coffee. *Robusta* has traditionally been discounted against *arabica*, and, since the 1970s, *robusta* prices have averaged 15% less than those of *arabica*. Uganda has traditionally been a *robusta* exporting coffee country; however, *arabica* production is on the increase and currently accounts for around 15% of production.

Latin American and Caribbean countries account for around 57% of world exports, mainly *arabica*, and African countries for about 14%, mainly *robusta*, with Uganda's share being around 3%. Three countries dominate global production, Brazil, Colombia, and Vietnam, with over 50% of total output.

Global coffee prices are determined by levels on the two major coffee futures and options markets, New York, for *arabica*, and London, for *robusta*. The coffee trade buys and sells, mainly at price differentials to futures levels, i.e., at premiums and discounts for various origins and qualities. The nature of the trade necessitates sophisticated price risk management techniques, such as hedging on the New York and London futures and options markets. This aspect of the trade makes price discovery and price transparency difficult to ascertain for small producers and traders in countries such as Uganda.

Currently, coffee is in a position of oversupply and prices are forecast to continue at low levels for the foreseeable future. Global production was around 112 million bags in 2000–2001, with consumption at about 102 million bags.

Finally, a feature of the coffee trade is price volatility due to the size of the markets, the huge daily traded volumes of coffee futures and options, and the involvement of speculators, such as computer generated funds.

Background to Ugandan production and marketing

Following Ugandan independence, an Act of Parliament (The Coffee Act 1962) gave the parastatal Coffee Marketing Board (CMB) monopolistic access to the procurement of

all the country's dry-processed *robusta*, about 85–90% of total production. Some private exporters operated pulperies and exported washed *robusta*, and the Bugisu Cooperative Union processed and exported washed *arabica*. However, in 1969, a new Coffee Act was passed giving the CMB a total monopoly of coffee processing, quality control, export marketing, and promotion. Apart from some hulling activity and internal trading, the private sector's activities were extremely limited.

The preliberalization system was based on fixed producer prices and processing margins with smallholders delivering coffee to primary cooperatives or private traders. The coffee was transported either to cooperative unions or private traders for hulling. The hulled coffee was then sold to the CMB who sold to exporters overseas.

In the years preceding Ugandan liberalization of the sector, coffee provided over 90% of the country's foreign exchange and in some years, up to 50% of government revenue.

The preliberalization coffee system was characterized by delayed payments from the CMB to cooperative unions and private traders, and little consideration for world market prices. The difference between the export price and the producer price was an important source of revenue for the government. Producer prices were kept deliberately low in order to minimize crop-financing requirements and reduce the budget deficit and inflation. A major deficiency of the system was that it imposed a heavy tax burden on growers and did not reward them according to the quality of coffee produced.

The inefficiencies and inequities inherent in the monopolistic, state-controlled system were compounded by the abolition of the quota system of the International Coffee Agreement (ICA) in 1989. This resulted in a collapse of coffee prices. The potential impact of historically low and declining world prices on real producer prices rendered Uganda's marketing system unsustainable. Therefore, plans to liberalize the market, with the support of the World Bank, were initiated in 1990.

The main effects of liberalization were the abolition of the CMB's monopoly, a more equitable producer price through an increased percentage of world prices, and growing private sector involvement. The regulation and monitoring of the coffee industry were invested in the Uganda Coffee Development Authority (UCDA), set up by an Act of Parliament in 1991. At the same time, the Bank of Uganda was divested of its responsibility for crop and trade financing. These functions were assumed by the commercial banking sector.

Following liberalization, the involvement of the private sector in the industry increased dramatically, with around 50 exporters by 1998, many being joint ventures with foreign companies. The early euphoria has waned and currently there are around ten significant exporters, with a trade volume in excess of 100 000 bags/year

Current contribution to the economy

Coffee has traditionally been a major contributor to the economy through the provision of rural and urban employment. Apparently, its position as the country's leading export is now challenged by the fish sector. In 2000, coffee exports totaled 150 000 t (2.5 million bags/60 kg) representing US\$125.316 million in foreign exchange earnings. The importance of

coffee to the economy is illustrated by the fact that its foreign exchange earnings in 2000 were over three times more than that of the second largest agricultural export, tea, which contributed US\$37.048 million. However, it is, perhaps, significant that coffee export volumes and earnings are on a declining trend whereas tea has shown significant increases in volume and, most years, in earnings, since the early 1990s.

(Source: Uganda Bureau of Statistics (UBS)—Key statistical indicators, January 2001)

Poverty eradication

Coffee is Uganda's most important agricultural cash crop and export. It is estimated that nearly one-eighth of the population of 20 million earn all, or most, of their income from coffee activities. There are an estimated 500 000 to 600 000 small coffee farms with an average size of less than one hectare. Coffee's traditional role as a major rural employer gives it a pivotal role in many areas of the country in poverty alleviation and sustainable livelihoods. Therefore, the sector's long-term sustainability, given declining producer prices consequent to low world prices, is a major issue for the sector.

It should be noted that the World Bank has established that coffee growing areas have a low incidence of relative poverty and are less prone to famine. Therefore, the UCDA is promoting coffee growing through the provision of high quality and early-maturing materials to rural households. The mid-north, eastern, and southwestern regions have been specifically targeted in this context. These activities have also been supplemented by the Coffee Poverty Alleviation Fund (PAF), undertaken by the GoU.

(Source: UCDA annual report, 1999–2000.)

Supporting institutional framework

The pivotal institution supporting the coffee sector is the UCDA. This was created following liberalization in 1991 with a statutory mandate to promote, improve, and monitor the coffee industry. Its main functions are to license processors and exporters, control quality, monitor prices, support research and development, and promote Ugandan coffee on both the local and international markets. Its activities are performed by four departments.

1. Administration and Finance
2. Monitoring and Statistics
3. Regulatory (licensing) and Quality Control
4. Research and Development

Initially, government representatives dominated the Board of the UCDA. However, in 1994, by amendments to the Act, the Board's structure was changed to include a majority of representatives of the industry, two each from the Uganda Coffee Trade Federation (representing exporters), the Uganda National Coffee Association (representing the processors), and the Coffee Growers' Association.

The UCDA is funded from a 1% cess which is levied on the value of all coffee exports, with 40% of the cess allocated towards research and development.

The CMB's role has been considerably reduced and is now virtually defunct, and on offer for privatization.

Primary cooperatives and cooperative unions played an important role in the production and processing of coffee prior to liberalization but their importance has drastically declined.

The following associations have been established to represent the interest of private sector traders, processors, and farmers operating in the coffee sector.

The Uganda Coffee Trade Federation (UCTF) was established in 1996 and superseded the Coffee Exporters' Association. Its members include exporters, hullers, bankers, insurers, and transporters and it aims to provide a common forum for sharing ideas, views, and experiences and to lobby Government on areas of concern to the coffee industry.

The Uganda National Coffee Association (UNCA) was established in the 1970s to promote the interests of the private sector processors. The Association acted as an important coffee industry pressure group prior to liberalization but its influence has since waned.

A number of growers' associations are being developed; three of potential significance are Uganda Commercial Farmers' Association, Uganda National Farmers' Association, and Uganda Coffee Farmers' Association (UCFA).

None of the above organizations have great influence in the sector but they need to be encouraged. For example, the UCFA, primarily with funding from the UCDA cess, is encouraging farmers to organize and focus on microfinance as a means to access inputs and improve quality.

The newly formed Government National Agricultural Advisory Services (NAADS) have initiated capacity building programs among farmer groups, particularly with regard to marketing.

Sectoral issues

Given the free market in coffee following the liberalization of the sector, and the pivotal and essential role of the UCDA, the main issues do not concern policy, institutional, and regulatory matters.

The following major issues were identified during the study:

- The need to ensure sustainability and development through improved yields, disease (coffee wilt) resistant varieties, producer net prices, and consequent profitability to farmers.
- The expansion of the high elevation area under *arabica* and the development of *arabica* varieties suitable to the humid lower elevation, traditionally a *robusta* region.
- The need to attract investment, both domestic and foreign, to the sector, to promote the large-scale commercial farming sector alongside smallholder growers.

- The need to address Uganda’s competitive position on the world market due to its status as a landlocked country and the consequent high transportation costs from Kampala to Mombasa, for onward shipments to world markets.
- The perceived need for a domestic price determination point through the institution of a coffee auction in Kampala.
- Exploitation and promotion of Ugandan coffee in the “gourmet,” speciality, and washed *robusta* markets.
- The need to develop value addition in the sector.

Supply

Uganda’s *robusta* coffee production is concentrated in a broad belt around the shore of Lake Victoria, hardly a surprise given that *robusta* has its indigenous origins in these areas. Districts with the highest output are Masaka, Mpigi, and Mukono. Luwero, Rakai, Jinja, and Iganga also produce large quantities, and production spreads as far as Masindi in the north and Rukungiri in the west.

In 2000–2001 season, Uganda produced 3.3 million bags of *robusta* coffee, an increase of 0.8 million bags over 1999–2000, despite a continued decline in export prices. Climatic factors probably account for most of the increase.

Figure 2.1 gives annual *robusta* production over the last six seasons. World prices started to collapse in mid-1997 and although we can not be sure about direct causation, there is a likelihood that Ugandan supplies of *robusta* have consequently reduced. At least one of the causes is likely to be higher postharvest losses. Given the lower returns, farmers have reportedly been putting less effort into drying their red cherry.

Arabica production is concentrated in highland areas to the east, in Mbale and Kapchorwa, to the northwest, in Nebbi, and to the southwest in Bundibuyo, Kasese, and Kabale. Production in 2000–2001 was just under a total of 400 000 bags, compared with 500 000 bags in 1999–2000.

Figure 2.2 indicates that, despite decreasing *arabica* prices over the period, Ugandan production has risen. This may well be the result of the success that the UCGA has had in pursuing its policy of promoting *arabica* production.

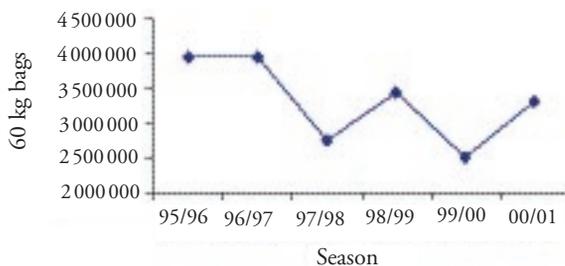


Figure 2.1. Annual production of *robusta* coffee in 60 kg bags.

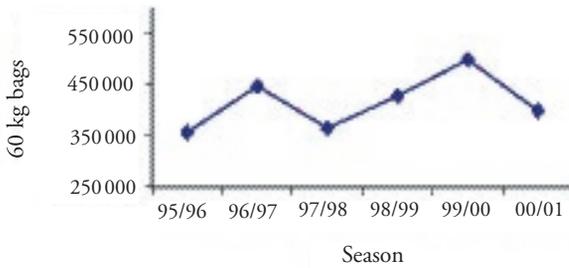


Figure 2.2. Annual production of *arabica* coffee in 60 kg bags.

Demand

Around 85% of Uganda coffee production are *robusta*, which is used mainly in instant coffee production and as a “filler” in roast and ground blends. Ugandan *robusta* has traditionally commanded a premium over the London futures market, the price determinant point for *robusta* coffee, in view of its superior quality relative to *robusta* of other African and Asian origin. In recent years, the world market for *robusta* has become dominated by Vietnam, which currently produces over 13 million bags of average quality *robusta*.

Uganda’s main market is Europe, and in 1999–2000 over 94% of Uganda’s exports were absorbed by the EU, with Spain (11.9%), Germany (5.4%), and Belgium (5.4%) being the largest buyers.

The coffee marketing chain

Robusta

After harvest, farmers usually sun dry the red cherry on the farm. In very few instances they may be able to sell red cherry for wet processing into washed *robusta*. However, the vast majority of coffee that comes off farms is *kiboko* (dry cherry). This is usually sold in small quantities to *kiboko* traders who bulk the dry cherry and transport it to coffee mills for hulling. At this point in the past, coffee mill owners bought the *kiboko*, dehulled it, and sold the rough-hulled green bean (locally referred to, somewhat optimistically, as “FAQ” or fair average quality). This practice has now ceased in most instances because mill owners generally do not wish to take the price risk involved in trading on low margins (the result of low world prices) and high price volatility. Instead, most mills provide dehulling services to *kiboko* traders at a fixed fee. After milling, the *kiboko* traders occasionally sell directly to exporters but more often they sell at the mill to “FAQ” traders, who then sell to the exporters’ district depots or to the exporters’ yards in Kampala. (See Figure 2.3.)

Given that the distance between mills and the exporter depots is often not far, it may seem curious why these extra intermediaries are required. Our fieldwork suggested two reasons. First, the buying process at the exporter depot takes some time to complete. Consignments have to be tested for moisture content, defective beans, and extraneous matter. Once any deductions have been made from the standard price, payments are often

made through bank transfers. Apart from not having bank accounts in the majority of cases, *kiboko* traders currently operate on small profit margins and consequently wish to turn over their working capital as quickly as possible in order to maximize their season's profits. Delays in payment at the exporter depot would decrease the rate of turnover. Secondly, and perhaps more tellingly, in order to reduce their transaction costs, most exporters have a minimum buying quantity, which is usually 300 to 500 kg of rough-hulled coffee. Most *kiboko* traders are very unlikely to be able to collect this minimum quantity. "FAQ" traders are able both to assemble sufficient quantities to sell to exporters and to wait for payment.

Once a sufficient quantity of green bean has been bought at the depot, the exporting company dispatches a truck to take it to Kampala. The rough-hulled coffee then undergoes export processing which involves cleaning, sorting, grading, and drying. Usually, where exporters do not have their own export transport, freight companies are contracted to send the export green bean by truck or ferry/rail to Mombasa and thence by sea to export destinations.

Most coffee is exported in 60 kg bags, which are stuffed into 20 ft or occasionally 40 ft containers. Some exporters have bulk handling facilities, which they use to blow coffee into lined containers. The cost advantages of exporting coffee in this way are significant because of the greater quantity that can be stuffed into a container and the reduced expenditure on packaging material.

Competition at all levels of the supply chain is intense. We could see no instances of where supply chain participants were not playing a crucial role in at least one of the following essential activities: bulking, transporting, product transformation, financing, and risk taking.

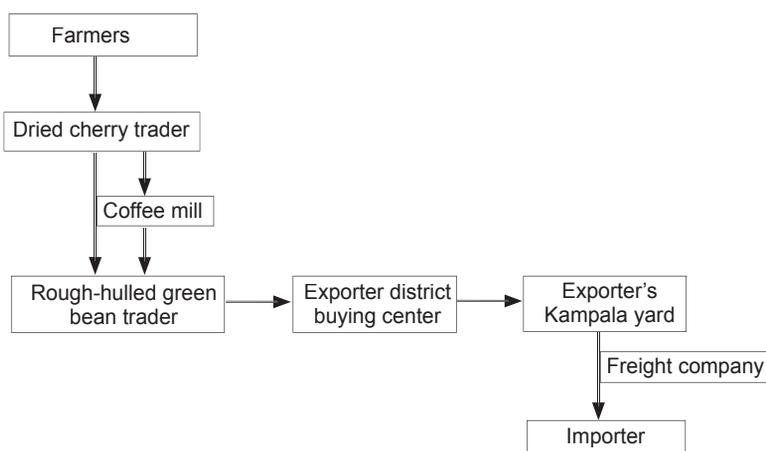


Figure 2.3. Robusta coffee supply chain.

Arabica

Whilst the *arabica* coffee marketing chain is generally similar to the *robusta* wet processing procedure, the different market orientation for *arabica* gives it special features. For example, in the case of speciality and fair trade *arabica* coffees, the chain tends to be shorter, with more direct overseas marketing links than that for *robusta*. The chain is illustrated in Figure 2.4 and is based on that in the major *arabica* growing districts of Kapchorwa and Mbale.

The various stages shown in diagrammatic representation of the marketing chain may be defined as follows:

Producer: The farmer who produces and sells ripe cherry and/or parchment. Parchment is often produced at the farm level in small-scale pulperies, where the cherry is washed, the pulp removed, and the resulting parchment sun dried.

Pulperies: These are larger-scale pulperies, located in rural areas, often operated by traders or groups of traders. They sell parchment usually direct to “dry” millers, but sometimes to other traders.

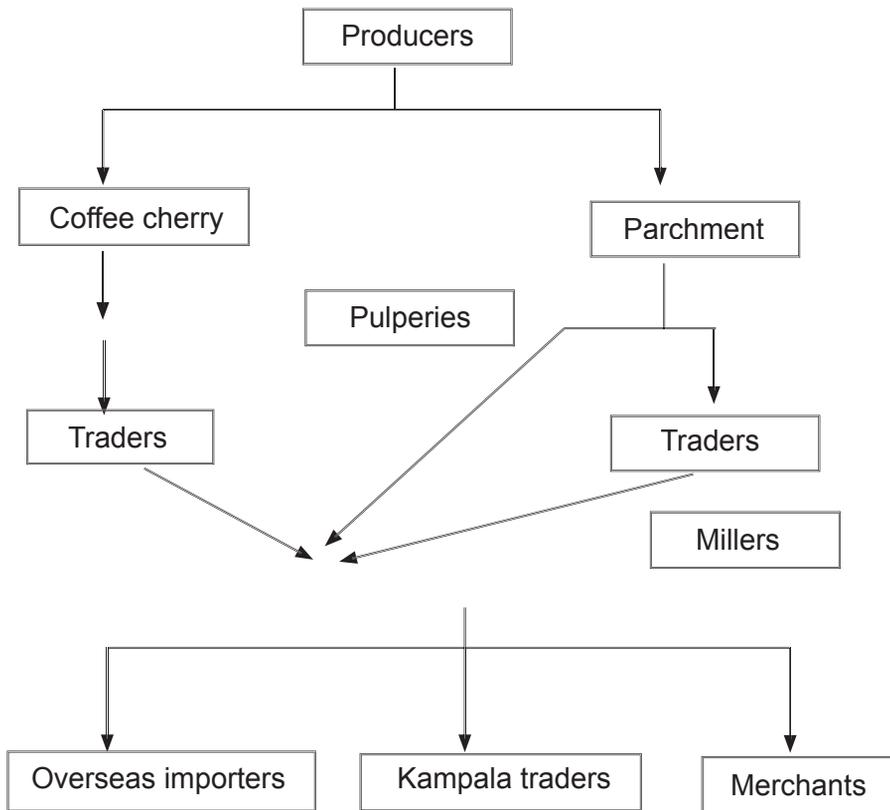


Figure 2.4. The *arabica* marketing chain.

Traders: Parchment traders, selling to dry millers.

Millers (dry): Located in urban centers, such as Mbale and Kapchorwa, millers further dry the parchment, remove the “silverskin”, clean, sort, and grade the coffee into exportable quality green bean.

Kampala traders: Kampala-based traders who are often international groups’ Ugandan representatives.

Overseas importers: Roasters and grinders located in overseas countries with direct relationships with Ugandan millers.

Merchants: Overseas located traders with direct contact with Ugandan millers.

Transactions are free from any obvious signs of cheating—another indication that competition is healthy at all levels of the supply chain. Coffee production, marketing, and transformation are well established and understood by all participants in the chain. Likewise, quality standards are widely known and are rarely the subject of argument. The only area of contention is price, especially in current times of very low London quotations. Being in the unfortunate position of knowing least, farmers often suspect that traders are cheating them and they accuse them of adding little real value to the product. The analysis later in this section reveals that this is not the case in the coffee industry but nevertheless transactions are often fraught with frustrations for farmers.

As one would expect from a marketing system that collects small quantities of occasionally indifferent quality product from many scattered locations, the upstream transaction costs per unit of product are high. Distances traveled to assemble sufficient quantities of coffee are often large and each small amount of coffee offered for sale needs to be inspected for quality.

Table 2.1 gives the evolution of prices and costs over the last four coffee seasons. Although we have a few queries over the way in which UCDA has calculated some of the costs, we nevertheless believe that the figures give a reasonably accurate picture of how costs and prices have changed.

Perhaps the most striking feature of Table 2.1 is the way prices collapsed over the period (with a slight anomaly in the 1998–1999 period when the Ush exchange rate weakened enough to compensate for lower US\$ prices). As one would expect, the margins between prices in the chain also decreased and in response, the *kiboko* traders and hulling factory owners have obviously worked hard to reduce costs. From the information in the table, the exporters appear to have performed less well in making cost efficiencies. We do not have a complete explanation for this but it is clear that the UCDA has changed the way it calculates its figures over the period. The increase in costs may, therefore, be misleading.

Table 2.2 gives our estimated costs and margins for a typical *kiboko* trader. All assumptions and workings appear in Annex 1 but the important assumptions are that the trader buys *kiboko* from farmers at Ush 364/kg (rough-hulled equivalent price) and sells his rough-hulled green bean for Ush 450/kg after having paid for milling. Clearly this trader is not making a lot of money, especially when one considers the low volumes in which such traders deal (typically two to four 70 kg bags of *kiboko*).

Marketing chain players' costs and margins

Robusta supply chain

Table 2.1. Evolution of prices and costs in the *robusta* supply chain.

	1997–1998	1998–1999	1999–2000	2000–2001
	Ush/kg			
Farmer price (rough-hulled equivalent)	1200	1111	743	491
<i>Kiboko</i> collection costs (rough-hulled equivalent)	110	87	68	67
Factory hulling costs	224	182	138	142
Rough-hulled price	1450	1400	950	640
Export processing and marketing costs	210	241	286	263
Export price (parchment)	1700	1870	1286	945

Source: UCDA annual reports.

Kiboko trader

Table 2.2. *Kiboko* trader costs and margins.

	Ush/kg of green bean	US\$/kg of green bean	Costs (%)
Cost of sales			
Raw material	364	0.21	85
Consumables	6	0.00	1
Total cost of sales	369	0.21	87
Trading costs			
Local taxes	–	–	0
Processing fee	25	0.01	6
Transport	32	0.02	8
Total trading costs	57	0.03	13
Cost of working capital	0.1	0.00	0
Total costs	427	0.25	100
Revenue	450	0.26	
Profit (loss)	23	0.01	

Source: Authors' fieldwork.

Coffee hulling factory

Table 2.3 gives our estimated costs and margins for a typical *robusta* coffee hulling factory. All assumptions and workings are in Annex 1. Most importantly, the factory is assumed not to trade coffee: it merely mills dry cherry for a service charge. The figures are worked on the assumption that the factory processes 5000 kg of green bean/day and operates for five months of the year.

Table 2.3. Coffee hulling factory costs and margins.

	Ush/year	Ush/kg of green bean	US\$/year	US\$/kg of green bean	Costs (%)
Operating costs:					
Management and labor	3,000,000	4.00	1,734	0.002	30
Electricity	1,400,000	1.87	809	0.001	14
Repairs and maintenance	1,300,000	1.73	751	0.001	13
UCDA levy	150,000	0.20	87	0.000	1
Council tax	150,000	0.20	87	0.000	1
Revenue authority	300,000	0.40	173	0.000	3
Subtotal operating costs	6,300,000	8.40	3,642	0.005	62
Miscellaneous	315,000	0.42	182	0.000	3
Total operating costs	6,615,000	8.82	3,824	0.005	66
Capital costs	3,465,429	4.62	2,003	0.003	34
Total costs	10,080,429	13.44	5,827	0.008	100
Revenue	16,875,000	22.50	9,754	0.013	
Profit (loss)	6,794,571	9.06	3,927	0.005	

Given that virtually all costs are fixed, throughput is a major determinant of profitability. At a daily throughput of 2500 kg, the factory would make a loss but at 10 000 kg, the factory would be making a healthy profit. However, the average daily throughput is likely to be much less than 10 t due to strong competition between factories. In the 2000–2001 season, the UCDA registered 223 coffee mills. Total output amounted to 3.3 million bags, and so, assuming a 5-month operating period per year, the average daily throughput for a factory would have been 4.9 t/day.

“FAQ” traders

These individuals generally buy rough-hulled green bean from *kiboko* traders at the mill and assemble sufficient quantities for sale to exporters. If they deliver to an exporter’s district depot in the same town as the mill, their margin (the difference between buying and selling price) is usually about Ush 10/kg. If they deliver over longer distances, the margin will allow for transport costs.

Arabica

Farmers usually de-pulp their ripe cherry at the farm level using hand operated pulping machines costing around Ush 300 000 each. We have recommended in this report that centralized pulperies should be reintroduced to improve parchment quality and reduce transaction costs through economies of scale.

As an example of costs we have used figures obtained during a visit to Mbale and the surrounding area including meetings with the senior management of Bugisi Cooperative Union (BSU). BSU claim to export over 30% of all Uganda’s *arabica* production and have direct links with importers in Europe and the Fair Trade movement.

Prices and costs are as follows:

Farm-gate price of parchment: Ush 915–1000/kg, depending on quality

Transport to dry mill: Ush 35/kg.

Trader margin: Ush 50–100/kg.

Delivered mill price: Ush 1050–1100/kg depending on quality.

Dry milling and marketing costs were unavailable at the time of the visit but UCDA has estimated these to be Ush 407.00/kg. (Source: UCDA Annual Report 1999–2000.)

Constraints and opportunities

Uganda's *robusta* coffee supply chain is highly competitive and efficient. On top of the general constraints that affect all agricultural export supply chains (roads, international freight, power, finance, etc.), there are no major issues of marketing and processing inefficiencies that specifically affect *robusta* coffee marketing. In particular, the UCDA is doing a good job of regulating the industry, reporting on it, and providing market information.

The major constraint suffered by the industry is historically low prices, which have squeezed trader margins to an average of less than 1% of revenue, and grower price levels to close to, or less than the cost of production.

So if nothing can directly be done on the cost side, are there any gains to be made on the revenue side? The UCDA and the COMPETE project have recently promoted the idea of exporting washed *robusta*. They claim that premiums are as much as US\$1000/t over the London futures prices. The information that we have obtained from the international trade suggests that premiums would be much lower at perhaps US\$50 to US\$200/t over screen 18 prices. The optimism of UCDA and COMPETE is partly based on just one shipment of washed *robusta* (which, rumor has it, remains in a Hamburg warehouse waiting for a buyer). Further optimism is gained from the plans of one of the world's largest coffee traders, Neumans, to establish a coffee plantation specifically for the production of washed *robusta*. However, Neumans' plans are less to do with gaining a market premium and much more to do with expanding its international portfolio of coffees so that it can provide its clients with a fuller range.

Another feature of the washed *robusta* market is its small size. There is some danger that a substantial expansion of Ugandan output could cause a substantial decrease in the premium. However, any decisions in this regard should await the outcome of an international market study.

Although premiums for washed *robusta* clearly do exist, the costs of producing washed *robusta* are substantially greater than those for ordinary *robusta*. While we are aware that Ugandan plans for producing washed *robusta* are well advanced, we nevertheless recommend that the UCDA conducts a careful review of world markets for washed *robusta* and feeds the information into rigorous and objective cost–benefit analysis of washed *robusta* production.

Linked to the plans to develop washed *robusta* production is the opportunity presented by the expanding premium speciality market. This market, which is particularly vibrant in North America, covers organic, shade (including bird friendly) and Fair Trade coffees,

for which market research proves that healthy premiums exist. Linked to the speciality market is the market for gourmet coffee that has been in existence, particularly in the USA, for some years. This relies on identifying the origins of coffee, the regions, and subregions. It is characterized by unique marks, e.g., Guatemalan Blue Volcano, Costa Rica San Antonio, Guatemalan, Genuine Antigua, Hawaiian Kona, and the world-famous Jamaican Blue Mountain, probably the most expensive coffee in the world. This market is almost exclusively an *arabica* market. *Robusta*, in view of their main usage in instant coffee and as fillers in roast and ground blends, do not lend themselves to differentiation, other than in origin terms. Connected with the development of the speciality coffee market is the current concept of “appellations” which seeks to emulate the success of certain wine producers, e.g., in Australia, Chile, and South Africa. Whilst we would support attempts to differentiate Ugandan coffee on the world market and gain access to the premiums that are available, the following important points should be borne in mind.

Uganda is still primarily a *robusta* coffee producing country (> 85% of production) and already has a reputation for producing good quality which attracts premiums over other origins such as Vietnam. Opportunities exist in expanding washed *robusta* production, but the limitations of the market should be fully understood before embarking on extensive investment programs in washing facilities.

The speciality coffee market is overwhelmingly an *arabica* market in the roast and ground sector, and whilst it is significant and expanding, it is still relatively small in terms of volume.

Virtually every coffee producing country in the world has plans to shift market focus from being a bulk commodity producer to being a producer of premium speciality coffees. Therefore, the competition in this sector is fierce.

Notwithstanding the above cautionary remarks, we believe that Ugandan *arabica*, with the right marketing skills, could achieve success in this sector. Good quality coffee is only a part of the formula for success, name recognition in this context is equally important. For example, Uganda has a number of evocative place names, which could be exploited, e.g., Source of the Nile, Mountains of the Moon, Lake Victoria, etc.

The establishment of a Uganda coffee auction as a medium for the sale of *arabica* and washed *robusta* has been mooted by the GoU and supported by recent consultancy studies. The success of the Nairobi auction in attracting premium prices for its coffees has been cited as an example to follow. However, it should be noted that Kenyan coffee producers are currently compelled to sell all coffee through the auction system, whereas the Ugandan proposal envisages a voluntary system, which is essential in a free, liberalized market. The key function of an auction is price discovery, and it is perhaps significant that, apart from Nairobi, the only other sizeable coffee auction in the world is in Bangalore, India. Since Indian liberalization, when producers were no longer compelled to sell their coffee in the auction, its importance and volumes have diminished. The auction system is still the main price discovery point for the tea trade. However, significantly, there are no futures markets for tea. In the case of coffee, the New York and London coffee futures markets will remain the primary price discovery points for the foreseeable future.

Whilst a strategy for promoting and marketing quality *arabica* and possibly washed *robusta* is essential, we would recommend caution before embarking on what could become an expensive “white elephant”. The following key questions need to be addressed:

- An auction would offer mainly *arabica*. The volume and number of Ugandan producers of *arabica* are small, and they seem to have market access to the international trade already, and some have already made limited inroads into the gourmet, organic, and Fair Trade markets. Therefore, who would use the auction? Furthermore, around 60% of Ugandan coffee exports are controlled by about seven exporters, mostly internationally linked, companies, with the facility of hedging on the New York and London futures markets. Would they patronize a Ugandan auction, when they have the option of buying direct from *arabica* millers, which is a more efficient marketing method for traders?
- An auction involves additional transaction costs and lengthens the marketing chain. A network of brokers and authorized warehouses will be involved. Cataloging and sampling of lots for sale take time, and result in delayed receipt of proceeds by sellers. Therefore, does cost–benefit analysis justify setting up a coffee auction?
- Are there more efficient methods of promoting Ugandan *arabica* and washed *robusta*? For example, has the idea of establishing overseas promotion offices, e.g., in the EU, been mooted?
- Those coffee producing countries that have achieved some success in promoting their quality coffee to the speciality market have not found it necessary to introduce auctions at origin, e.g., Costa Rica, Guatemala, Papua New Guinea, and Ethiopia. Their marketing strategies should be studied and lessons learned.

A constraint to transaction costs efficiency is the availability of adequate finance, particularly at the level of small-scale farmer and trader. The international trading houses normally have sufficient funds to finance their activities through their overseas connections. An opportunity exists to examine whether warehouse receipt financing could increase liquidity in the coffee marketing chain. This issue is being investigated in the context of other Ugandan commodities, such as grain and beans.

A major constraint to transaction cost efficiency results from Uganda’s location as a landlocked country. The transport costs between Kampala and Mombasa are a burden on the industry and reduce net prices to producers, as Uganda must remain competitive on world markets in relation to other origins which do not have to bear high internal costs of this kind.

Freight costs from Kampala to Mombasa, currently around US\$75/t, have come down from about US\$120/t five years ago. However, this figure still represents a high percentage of the current value of Ugandan coffee. We would suggest that smaller exporters consider combining their volumes for offer to freight companies with a view to obtaining discounts in return for making larger volumes available.

Low producer prices and the need to protect farmers from the vagaries of the world market are a particular concern currently of donor organizations. The World Bank and

Common Fund for Commodities (CFC) have recently funded studies on price risk management and how tools such as futures and options can be utilized to protect farmers' incomes from adverse price movements. We have seen recent studies relative to Tanzania. The UCDA should endeavor to obtain access to current knowledge and plans in this regard to assess their relevance to Uganda coffee.

Raising farmer incomes

Postharvest handling and farmer associations

Farmers are not currently maximizing their coffee revenues because their postharvest drying is not as careful as it could be. The suggestion is that simple and inexpensive drying techniques would improve quality, increase sellable volumes, and therefore raise farm revenues. We believe that the problems with this argument are twofold. First, smallholder coffee farmers grow more than just coffee. They are currently paying less attention to coffee because they are putting more effort into other, more lucrative activities. Widespread improvements in postharvest handling are, therefore, unlikely to occur until coffee prices recover. The second factor acting against improvements in on-farm postharvest quality is the small quantities of coffee that each farmer produces. If a farmer takes unilateral action to improve quality, it is highly unlikely that he will receive quality premiums. A trader will buy his small quantities of coffee and, in assembling tradable quantities, will mix his good quality *kiboko* and the indifferent quality *kiboko* bought from other farmers. Any advantage of high quality is therefore lost both to the trader and the farmer.

This suggests that farmers could benefit from grouping to sell tradable quantities of higher quality *kiboko* and receive higher prices. One of the most famous examples of such an organization is the Kyibinge Coffee Farmers' Association, which has become a "must see" stop-off on the coffee consultant's itinerary. Without doubt, the Association has enjoyed considerable success in marketing its coffee. As a result of careful postharvest quality practices, the high proportion of screen 18 beans that its *kiboko* yields, and its ability to assemble *kiboko* in tradable quantities, the Association has been consistently able to negotiate premiums of 20 to 25% over the market price. However, critics characterize the Association as an outgrower scheme that is based around one particularly large coffee farm. Most members, we were told, are passive participants who merely supply small amounts of coffee. While our firsthand impressions of the Association suggest that its operations are more democratic than this, we nevertheless believe that its success largely rests on the strength that the key large farmer lends to the organization. Replicating its success in most other places where large farms do not exist may therefore be difficult.

The history of farmer organization in the coffee industry is not auspicious. The collapse of the government-imposed cooperative system has left coffee smallholders with a bitter attitude towards organized groups. Despite this, farmer associations are apparently beginning to emerge. But to avoid mistakes of the past, we believe that the best form of government support will involve promoting the possibilities and benefits of organization and then building the capacity of those groups that volunteer for assistance. Clearly, the

UCDA, the Uganda Coffee Farmers Association, and NAADS would have crucial roles to play in creating this nurturing type of support.

Summary of findings

Uganda's coffee supply chain is competitive and efficient. There is little that can be done specifically within the supply chain to reduce marketing and processing costs.

- The best opportunities for cost reductions come from general improvements in roads and from efficiency improvements in railways.
- There is no particular policy, regulatory, and institutional constraint to transactions within the marketing chain and the UCDA is playing a valuable role in monitoring, regulating, and promoting the industry.
- Low producer prices near or below the cost of production threaten the long-term sustainability of the sector.
- Prices and price formation at the farmer level of the supply chain are not currently transparent.
- Freight rates from Kampala to Mombasa, although reduced in recent years, represent a heavy burden on the industry and reduce prices to farmers.
- Processing and marketing washed *robusta* may have some net benefit but it will not be as large as commonly predicted.
- Market focus should include exploiting the growing speciality (organic, shade/bird friendly, Fair Trade, and gourmet) coffee markets.
- The creation of coffee farmer associations is hampered by the unfortunate history of farmer cooperatives in the subsector. Nurturing new associations will require a careful approach of awareness raising and capacity building.

Recommended implementation plan

1. Nurturing and building the capacity of farmers groups

We recommend the encouragement of farmers' groups as the key to improving coffee quality, profitability, and marketing efficiency. We commend the initiatives that are currently being undertaken by the UCDA and the Uganda Coffee Farmers' Association (UCFA) and recommend that assistance be sought from appropriate donors such as the World Bank and the EC. Support to farmers' groups should be guided by the general conditions for successful FCEs outlined in the first section of this report.

2. The development of rural finance through warehouse receipt financing

We recommend that developments in warehouse receipt financing being proposed under the GoU's Export Competitiveness Strategy should be extended to include coffee.

3. Reassessment of the case for centralized pulperies

We recommend that the centralized pulperies system at village and urban levels, widely used during the coffee cooperative period, should be reassessed for *arabica* wet milling. The reintroduction of such a system would improve parchment quality but its financial cost–benefit ratio should be carefully analyzed. The UCDA, Uganda Coffee Farmers’ Association, and private sector participants (perhaps through the Uganda Coffee Trade Federation) are the most appropriate bodies to support the necessary feasibility study.

4. The promotion of improved marketing information at rural level

Current initiatives, such as UCDA’s marketing information service through its daily coffee price and market analysis report, are disseminating coffee prices (world levels for *robusta* and *arabica*, and local prices for “FAQ”, *kiboko*, and parchment) to exporters. We suggest that this service be made more widely available at the farm level through current initiatives such as FOODNET’s micro-MIS (described in the first section) and MTN’s new price information service. To promote transparency in rural locations, we also recommend that the UCDA and the industry use published formulae for the calculation of indicative prices at farm-gate and delivered mill levels. Examples of how such a system could work are given under the cotton section of this report.

5. Joint exporters’ freight agreement

We recommend that exporters combine their coffee volumes and negotiate a joint exporters’ freight agreement with shippers for the transport of coffee from fot mill/Kampala basis to overseas markets. We suggest that this task be coordinated by the Uganda Coffee Trade Federation. We recognize that this initiative may not be appropriate for large foreign-owned exporting companies, who already benefit from concessionary rates with shipping companies.

6. Use of export credit guarantee funds

The joint exporters’ freight agreement would require exporters to change from selling fot/for Kampala to either fob Mombasa or c and f destination port. This will require increased access to financing. We believe that currently available Export Credit Guarantee Funds should be used in this context.

The promotion of the speciality arabica and washed robusta premium markets

We recommend that plans to introduce a Ugandan coffee auction and widespread washed *arabica* wet processing facilities should be halted until studies can be conducted on the following.

- Examine the costs and benefits of a voluntary Ugandan coffee auction for *arabica* and washed *robusta*. The study should make a realistic assessment of potential transaction volumes and estimate the additional transaction costs that the auction would create.
- Consider alternative strategies for promoting Ugandan coffee abroad.
- Examine the international market for washed *robusta*.

Cotton

Introduction

This section addresses the specific issues relative to the transaction costs of cotton marketing.

On the advice of sector stakeholders, the following cotton producing districts were visited (cotton ginneries visited shown in brackets), exhibiting representative, yet contrasting, features of the country's cotton trade:

Pallisa/Mbale: (Iki-Iki Ginnery, Pallisa, and Bugema Ginnery, Bunghoko, Mbale-North Bukadi Cotton Company).

Iganga: (Busembatia Ginnery, Bugweri, Iganga-Pramukh Agro Industries).

Kasese: (Kasese Ginnery, Kasese town, Nyakatonzi Growers Co-Op).

In addition, facilities for crushing cottonseed were visited in Jinja (Nile Agro-Industries Ltd).

Consultations were held with the Cotton Development Organization (CDO), district agricultural officers, district commercial officers, cotton farmers, cotton farmers' groups, agents, cotton collection centers, cotton ginners, cooperatives, and cottonseed milling companies.

During the course of the study the following recent reports and papers were consulted for reference purposes:

- COMPETE project, Cotton Sector position paper, April 2001 (USAID).
- COMPETE project, The path forward for Uganda's Cotton and Textile Sector, January 2002 (USAID).
- Brief on the Cotton and Textile Industry in Uganda (PMA, undated).

Background to production and marketing

Cotton was introduced into Uganda in 1903 as a cash crop and for poverty alleviation; the roles remain the same after almost 100 years. It is almost exclusively an export-oriented crop with no value added, apart from some cottonseed crushing into oil and cake and a small textile sector. It is also an annual crop and this distinguishes it from Uganda's other important agricultural export crop, coffee.

Prior to the 1970s, Uganda ranked third among African cotton producing countries, after Egypt and the Sudan. Production peaked in 1970 with a record output of 87 000 t output from 900 000 ha. Most cotton-related activities were controlled by monopolistic public sector enterprises. The Ministry of Agriculture was responsible for research and seed multiplication; the Lint Marketing Board was responsible for supplying seed material to farmers for planting, oil milling, lint marketing, both export and domestic, and generally regulated all aspects of the sector. Cooperative unions, each having its own network of producers and ginning operations, were responsible for both primary marketing and processing.

From the 1970s onwards, political instability and inappropriate macroeconomic policies devastated the Ugandan economy. Inefficient ginning and marketing activities, the inability of cooperative unions to pay cash to farmers for their cotton, and a lack of research and development, extension services, and seed multiplication activities engendered the collapse of the cotton sector. By 1987, cotton production had declined to an all-time low of 2000 t.

In 1992, with the assistance of the World Bank, Uganda embarked on a major reform program designed to resuscitate the cotton sector by reducing and redefining the role of the GoU, encouraging private sector participation and investment, and liberalizing ginning and marketing. Following a transitional period, the sector has gradually recovered to its current level of production of over 20 000 t/year.

Today, GoU participation in the sector takes place largely through the CDO. (See comments below.)

Contribution to the economy

Cotton lint is currently Uganda's fourth largest agricultural foreign exchange earner, behind coffee, tea, and tobacco, with 21/130 t, valued at US\$21.94 million exported in 2000, about 5.5% of the total export value. (Source: Uganda Bureau of Statistics (UBS) Key Economic Indicators, January 2001.) The sector has the potential to increase, dramatically, its contribution to the economy through greater foreign exchange earnings, value addition, and rural and urban employment creation. The potential scale of the sector is illustrated by the fact that in the 1960s, cotton contributed some 40% of the country's foreign exchange earnings.

Poverty eradication

Cotton is an important cash and poverty alleviation crop in many districts of Uganda, providing rural employment, particularly in remote areas, at both the farm and ginnery level. The sector is currently estimated to contribute to the employment of about 10% of the population in the East, North, and West of the country, numbering around 2.5 million people. It has been forecast that the continued revival of the sector could have a positive impact on around 15% of the rural population, and contribute significantly to the alleviation of poverty. Furthermore, the development of domestic value addition activities, such as textiles, oilseed crushing, soap and cooking-oil manufacture, and compound feedstuff formulation, would enhance urban employment opportunities. Industries serving the sector, such as transport, packaging, and financial services would also benefit.

Supporting institutional framework

Since the reforms of 1992–1993, the cotton sector has operated through an institutional framework almost entirely controlled by the CDO. The CDO was initiated by statute and has a mandate to represent the cotton industry as a whole, including the textile and cottonseed sectors. It monitors the production and marketing of cotton, including the registration of new entrants, and can charge for its services, borrow, manage property, and

levy cess. Whilst the CDO is the key sector institution, it collaborates with other public sector bodies such as MAAIF, MoFRED, and the PMA Secretariat. The GoU's policy for the cotton industry is embedded in its overall broader policy for the agricultural and industrial sectors.

Most cotton-related activities are now controlled by the private sector, which is represented by the Uganda Cotton Exporters Association (UGCEA). The cooperative union movement, which played a major role in the sector prior to liberalization, is now largely defunct, with only seven unions identified amongst the 34 ginneries registered by the CDO in the current season.

Sectoral issues

The major issues identified during the study are as follows.

- The need to ensure sustainability and development through improved yields, net farm-gate prices, and consequent profitability to farmers.
- The need to attract investment, both domestic and foreign, to the sector to promote large-scale commercial farming and the rehabilitation of old and outdated technology in the ginnery operation.
- Inadequate market information at farmer and ginnery level and the need to develop price risk management techniques.
- The need to develop value addition in the sector.
- The need to review GoU support for the sector and the ongoing role of the CDO.

Cotton supply

Cotton is an annual crop and world production varies between around 16 and 20 million bales/year. The largest producers are China, USA, India, Pakistan, and Uzbekistan. The largest exporters are the USA (27%), Uzbekistan (17.63%), and Australia (9.65%). Other important exporters are Syria, Greece, Argentina, and Mali. Much of the world's cotton is grown on large commercial farms and yields are considerably higher than those achieved in Uganda. The world's average yield is estimated at 592 kg/ha, which is equivalent to 1460 kg/acre, whereas the highest yield quoted during the study was 1000 kg/acre, with national averages around 350/450 kg/acre. The above statistics relate to the 1997–1998 season, and it is assumed that the overall global cotton situation has not changed radically since then. (Source: ICAC Cotton Review, August 1998.)

Cotton is grown in Uganda by small-scale farmers, on average holdings of one acre, in 31 of Uganda's 45 administrative districts. The dominant production areas are the eastern, northern, West Nile, and southwestern regions.

The main cotton seasons in the dominant production areas are as follows:

1. Eastern districts—plantings in June–July and harvesting–ginning from December to April.
2. Southwestern districts—plantings in August–September and harvesting–ginning from January to April.

The season's production is estimated at around 120 000 bales (of 185 kg) or about 22 200 t, which is a considerable recovery from the low production point reached in 1993–1994 (the season following the reform of the sector) of 27 000 bales, or 5000 t. (Source: ICAC.) However, the sector has far to travel to reach the production levels achieved in the 1960s, which were around 450 000 bales/year or about 84 000 t.

Cotton demand

Uganda has very suitable soil and climatic conditions for cotton cultivation and has good quality seed producing quality cotton with a low level of trash (< 0.02), which has traditionally commanded a premium on world markets.

Uganda's cotton sector is overwhelmingly export-oriented, with less than 10% being absorbed by domestic value addition enterprises, primarily textiles. In addition to the demand from the domestic textile industry, cottonseed is crushed into oil, which is used for the production of cooking-oils and soap, and cake, which is used in the compound animal feedstuff industry.

Price discovery

The CDO advise indicative farm-gate prices/kg of seed cotton around at the beginning of the season, between 15 November and 31 December. The prices remain in effect for a season and the current season's indicative price is Ush 255/kg. Prices are worked back from cif main European port (EMP), Europe being a major market for Ugandan cotton. Details of how the CDO calculate the indicative price to farmers were not made available. Fierce competition between middlemen (traders) and agents representing ginneries is considered a feature of the market, although during the two months elapsed time taken for the study, farm-gate prices do not appear to have moved from the Ush 255–260/kg level.

The key price reference point for the Ugandan cotton sector is the Liverpool index which, according to information published in the *Public Ledger*, a UK daily commodity journal, is a composite of cif main European prices, in US cents/lb., for the following cotton origins: USA, Australia, African French franc zone, Uzbekistan, Syria, and Greece.

Traditionally, Uganda has enjoyed a premium against this index, for example in 1999, when the index was at US\$0.44/lb. (cif EMP basis) traders were bidding US\$0.42/lb. (fot ginnery) for Ugandan cotton. Currently, with the index standing at US\$0.42/lb, we were informed that traders are bidding only around US\$0.33/lb. These levels are based on fot Kasese ginnery. If the figures advised to us are correct, there has been a decline in the Ugandan premium of around US\$0.7/lb., over the last three years. Some stakeholders attributed this decline to the following:

- declining quality
- incorrect grade classification
- contract default
- nonpayment of ginnery prefinance

Therefore, it is essential that good business practice and ethical standards be maintained and followed by all exporters to regain Uganda’s reputation as a premium quality and reliable cotton shipper.

Uganda is a small producer in global terms. Its current output of around 18 500 t represents only about 0.1% of world production (around 20 million t) and about 0.3% of world exports (6 million t). Therefore, Uganda’s production and export levels do not affect, significantly, the global supply and demand equation and hence, world price levels.

World cotton prices are volatile. For example, in 2001, New York futures (NYCE–second position) levels ranged from highs of around US\$0.60/lb to lows of around US\$0.30/lb. It is appreciated that farmers need stable prices throughout the season and should not be subjected to daily changing levels, but a more direct and transparent link to the world market should be considered.

Farmers’ prices, as a percentage of world prices, have ranged between the 1994–1995 and 1999–2000 seasons, from a high of 60% in 1997–1998 to a low of 42% in 1994–1995. (Source: CDO.) The maximization of farmers’ incomes as a percentage of world prices and price transparency should be major objectives of the sector, and our proposals in this regard are contained in the Recommended Implementation Plan section of the report below.

The cotton marketing chain

The marketing chain for cotton is illustrated in Figure 3.1. Regional differences in the marketing chain are minimal.

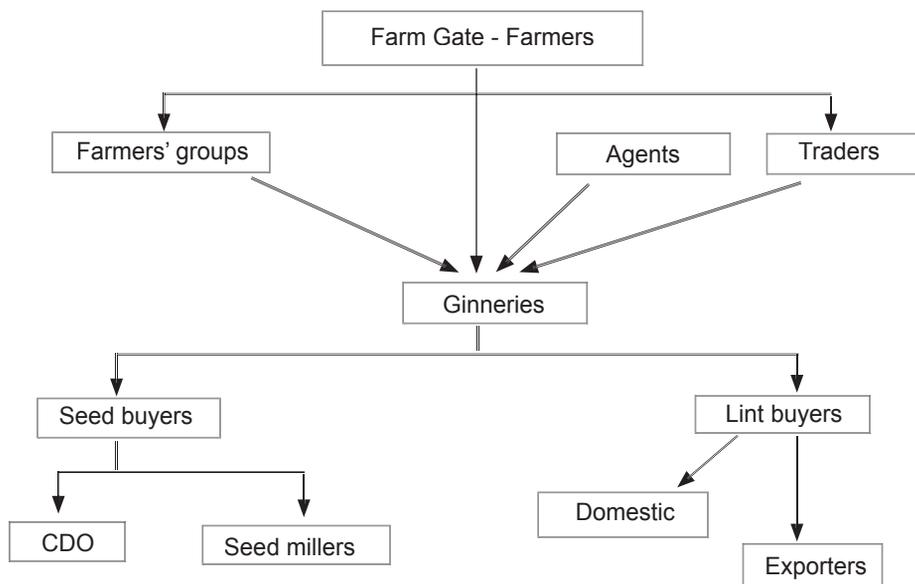


Figure 3.1. Cotton marketing flow diagram.

Marketing cost analysis

Seed cotton cost of production

Although outside the strict terms of reference of the study, we consider that the farmer's cost of production is a key element in analyzing transaction costs within the sector, and has important implications for the future of Ugandan cotton. The CDO stressed that production costs have a great bearing on rural incomes, particularly as farmers do not retain their seed for planting. The farmer sells his seed cotton with lint to a ginnery that retains and owns the seed.

The current and future profitability of the cotton production enterprise to the small-scale farmer will determine whether the cotton sector continues to recover to levels last seen in the 1960s, when it contributed around 40% of Uganda's foreign exchange earnings. Therefore, the following cotton costs of production, based on smallholdings in the Western Region (Kasese), have been ascertained (Table 3.1).

Assumption

- Average yield: 800–1000 kg/acre (Kasese); 350–450 kg/acre (national average).

The Pallisa district achieves only around 175–225 kg/acre due, mainly, to poor soils.

Note: The cost of production (COP) (Ush 229.10/kg) above is based on a high yield in national average terms and in this case the first season seed cotton production is on a rented farm on virgin land. With planting taking place on non-virgin land (i.e., a second plowing is not required), on a hired farm the COP would be Ush 201.35/kg, and Ush 185.70/kg if the farm is owned.

The above COP levels should be viewed against the current farm-gate price for seed cotton in Kasese of Ush 260/kg.

Although the above figures need further research and analysis, they give some indication of the profitability of the cotton enterprise to a small farmer. For example, an owner of a 2.5 acre farm, selling to a Kasese ginnery, on a farm-gate basis, would expect a net income this season of around Ush 167 175 (i.e., $260 - 185.70 \times 900 \times 2.5$).

At current price levels, cottonseed production seems to be a loss-making farming enterprise at national average yields of 350–450 kg/acre. However, cotton is a part of the farming system for smallholders as the crop cleans and weeds the soil, prepares seed beds, and adds and fixes nitrogen and other nutrients. It is usually grown within a crop rotation scheme and if farmers lose on their cotton crop, they can usually gain on the next season's rotated crop, e.g., beans. Despite this factor, unless yields and net unit prices to farmers can be improved, the long-term sustainability of the Ugandan cotton sector is under threat.

Farm inputs

The cost and lack of credit for key farm inputs—planting material, pesticides, fertilizers, spray pumps, spraying chemicals—have a major effect on yields and cost of production, and hence farmer profitability. The UGCEA currently impose a levy on ginners of Ush 35/kg (payable after seed cotton is weighed and before export) to cover the provision of seed to

farmers. This is factored into the farm-gate price. This levy, which is paid into a fund held by the UGCEA, dates from a CDO program started around 1998–1999, to assist farmers in obtaining inputs. In season 1, the levy covered seed, spray chemicals, pesticides, and spray pumps. In season 2, the levy covered only seed and pesticides. In season 3, only seed is covered by the levy, as current CDO philosophy, in accordance with free market theory, is that farmers should retain the bulk of the farm-gate price and obtain inputs themselves. Consequently, the levy has been reduced progressively from around Ush 150/kg to the current Ush 35/kg. Exact figures were not available.

Table 3.1. Costs of production: seed cotton/kg.

Cost item	Cost	Unit cost Ush /kg		Comments
		Yield: 900 kg/acre	Yield: 450 kg/acre	
Bush clearing	10 000/acre	11.10	22.20	Slashing/burning/ tree uprooting.
Farm rent	15 000/ acres/year	16.65	33.30	If hired, and not owned.
Plowing	35 000/ acre	38.85	77.70	
Second plowing	25 000/ acre	27.75	55.50	On virgin land only.
Planting	10 000/ acre	11.10	22.20	
Thinning	5 000/ acre	5.55	11.10	
First weeding	15 000/ acre	16.65	33.30	
First spraying	3 000/ acre	3.35	5.70	
Second weeding	10 000/acre	11.10	22.20	
Second spraying	3 000/ acre	3.35	5.79	
Third weeding	8 000/ acre	8.90	17.80	
Third spraying	3 000/ acre	3.35	5.70	
Fourth weeding	8 000/ acre	8.90	17.80	
Picking	50/kg	50.00	50.00	Picking average = 40 kg/day.
Cost of baling/bagging	Ush 500/bag	12.50	12.50	Farmers use 40 kg polypropylene bags.
Total costs of production		229.10	392.79	

Source: Nyakatonzi Growers Cooperative, Kasese.

Table 3.2. Seed cotton—from farm gate to ginnery.

Cost item/price	Pallisa	Iganga	Kasese
Farm-gate price (seed cotton)	255/kg	255/kg	260/kg
Transport (to ginnery)	20–25/kg	20–25/kg	20/kg
Agents commission (includes labor costs/bagging/security)	30/kg	20/kg	20/kg
Delivered ginnery price	315/kg	320 /kg	335/kg

Source: Farmers/Agents/Transporters/Ginneries.

From farm gate to ginnery

- The delivered ginnery price is before the deduction of a Ush 35/kg levy payable to the UGCEA to cover the distribution of seed to farmers for the following season's planting. The levy is factored into the farm-gate price received by farmers.
- If farmers bring seed cotton to the ginnery, either head-loaded or by bicycle, they receive a lower price than agents delivering by pickup truck, i.e., Ush 290–295/kg, presumably because they deliver small quantities in polypropylene bags. Ginneries discourage the use of polypropylene bags due to their adverse effect on quality.
- Agents may be local traders, commercial farmers, or farmers' groups.
- The ginnery provides gunny bags (hessian cloth), the desired mode of seed cotton packing, through their agents, to farmers.
- Information gained in Kasese was given by a cooperative, and their mode of operation differs from private ginnery companies who have no direct interest in seed cotton production (Table 3.2).
- An important issue arising from the study seems to be that the private ginneries will raise their purchase price of seed cotton (e.g., the recent rise from 305/kg to 315–320/kg in Iganga/Pallisa districts), delivered ginnery, but the farm-gate prices have remained the “one off” season's indicative price given by the CDO. Additional margins seem to go straight to agents, as there is no indication of higher internal transport/labor/packing charges.
- Location is an important cost factor, particularly the location of the buyer (ginnery) relative to the farmer which influences transport costs.

Processing (Ginning)

The stages of the ginning process and operational considerations are as follows.

- Delivery of seed cotton to ginnery by farmers (by head loads and bicycles) and agents (by pickup trucks/lorries).
- Weighing/offloading.

- Sorting (agents pay casual labor costs)/Grading (according to moisture/foreign matter (stones, sand, etc./color) into: AR — first grade, BR — second grade.
- Temporary storage.
- Precleaning/drying.
- Seed cotton transferred to elevated platform.
- Gin feeders (more foreign matter removed).
- Ginning operation (lint is separated from seed).
- Conveyors transport lint to condensers where it is pressed (hydraulic) for baling.
- Seed is transported by conveyor to seed store.
- Lint grading (100% sampled) and cleaning.
- Baling—every bale is weighed (185–190 kg) by bale clerk (CDO representative permanently present to allocate numbers).
- Each bale wrapped in a cloth and tied and marked.
- 1 lot = 50 bales.
- Processing losses: < 2 %.
- Ginners work up to 2 × 12-hour shifts during the season, depending on throughput of seed cotton.
- Ginners operations operate for 4–5 months, December/January to April, with about a month for servicing, repair, and maintenance of machinery and equipment.

Note

- National average capacity utilization appears to be around 60%–70% and costs have been calculated at 60% and 90%.
- Ginning losses of around 2% have been ignored.
- The margin on ginning costs is based on estimates included in contract ginning charges of around Ush 180/kg.
- The current national ginnery capacity is 800 000 bales/year and as current production is only around 100 000 bales/year, there is overcapacity in the country. Those companies with more than one ginnery, located in relative proximity, can adopt a policy of closing one ginnery, and perhaps, use it as a buying and collection center, e.g., the North Bukedi Cotton Company. Such a policy enables a company to operate their active ginneries at optimal capacity.
- Current ginning technology is old, and although considered by stakeholders to be appropriate for Uganda, investment in new technology would doubtless reduce processing costs through enhanced efficiencies.

Major constraints to ginning efficiency

- Insufficient good quality seed cotton to operate the ginnery at optimal capacity.
- Poor quality seed cotton with a high percentage of admixture (stones, sand, etc.)
- High electricity costs.
- In some areas, inconsistent power supplies from the national grid.
- High cost of fuel to operate standby generators.

Cottonseed (for sale)

The cost of cottonseed sales has been taken at Ush 130/kg, although prices vary in accordance with distances from cottonseed mills. Ginneries near Jinja, Mbale, and Kampala are likely to obtain around Ush 130/kg, ex-ginnery, whereas in the Kasese region prices are around Ush 80/kg, due to high transport costs to the nearest oilseed-crushing mills. However, we were advised that the CDO will pay Ush 130/kg, ex-ginnery, for cottonseed for planting material, regardless of location.

Cottonseed (for planting material)

As it is important that the ginnery retains enough seed to satisfy farmers planting requirements, each ginnery must retain a quota of 300 t at the beginning of the season (Dec–Jan) for treatment (significant costs associated with this operation are dressing/delinting/bagging) by the CDO (at designated ginneries). The treated seed is distributed to farmers for the new season's plantings. On every bale (185–190 kg) over 5600 bales produced in a season a ginnery must retain and make available to the CDO 15% of recovered cottonseed for planting purposes. Whilst the ginnery owns the resultant cottonseed separated during the ginning process, the Ush 35 kg levied by the UGCA to cover the cost of supplying the farmer with planting material is factored into the farm-gate price. Therefore, the farmer, in reality, is not being supplied with free seed.

Security at the time of seed storage and transport is also a cost in this operation as untreated seed is valuable for crushing. Furthermore, the obligation to retain seed at the beginning of the season affects the time of its availability to cottonseed millers.

Cotton lint marketing and sales costs/profitability

Marketing and sales costs of lint have been included in Table 3.3 at Ush 40/kg with output based on 60% capacity utilization.

The total marketing and sales cost of lint is calculated at Ush 1187/kg, for ginnery, which converts to US\$0.69/kg, or US\$0.31.30/lb (the cotton lint international trading currency and weight unit).

Note: Exchange rate: Ush 1720 = US\$1.00.

Weight conversion: 2.2046 lb = 1 kg

The market price was quoted at US\$0.36/lb, ex-ginnery, the reference point for transport costs being Kampala/Tororo. On this basis, ginneries in areas such as Kasese are

at a disadvantage and prices quoted by buyers in this instance deduct transport costs of US\$0.3/lb, i.e., US\$0.3/lb, ex-ginnery Kasesi. Therefore, on the current market, profitability seems marginal at around US\$1.70/lb (US\$3.75/kg/Ush 64/kg). At current indicated cost and price levels, a ginnery producing 10 000 bales/year and also making an additional margin on ginning of Ush 30/kg, would achieve a profit of around US\$100 000/year.

It should be emphasized that the above calculations are based on secondary information of a very small sample of the ginning sector and are merely indicative. Additionally, market prices can be volatile and prices quoted were those pertaining at the time of field visits.

Table 3.3. Cotton lint: ginning and sales/marketing costs.

Cost item	Unit cost Ush/kg lint		Comments
	60% capacity utilization	90% capacity utilization	
Cost of raw material	1005.00	1005.00	Ush 335/kg seed cotton converted to lint at 3:1
Fixed costs			
Depreciation	50.00	50.00	On plant and machinery
Long-term loans interest	20.00	20.00	For ginnery plant, machinery and equipment
Permanent staff	15.00	15.00	
Cess	32.00	32.00	Payable to CDO
Crop finance	40.00	40.00	Interest at 12%/year US\$-based, for 2 months.
Baling materials	50.00	37.50	Hessian cloth and metal ties
Variable costs			Increased throughput of seed cotton will reduce unit costs of these items
Electricity	30.00	22.50	
Casual labor	35.00	25.25	
Marketing costs			
1. Classification	10.00	7.50	
2. Documentation and communication	30.00	22.50	
Margin on ginning costs	30.00	30	
Total lint cost	1317.00	1290.75	
Less realized cottonseed sales	130.00	130.00	
Total lint cost	1187.00	1160.75	

Source: interviews with ginners.

Ginneries consulted all sold lint sales on a lot ginnery basis, mainly to Nairobi and via Mombasa to Asia and Europe, with companies such as ACE and Société Générale de Surveillance (SGS) handling documentation, inspection, etc.

Although ginneries are not involved in onward freight and forwarding costs, shipping companies consulted in Kampala, e.g., Maersk and Transami quoted freight and forwarding rates, with through bills of lading at US\$2300 per 40 ft container (100–108 bales) via Mombasa to the Far East.

Processing (cottonseed)

Vegetable oil millers based in Kampala, Jinja, and Mbale purchase cottonseed from ginneries for milling into refined, bleached, and deodorized (RBD) cottonseed oil, used primarily in cooking-oil and cottonseed cake used in the compound animal feed industry.

The oil content recovery from crushing cottonseed is 13%, with 55% oilcake recovery and 32% losses (husks which can be used as fuel for firing boilers).

The major companies involved in the business are Nile Agro-Industries and Madvani (Jinja), Mukwano and Kengrow (Kampala), and Rafiki (Mbale). RBD cottonseed oil is usually blended with other oils, e.g., sesame seed oil, packaged, and sold primarily in the domestic market as cooking oil. There is a small amount of regional trade to Kenya. However, as Uganda imports about 80% of its vegetable oil, mainly palm oil from Malaysia, quantities available domestically can easily be absorbed locally.

The stages in the cottonseed milling process are as follows:

- Unbagging of cottonseed.
- Decortication.
- Seed transportation to presses by elevator.
- Crude oil extraction by screw presses.
- Crude oil movement to the oil refinery stage.
- Neutralizing.
- Bleaching.
- Deodorizing
- Oil cooling.
- Oil blending, if required.
- Jerry-can/bottle/tin filling station/packing/labeling.

Major cost elements:

- Steam (fired by husks for cottonseed. Sesame seed/soybean have no husks, therefore sometimes fuelwood is bought).
- Electricity (from national grid) to drive elevators/motors for conveyors and presses, etc.
- Water (own borehole).

- Labor.
- Packing materials.

Processing costs at 50% and 100% capacity utilization are as follows: (Table 3.4)

Note: Due to seed shortage, most mills can attain only around 50% capacity utilization.

Cooking oil, usually a blend of cottonseed oil and sesame seed oil, is currently sold at Ush 28 500/20 liter jerry-can, plus 17% VAT.

Cottonseed cake is sold at Ush 120–130/kg, in 50–60 kg bags, delivered feedmill.

Table 3.4. Cottonseed: processing, costs.

Cost item/prices (Ush/kg)	50% capacity utilization	100% capacity utilization
From ex-ginnery to oil mill		
Cost of seed, ex-ginnery	140.00	
Bagging		
Labor		
Transport		
Other (taxes, etc.)	20.00	
Cost of seed, delivered mill	160.00	
Milling costs		
Fixed		
Depreciation	2.00	2.00
Permanent staff labor	9.00	9.00
(e.g., management/security)	–	–
Licence fee	1.00	1.00
Financing (interest)	2.00	2.00
Variable		
Electricity	12.00	6.00
Fuel	1.00	0.05
Labor	4.00	2.00
(non-permanent/casual)	2.00	1.00
Water	1.00	0.50
Effluent treatment?	2.00	1.00
Weighbridge costs	1.00	0.50
Plant and machinery maintenance	10.00	5.00
Administration	5.00	2.50
Cost of RBD cottonseed oil, fot mill (excluding packing and taxes)	213.00	195.00

Source: interviews with cottonseed millers).

Constraints and opportunities

The following constraints and opportunities to increasing production, transaction, marketing, and processing efficiency have been identified.

Poor yields, productivity, net prices, and farmer profitability

The average size of cotton holdings in Uganda is one acre, which prevents the introduction of economies of scale at the farm level. This factor, coupled with lack of agricultural input credit, low production technology, postharvest losses, lack of on-farm/rural storage facilities, and poor marketing information and efficiency, results in low yields and profitability. Furthermore, these constraints to increased production have limited the area planted to cotton that is unable to realize its full potential, estimated to be 1 million bales/year (85 000 t). The liberalization of the cotton sector in the 1990s removed much of the support mechanism that farmers had received from the cooperative unions and other public sector bodies during the 1960s and 1970s and which had served the industry well. Whilst political instability, corruption, lack of finance, and inefficiency had driven the sector to the point of collapse, and reform was essential, the previous support mechanism to farmers has not been replaced by the private sector, as liberalization theory had predicted.

With cotton production on the increase, there exists the opportunity to encourage efficient and capable farmers' groups to access credit for inputs and to pool their crops to achieve marketing efficiency, and better quality and net prices. Furthermore, the monopsonistic structure of the cotton ginning sector (one buyer—many sellers—no buying competition at processing level) lends itself to the introduction of contract farming/outgrower schemes. Such developments would assist in improving farmer profitability by developing farmer/ginning cooperation to their mutual benefit.

The inflexibility of the farm-gate price

The CDO publishes an indicative farm-gate price only once at the beginning of the season. This encourages ginneries to treat the indicative price as a maximum farm-gate price. Where delivered ginneries prices have improved, as seen during the course of the study (from Ush 305 to Ush 315–320/kg), the farm-gate price has remained unchanged at Ush 255/kg, and the additional margin accrues solely to the agent/trader.

In order to establish price transparency and link farm-gate prices more closely to market prices, the CDO and the UGCEA should consider introducing a mutually acceptable, but voluntary, regular, fluctuating, indicative price. This would be based on an agreed formula calculated from world prices, with cost deductions at each stage of the marketing chain. Such formulae work well for smallholders in other crops in other parts of the world, and an example is given in Annex 2 (PNG oil palm smallholders' formula). The formula system lends itself particularly to contract farming/outgrower schemes and nucleus estates.

Through the pooling of their crop, farmers can achieve economies of scale for transportation purposes and assume the role of ginneries agents themselves, thus improving prices. At present, only larger scale commercial farmers are able to assume this role.

Economies of scale/diversified production systems

The CDO wishes to encourage the development of estate/block farming production alongside smallholder enterprises. The liberalization and privatization of the sector lends itself to investment in commercial plantations on the nucleus estate concept, which has proved successful in other crops in other parts of the world. (See note below.)

Extensive literature exists on the nucleus estate concept with the original model accredited to the work of Phillips (Nucleus plantations and processing factories: their place in the development of organized smallholder production, 1965) The original model allowed for the provision of controlled credit, technical assistance, management and processing, and marketing facilities by the nucleus estate to smallholders. The model assumed that smallholders would use advanced planting techniques and material, fertilizers, spray chemicals, on-farm quality processing and storage methods where appropriate (e.g., cocoa and copra), and the market outlet provided by the nucleus estate. The model promoted the thesis that nucleus estate schemes would provide a method of concentrating scarce resources (capital, credit, management, and extension workers) to obtain optimum results for all stakeholders. It was also envisaged that smallholders could supply both their own food subsistence requirements and sell to the estate and factory work force. This model and theory of the nucleus estate concept have been generally accepted, with some modifications, in the intervening years since 1965.

The concept is a development of outgrower schemes/contract farming and in successful models, e.g., PNG oil palm, has involved the introduction of price formulae to determine an equitable price for the smallholders' raw material to be supplied to the nucleus estate processing facility.

High rural transport costs

Transport costs between the farm gate and ginnery appear relatively standard in the production areas visited. Poor rural access roads in remote areas inhibit farmer accessibility to the market. High fuel costs, wear and tear on vehicles, and high vehicle maintenance costs, all contribute to transaction cost inefficiency.

The issue of poor rural roads is addressed in the section of the report on crosscutting issues.

Processing inefficiencies

With some 800 000 bales of ginning capacity available in the country, and a forecast production this season of around 120 000 bales, substantial overcapacity exists. Many ginneries are able to operate only at around 60%, which results in suboptimal processing unit costs. Furthermore, many ginneries are old and use outdated technology. The CDO and other stakeholders take the view that the existing technology is appropriate for Uganda's existing cotton sector structure. However, old and outdated technology inevitably results in processing inefficiency, and if the sector is to expand, this issue should be addressed sooner rather than later.

The opportunity exists to study and implement a ginnery rationalization plan, taking into account ginnery locations relative to production areas, larger ginnery units

to promote economies of scale, and the introduction of “state-of-the-art” technology. It is acknowledged that such a rationalization plan will involve substantial financing and incentives (e.g., fiscal) and cooperation within the private sector.

Other constraints to ginning efficiency are high electricity costs and, in some areas, inconsistent supply from the national grid, necessitating the use of standby generators with consequent high fuel costs. These issues are addressed in the section of the report on “crosscutting” issues.

With regard to the cottonseed milling subsector, insufficient seed to run the mill at optimal capacity, high electricity costs, and old, inefficient equipment (> 50 years old in some cases) are major constraints.

The high cost in foreign exchange of imported vegetable oils presents an opportunity to encourage the development of the oilseed-crushing sector to meet the local demand for cooking oil and soap from domestic production.

Market information and access to world markets

Ginneries tend to sell their lint to international traders on fob ginnery basis, partly due to the inability to fund freight and forwarding costs to Mombasa and beyond. Therefore, access to, and knowledge of international markets and end users is very limited.

The opportunity should be taken by ginneries to explore the potential of combining to negotiate an annual freight agreement with international shipping and forwarding companies for the entire cotton output available for export from Uganda. Such initiatives have worked well for exporters in other commodities in other parts of the world, and would have had a twofold positive effect:

1. A reduction in rates through the attraction to shipping companies of capturing a larger share of the country’s freight business.
2. The encouragement of exporters to sell on an fob and cif basis, enabling greater market access.

The role of Government in the cotton sector

The role of the GoU was redefined at the time of reform in the 1990s and the CDO was created as the sole medium of direct public sector involvement in the cotton industry. Some ten years later, there is a need to examine the role of the CDO in the context of the GoU’s support to the sector.

Raising farmers’ incomes

The poor profitability of cotton at the farm level is due, primarily, to low yields and prices. Raising farmers’ incomes is essential to ensure the long-term sustainability and growth of the sector. Global cotton price levels are beyond the influence of the Ugandan industry, therefore, farmers’ incomes must be raised through efficiencies within the internal production and marketing system.

Both production and marketing efficiencies can be improved by encouraging farmers’ groups to enhance their ability to access input credit and improve net farm-gate prices.

Past experience in Africa and other developing countries, particularly related to the cooperative movement, warrants caution in this regard. Successful farmers' groups should be formed from within the farming community owned by farmers themselves, have a clear objective, and eschew commercial activities, which are beyond their capacity. Whilst external assistance is required as a catalyst to formation and capacity building, such outside involvement such be minimal with a view to disengagement when long-term sustainability is achieved. As mentioned elsewhere in this report, many donors have a particular interest in sustainable livelihoods in the rural sector and should be recommended to act as a catalyst in this context.

Related topics

The terms of reference of the study do not include an analysis of value addition in the cotton sector which is being addressed in work being undertaken by the COMPETE project and others. As a general comment, we believe that enormous opportunities exist for the textile industry, which is currently small, underfinanced, and burdened by old and outdated technology. Furthermore, by reason of its regional comparative advantage in the production of high quality cotton, Uganda should take advantage of the opportunities presented by the African Growth and Opportunity Act (AGOA). (The terms of reference of the study do not include an analysis of value addition in the cotton sector, which is being addressed in AGOA.) This was passed by the USA in May 2000 and allows duty-free and quota-free access to the US market for over 1800 African products. Whilst textiles do not automatically qualify under AGOA rules, if certain conditions are met, access will be given.

It is significant that Kenya's textile industry is currently undergoing resurgence, despite the parlous state of its cotton production sector. During the course of the study it was noted that lint exports to Nairobi were on the increase.

Other value-adding activities related to the cotton sector that require encouragement are vegetable oil and cake production for use in consumer goods, such as cooking oil and soap, and the compound animal feed industry.

Summary of findings

- Cotton production at current national average yields and farm-gate prices is unprofitable for farmers in certain areas of the country.
- Farmer profitability will be dependent on improved efficiencies in production, marketing, and processing, enabling economically viable farm-gate prices to be paid.
- The profitability of the cotton enterprise to farmers is essential for the long-term sustainability and growth of the sector. This is the key issue facing the sector.
- Direct measures to achieve this objective include the formation of farmers' groups, greater price transparency and flexibility, R&D, and improved extension services.

- Small-scale farmers are unable to assume the role of ginnery agent and benefit from the commission paid in this context (Ush 20–30/kg). They receive only the farm-gate price whether their crop is collected or they transport it to the ginnery by head-load or bicycle.
- Farm-gate prices are not transparent; the indicative price advised by the CDO remains in force for a whole season despite fluctuations in global levels.
- Transaction cost efficiency is also particularly hampered by high transport costs between remote rural farms and ginneries, high electricity costs and inconsistency of supply, and insufficient seed cotton availability relative to ginning capacity.
- Substantial ginnery overcapacity exists and factory units tend to be old with outdated technology.
- A national strategy for the rationalization of the size and location of ginneries is essential to achieve sustainability and growth of the sector.
- At current prices and levels of processing efficiency, ginneries appear to be only marginally profitable.
- Exporters lack market information, knowledge, and market access and are constrained to sell on fot ginnery basis, which limits their knowledge of endusers' requirements, an optimization of net prices.
- The value-added sector is very small, underfinanced, and unable to take advantage of the opportunities presenting themselves in the textile and oil-milling sectors.
- Following the liberalization of the sector in the 1990s, policy, regulatory, and institutional constraints to the development of the cotton sector have largely been removed. However, the role of the CDO needs to be reassessed to ensure the appropriate level of GoU support to the sector.

Recommended implementation plan

1. The encouragement and capacity building of farmers' groups

We recommend the encouragement of farmers' groups as the key to improving the profitability of cotton growing. We suggest that initiatives in this context are undertaken by the CDO/NAADS/ MAAIF and that assistance is sought from donors under various sustainable livelihoods programs.

2. The development of contract farming

We recommend that initiatives to encourage contract farming be undertaken by CDO, NAADS, and the private sector through the UGCEA.

3. *The promotion of commercial plantations/block estate farming and nucleus estates*

We recommend the promotion of the nucleus estate concept through dialog with private sector entrepreneurs and overseas investors, and suggest that the MTTI, CDO, UGCEA, Uganda Investment Authority, and Private Sector Foundation undertake initiatives.

4. *The introduction of a voluntary smallholder indicative seed cotton price formula*

We recommend that the introduction of a voluntary formula, drawing lessons from similar schemes in other parts of the world be studied. We suggest that CDO and UGCEA undertake this initiative.

5. *Rationalization of ginning capacity*

We recommend a study on a national strategy for the rationalization of ginning capacity throughout the country, involving all stakeholders and led by the CDO and UGCEA.

6. *Joint exporters freight agreement*

We recommend that exporters combine their lint exportable volumes and negotiate a joint exporters freight agreement with shippers for the transport of cotton from for ginnery basis to overseas markets. We suggest that this task be coordinated by the UGCEA.

7. *GoU support to the cotton sector*

We recommend that the role and mandate of the CDO be reassessed to ensure the appropriate level of GoU support to the sector in the current circumstances and future development plans of the industry.

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Fish

Introduction

The Ugandan fisheries sector rose to national prominence in the late 1980s and early 1990s when fish exports to Europe and the Far East became established. Several years behind developments in Kenya, Uganda and Tanzania's fish processing industries emerged roughly simultaneously. All three countries' export industries have relied upon capture fisheries (rather than aquaculture) and consequently the shared resource provided by Lake Victoria is of vital importance. Attempts to manage this resource on a regional basis are now emerging through the efforts of the East African Community and its Lake Victoria Fisheries Organization.

With access to a large part of Lake Victoria and numerous other water bodies including Lakes Kyoga and Albert, Uganda's fisheries were of significant importance in domestic and regional trade long before the rise of the new, capital intensive export industry. This importance remains intact today, although its relative size is impossible to state accurately due to an almost complete lack of hard information on trade flows, volumes, and prices. Evidence gained during our fieldwork suggests that significant quantities of fresh fish (certainly of the magnitude of tens if not hundreds of tonnes) are exported every week to Kigali. Ugandan salted fish is also sold in large quantities in DRC. Domestic marketing concentrates on supplying fresh fish to areas close enough to the lakes and processed fish (sun dried and smoked) to areas away from the lakes where fresh fish are unknown.

The importance of Uganda's fisheries to the national economy is significant. At the time of our fieldwork, the Department of Fisheries and the fish exporters were proudly announcing that fish had surpassed coffee as the number one export revenue earner in the last part of 2001. While this statistical victory may soon be reversed, it nevertheless indicates the extent of the wealth generated by an industry that directly and indirectly employs fewer people than the coffee industry (an estimated 1 000 000 versus 2 000 000). Furthermore, revenue generated by regional trade undoubtedly adds significantly to the overseas export sector earnings. If convincing regional figures can ever be established, the combined earnings may reveal that Uganda's fisheries regularly outperform the coffee subsector.

In 2000, over 15 000 t of factory processed fish were exported, generating substantially more than US\$30 million of export revenue (Customs figures). In 2001, an estimated 23 000 t were processed and exported, earning more than US\$70 million (industry data).

The development of export fisheries has been hampered by a series of health scares over the last five years. These have led to the imposition of one voluntary export ban and two imposed by the EU. Substantial efforts have been made to improve facilities at landing sites and hygiene in processing factories. These efforts paid off last year when the EU declared that Ugandan fish exports to the EU were to be harmonized or, in other words, allowed to enter any EU state without recourse to the bilateral arrangements between exporter and importing country—the arrangement that had existed previously.

MAAAIF's Department of Fisheries oversees the regulation and development of the Ugandan fisheries. The Department has statutory powers to tax and license the fisheries industry and has, in the past, imposed quotas on factories' output. It is also entrusted with the sustainable management of the fisheries. Under its current Commissioner, the Department is seen as a dynamic institution that has ambitious plans for the future of the industry. One such plan is the establishment of a new fisheries agency that will take over regulatory and development responsibilities from the Department. Plans for the agency are well advanced and Parliament's approval will soon be sought.

Another key institutional player is the Uganda Fish Processor and Export Association (UFPEA), which emerged as a response by the industry to the export bans imposed by the EU and by the GoU. The Association is well supported by its members and has been effective in raising quality standards and representing members' views.

Other important organizations involved in fish processing and marketing are:

- USAID's COMPETE and SPEED projects (covering aspects of export competitiveness).
- DFID's Integrated Lake Management Project (covering capture fisheries on water bodies other than Lake Victoria) and its Aquaculture Project.
- NARO's Fisheries Resources Research Institute (FRRI).
- The East African Community's Lake Victoria Fisheries Organization (LVFO).
- The European Commission's Lake Victoria Fisheries Research Project.

During our investigation of fish marketing and processing we deliberately avoided the debate on the sustainable management of Uganda's fish resources. While we recognize that this is a very important issue that probably eclipses the marketing and processing issues highlighted in this report, we feel that we are not competent to add to the debate. In any case, we believe that the issue of fish capture lies outside our terms of reference.

Fish supply

The vast majority of Uganda's fish is caught on Lakes Victoria, Kyoga, and Albert. In 1999, an estimated 210 000 t was caught on these three lakes and only 14 000 t on all other water bodies (Fisheries Department figures). While capture figures are somewhat controversial and based to some extent on guesstimates, Lake Victoria clearly supplies at least 50% of the total fish catch by weight and considerably more by value. A very large proportion of export factory processed fish comes from Lake Victoria—indeed, during our fieldwork around Lake Kyoga, we found no evidence that processing factories source from the lake.

The major commercial fish species are Nile perch, Nile tilapia, and mukene. Nile perch almost entirely dominates formal sector exports and also contributes to regional and domestic trade. Mukene, a sprat-sized fish, is sun dried and sold both as an animal feed ingredient and for human consumption. Tilapia has traditionally been the favorite fish of Ugandan consumers but also has potential for overseas markets.

An estimated 250 000 artisanal fishermen (136 000 on Lake Victoria) crew Uganda's fishing fleet. These figures may represent a significant overstatement of the truth. The Lake Victoria Frame Survey of 2000 found that only 34 889 crew manned all types of fishing industry related boats.

Very many of Lake Victoria's fishermen live on and operate from the islands that are typically 10–30 km offshore. While some fishermen are able to bring their own catch to shore-side landing sites, the majority sell to traders who operate transport boats specifically designed for bringing fish from the islands. Despite the relatively high earnings among fishermen, living conditions in fishing communities are generally poor (LVFRP 2001). Anecdotal evidence suggests that fishermen tend to spend freely in response to the high risks they face on the water. The occurrence of fishermen drowning on the lake is apparently not uncommon.

Fishing technology is simple. Fishermen almost exclusively use small canoes made of planks from which they cast their nets and set their lines. In 2000, of the 15 544 canoes found to be operating on Lake Victoria, 12 848 were manually powered, 2031 were mechanically powered, and 665 were sail powered. Although outlawed, beach seining (using nets of small-size mesh from the beach) is also practiced.

The fishing fleet has grown in line with the rise of the export processing factories. In 1990, at the beginning of the export industry, just 8674 serviced the Lake Victoria fishery. In 2000, as noted above, the figure had increased to 15 544.

Fish is landed at numerous sites around the shores of Uganda's lakes. On Lake Victoria alone, there are 597 landing sites, although of these, only eight have been gazetted as sites of sufficient quality for landing fish destined for export processing factories. Despite the restrictions on where export fish can be landed, processing factories regularly buy from nongazetted sites.

A very relevant feature of the supply of fish from Lake Victoria is that it is highly inelastic, at least in the short term. This means that, correcting for seasonal variations, the quantity of fish coming off the lake remains roughly similar regardless of the price paid to fishermen.

Aquaculture has yet to contribute significantly to national fish output. Its annual production has amounted to just a few hundred tonnes for local consumption. The Fisheries Department foresees aquaculture contributing significantly to export and domestic production and indeed, there is some interest from the fish processing industry. Apart from augmenting what are perceived to be dwindling supplies of Nile perch, the processors see advantages in the type of fish that aquaculture can supply. Export prices are higher for fillets from fish of about 1 kg in size. Such fish are well below the 18-inch legal minimum length allowed for trade but this is the size of fish that could be produced on fish farms, providing certain technical constraints can be overcome. There are mixed feelings about the likelihood of success. Detractors point to the difficulty of finding sufficient quantities of affordable fish feed and the lack of success of aquaculture in any other part of sub-Saharan Africa. Promoters of the idea point to the ready export market for the fish and the will among private sector players to make it work. Whatever point of view is

expressed, both sides agree that aquaculture will, at best, only supplement fish from the capture fisheries. The future of the export industry, therefore, largely rests on fish caught from the lakes.

From a poverty perspective, commercial aquaculture is not for poor producers. The fixed and working capital requirements are far too high. However, according DFID's Aquaculture Project, some potential exists in small-scale fish farming sited away from the major lakes and far enough north to take advantage of higher temperatures (which increase yields). The chief obstacle to success seems to be the local preference for dried and smoked fish and the general dislike for fresh fish. The DFID project believes that tastes will change over time.

Fish demand

From 60 to 65% of factory processed fish exported from Uganda are sold chilled and air freighted, principally to the EU (95%) but also to Japan, Australia, and the USA. These chilled fish markets are more lucrative than those for frozen fish (30 to 35% of exports), which is generally transported to importing countries by sea freight. Regular importers of Ugandan frozen fish are Australia, the EU, the USA, the Middle East, the Far East, and Japan.

Chilled fish exporters are currently receiving about US\$3.50/kg of Nile perch fillet fob Entebbe. Industry observers often query why export prices should be so low when retail prices in Europe are as high as US\$9. A large part of the difference is made up by freight and distribution costs. Air freight from Entebbe to Europe currently costs about US\$1.50/kg of fish. Handling, customs clearance and distribution costs in Europe probably add as much as another US\$0.50 to US\$1/kg, mostly because of the need to move the product quickly over large road distances and to maintain an unbroken cold chain. Such logistics are expensive. Added to this, the importer expects to make an adequate return, which includes compensation for the risk of product spoilage in transit. Finally, retailers are notorious for adding as much as 50% to the delivered price to cover their large overhead costs and to protect their profit margins. European supermarkets are generally powerful organizations and can dictate terms to suppliers. It is therefore unlikely that fish importers are making excessive profits. From this rough analysis, it should be clear how costs and margins build up to create the final retail price.

Overseas demand also exists for Nile perch swim bladders, which are dried and exported to the Far East. We were unable to discover much about this trade but it is safe to assume that, while important, the revenue from these sales is a fraction of the revenue from the exports of frozen and chilled fillets.

Kenyan processing factories are in the frustrating position of enjoying higher export prices (the result of lower air freight charges to Europe) but being able to source fish legally from only 6% of Lake Victoria. Processing capacity substantially outweighs supply and consequently large quantities of Kenyan processed fish is caught by Ugandan (and, one has to assume, Tanzanian) fishermen, after which it is transported illegally to Kenya. Kenyan factories and their waterborne agents can pay higher prices to Ugandan fishermen, not only because of their higher export prices but also because the cost of the petrol to power

their outboard engines is cheaper than in Uganda. Reportedly, Kenyan traders also tempt Ugandan fishermen with supplies of ice, which allow the fishermen to wait for the higher prices offered by Kenyan traders rather than being forced to sell at lower prices to Ugandan transport boat operators for fear of spoilage.

There are no good estimates of how much Ugandan fish is sold to Kenyan fish factories. However, an indication can be surmised from an occasion when the Ugandan Fisheries Department and the police imposed a strictly enforced ban on illegal cross-border movements of fresh fish. According to the Fisheries Department, a substantial glut of fresh fish appeared at Ugandan landing sites, prices collapsed, and the Department was forced to cease its border patrols.

As noted previously, demand for fresh whole fish exists in Kigali. We suspect current estimates of the quantity of fish that Uganda exports to this market are pure guesses. Regardless of what the Ugandan Authorities wish to do with this trade—to curb or promote it—we believe that a thorough analysis of costs, margins, and volumes should be conducted before government intervenes. Our justification is that the livelihoods of many poor people could either be harmed or enhanced through government action and there is, therefore, a considerable need to understand the trade and revenue flows. Similar studies should be conducted for processed fish that is exported to Kenya, Sudan, and DRC.

In most cases, fishermen or, more likely, the owners of the boats that the fishermen crew) sell their catch to transport boat operators. Where fishermen operate from the shores of Lake Victoria or from islands near enough the shore, sales are either made directly to the factories or their land-based agents. Competition among fishermen appears to be high.

Fishing and waterborne transport are often vertically integrated. It is not uncommon for owners of transport boats to also own fleets of fishing canoes, thereby capturing profits at both levels of the supply chain.

The transport boat operators provide the important link between the majority of fishermen on Lake Victoria and the factories. In many cases, factories value the strong relationships they establish with the transport boat operators, whom they see as having in-depth knowledge of their supply and quality requirements. Factories supply ice to transport boat operators as a way of cementing trading relationships. There is some reason to believe that competition between the transport boat operators is not particularly high. Our evidence is that the traders' margin between their buying and selling prices is approximately Ush 300/kg, yet on average, costs are less than Ush 100/kg. Greater analysis of this is provided later in this section.

In the past, some factories have used their own transport boats to source fish directly from fishermen (pers. comm. Greenfields Ltd). All such initiatives have failed because of the complicated logistics involved in gathering large quantities of fish from scattered locations, and because of the opportunities for cheating among waterborne factory staff. On the whole, the job of transporting fish from the islands is best conducted by small operators who have much better control over costs and their employees. A proportion of fish is rejected by the factory buyers at the landing sites. This fish is sold to local traders who sell into the domestic market. For the marketing chain, see Figure 4.1.

Marketing chains

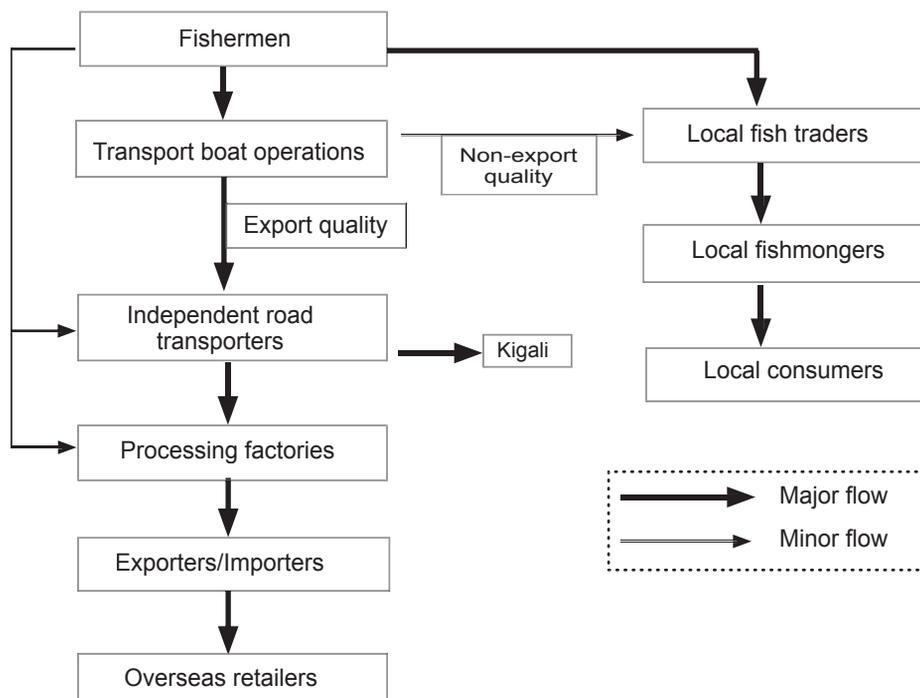


Figure 4.1. Fresh fish supply chain.

Export quality fish is sold at the landing sites to factory employees or to factory agents. Agents come in two categories; those who cover their own expenses and those who are tied to specific factories who supply trucks, fuel, drivers, and ice. In both cases, agents are expected to provide their own working capital. The insulated trucks used by factories and agents arrive at the landing sites laden with ice. Some ice is off-loaded onto the transport boats (which have insulated fish holds), while the remainder is used to pack the purchased fish in the trucks.

There are nine fish processing factories currently operating in Uganda but a further two are about to be commissioned. Operating licenses are likely to be granted for a further three factories, two of which would be strategically located next to the borders with Kenya and Tanzania in an attempt to reduce the leakage of Ugandan fish to foreign factories.

Competition between factories seems to be fairly intense. There is no evidence of a cartel over setting prices for fish at the landing sites. On visiting Kasenyi landing site near Entebbe, we discovered that prices offered by factories the previous day had ranged from Ush 1750 to 1850/kg. Our assumption was that factories offering higher prices had pressing export orders to fill. Another indication that prices are not fixed by agreement is that factories operate at between 50 and 70% capacity. Factories must therefore strike a balance between paying too much for fish and paying enough to ensure an adequate

throughput that will keep per unit costs in check. Each factory has to find its own balance in a fishery where fish is becoming scarcer, and consequently price fixing is unlikely.

After processing fish into fillets and packaging, the factories have a number of options. They can either sell to fish exporters fob Entebbe (fot/for Kampala for frozen fillets) or arrange freight for themselves and sell C&F to overseas importers. In reality, the chilled fish exporters are in-country branches of European fish importing companies and so the advantages to factories of selling C&F European airports over selling fob Entebbe are not substantial.

We assume that European importers operate in Uganda to capture a greater part of total fish exports. This in itself is an indication of the value that European buyers attach to Nile perch.

Transactions in the Lake Victoria export supply chain

In cases where fishing and waterborne transport are not vertically integrated, transactions between fishermen and transport boat operators are either on a spot cash basis (Clucas et al. 2000) or, in some cases, on the basis of credit extended by fishermen to their buyers. We discovered some instances of interlocked credit and output markets, where transport boat operators provided credit to fishermen in the form of fishing nets. The fishermen are then obliged to sell fish to the credit provider who recovers his money through paying lower prices to the fishermen.

During our research, we heard anecdotal evidence from the Fisheries Department that transport boat operators cheat fishermen through the use of inaccurate scales, inflated prices for nets provided on credit, and an over-declaration of the quantity of fish rejected for export (in cases where transporters buy on credit from fishermen). While we were unable to verify any of these claims, it is certainly the case that fishermen have a weak bargaining position. Without any means of storing their fresh fish, they are usually obliged to sell to the first buyer that comes along.

Transactions in other parts of the supply chain appear straightforward and free from any obvious signs of cheating.

Supply chain costs and margins

The overseas export chain

We have concentrated our analysis of costs and margins on two parts of the supply chain; the transport boat operators and the processors. This was for two reasons. First, Uganda's ability to influence postharvest activities in the overseas export subsector is largely limited to these two levels. Secondly, confidentiality meant that we were unable to gain access to costs and margin information at the export–import level.

Table 4.1 gives costs and margins for a typical transport boat owner who operates a boat with a capacity of 6 t of fish. On average, such a boat will gather approximately 3800 kg of fish/trip, which takes three to four days to complete. All assumptions and workings supporting the summary information in Table 4.1 are given in Annex 3.

Table 4.1. Transport boat operators costs and margins.

	USh/year	Ush/kg of fish	US\$/kg of fish	% of costs
Operating costs—variable:				
Raw material	448,695,000	1,500	0.87	94
Subtotal variable costs	448,695,000	1,500	0.87	94
Operating costs—fixed:				
Labor	8,190,000	27	0.02	2
Fuel and oil	12,909,000	43	0.02	3
Repair and maintenance	500,000	2	0.00	0
License	500,000	2	0.00	0
Subtotal fixed costs	22,099,000	74	0.04	5
Capital costs	3,124,805	10	0.01	1
Total costs	473,918,805	1,584	0.92	100
Revenue	533,962,007	1,785	1.03	
Profit (loss)	60,043,202	201	0.12	

Source: Authors' fieldwork.

The most striking feature of Table 4.1 is the profit made by the transport boat operators. The annual profit of Ush 60 million (US\$35 000) is just under four times the total fixed and working capital investment that the operator has to make. This represents an extraordinary rate of return on investment. Against this, however, one has to consider the risk taken by the ice-boat operator. Piracy, foul weather, and spoilage all play their part in making the trade more risky than many land-based operations. Put in terms of potential monetary loss, there is perhaps a 1% chance of losing an entire cargo, which translates into an average of about once every year and four months. In such cases, the entire sum of the operator's working capital will be lost—a sum of about Ush 6 million. Of course, worse things could happen. In the case of a pirate attack, not only could the working capital be lost but also outboard engines and, in extreme cases, people's lives. However, according to the information that we could gather from the Ugandan Police, such incidents are rare and on the decline.

Even if working capital and an outboard engine are lost (a combined value of approximately Ush 12 million), annual profits would appear to be easily capable of absorbing the loss.

We can only speculate as to why the transport boat business is so profitable. On the face of it, the 900 plus transport boats that operate on Lake Victoria should provide enough competition to ensure that profits are not excessive. Not only does Table 4.1 belie this notion but we also found evidence to suggest that the transport boat operators' margins do not change in proportion to the landing site price (prices and margins should change roughly proportionately in a truly competitive market). This finding needs to be verified but if true, it probably indicates that ice-boat operators are using their strong bargaining position over fishermen (the power that ice confers) to protect their margins.

We are not aware of any anticompetitive practices that exist between transport boat operators. As one fish processor put it, if the nine processing factories cannot combine to form a buying cartel, what chance do 900 ice-boat operators have? Despite this, we believe it is possible that transport boat operators informally agree individual rights over fish caught by specific groups of fishermen. If this were not the case, it is unlikely that the system of transport boat operators providing input credit to fishermen would work. Although these suggestions are highly speculative and merit further research, the inescapable conclusion is that if fishermen are to gain better prices, the bargaining position of the transport boat operators must be weakened by improving the bargaining position of fishermen. Ways of achieving this are discussed later.

The information in Table 4.2 was compiled from data given by several fish processing factories. We therefore believe that it gives a reasonably accurate financial picture of an average processing factory in an average year. All assumptions and workings are contained in Annex 3. The key assumptions are that the factory is working at 70% of full capacity, has an average landing site buying price of Ush 1800/kg (US\$1.04/kg) of fish, has a fillet yield of 40%, and receives a weighted average price for fillets (chilled/frozen) of US\$3.48/kg (Ush 6,020/kg).

Table 4.2. Fish processing factory costs and margins.

	Ush/year	Ush/kg of fillet	US\$/ year	US\$/kg of fillet	% of total costs
Operating costs—variable					
Raw material	8,810,100,000	4,500	5,107,304	2.61	76
Packaging	506,580,750	259	293,670	0.15	4
Energy	360,000,000	184	208,696	0.11	3
Direct labor	289,314,600	148	167,719	0.09	2
Fuel	44,201,028	23	25,624	0.01	0
Subtotal variable costs	10,010,196,378	5,113	5,803,012	2.96	86
Operating costs—fixed					
Management	276,000,000	141	160,000	0.08	2
Lab expenses	139,200,000	71	80,696	0.04	1
Admin expenses	177,600,000	91	102,957	0.05	2
Fixed asset maintenance	67,200,000	34	38,957	0.02	1
Capital costs (interest and depreciation)	549,600,000	281	318,609	0.16	5
Subtotal fixed costs	1,232,400,000	629	714,435	0.36	11
Subtotal operating costs	11,242,596,378	5,742	6,517,447	3.33	97
Miscellaneous	416,290,873	212	240,865	0.12	3
Total operating costs	11,636,087,251	5,943	6,745,558	3.45	100
Annual revenue*	12,783,147,447	6,529*	7,410,520	3.79*	
Profit (loss) before tax	1,147,060,196	586	664,962	0.34	

*Includes revenue fillets and fish parts. The weighted export value of fillets is assumed to be US\$3.48.

Source: Authors' fieldwork.

Under these assumptions, the processing factory is making fairly respectable profits, although with a total cost of US\$3.45/kg of fillet and revenue of US\$3.48/kg, it is clear that profitability depends on sales of “by-products” such as swim-bladders and fish frames (the bones, head, and tail) which are sold onto the local market.

Another feature of fish processing profitability is its sensitiveness to factory throughput, and, unsurprisingly, to the cost of raw material and the export price of fillets. While the export price remains fairly static, raw material prices (the prices paid for fish at the landing sites) are highly variable. At the time of our fieldwork, fish was scarce and the factories were paying as much as Ush 2200/kg of fresh fish. At this price, our “average” processing factory would be making a loss of US\$0.26/kg of fillet. This loss can be borne in the short run in order to keep overseas customers happy. However, if there were a structural shift in the price of fresh fish that increased the average price from Ush 1800/kg to Ush 2030/kg, the factory would make a long-term loss if overhead costs could not be reduced.

Similarly if, from the average scenario throughput declined from 70% of capacity to 43%, the factory would again make a loss.

We were unable to gauge the extent to which factory overhead costs can be reduced. However, a large part of these costs is incurred through the stringent quality procedures and testing that access to the EU market requires. There is a limit to which such costs can be reduced before quality standards suffer and Uganda’s harmonized access to the EU market is put in jeopardy.

Costs and margins in the fresh fish trade to Kigali

The following analysis is presented as a very rough indication of costs and margins involved in the trade of fresh fish from Lake Kyoga to Kigali (Table 4.3). It is based on the experience of just one exporter and is therefore open to the criticism that it is not representative. All assumptions and workings appear in Annex 3.

Profitability is sensitive to the price of fish both at the lake and in the market. Given that both tilapia and Nile perch are traded and both have different prices, the average cost of raw material depends heavily on the relative availability of these species.

The trip to Kigali takes about one week to complete, including time spent collecting fish at Lake Kyoga. Consequently, profitability does not seem excessive, especially in the light of the possibility that fish may spoil in transit and fetch lower prices in Kigali. On occasion, the trader is able to pick up a back load of freight from Kigali to Kampala, thereby substantially increasing his profits.

Efficiency constraints and opportunities

Our constraints and opportunities analysis was confined to the factory processed fish supply chain. This should not be taken as an indication of the unimportance of other supply chains but merely reflects the lack of documented information on regional and domestic trade. In the time available to us, we were unable to add substantially to this base of knowledge and therefore felt unable to conduct a well-founded analysis of constraints and opportunities in these supply chains.

For the factory processed fish export supply chain, we concentrated our investigations on what we saw as three crucial areas:

- Reducing postharvest losses.
- Increasing value added.
- Reducing air freight charges.

Postharvest losses

Care should be taken when defining postharvest losses in the context of the export supply chain. Very few, if any, of the fish caught on Ugandan lakes do not reach consumers in one form or another. A better term would be “postharvest rejection” because the fish that is rejected by factory buyers is almost always sold onto the local market, albeit at a substantial discount. The financial loss involved in not being able to export all the fish offered to factory buyers is felt particularly keenly because it represents a loss of export revenue.

Postharvest rejection is said to occur at every level of the supply chain in Uganda. Estimates for the rate of total loss range from 15 to 40%. Our own fieldwork suggests that rates may be even lower than the lowest estimate, and that the highest estimate almost certainly presents an out-of-date picture. At the transport boat level of the chain, where the major losses are said to occur, operators have been investing in larger boats with better insulation. Furthermore, the availability of ice provided by the factories to the transport boat operators has increased. Evidence now suggests that, apart from isolated incidences of very high losses, rejection rates at this level are less than 2% (a figure of 1.5% is likely).

Table 4.3. Fresh fish exporter to Kigali costs and margins.

	Ush/trip	Ush/kg of fish	US\$/kg of fish	% of costs
Operating costs—variable:				
Raw material	3,825,000	850	0.49	68
Subtotal variable costs	3,825,000	850	0.49	68
Operating costs—fixed:				
Vehicle hire (including driver)	600,000	133	0.08	11
Fuel	520,000	116	0.07	9
Labor	100,000	22	0.01	2
Local Ugandan taxes	50,000	11	0.01	1
Ice	350,000	78	0.04	6
Import duties	160,000	36	0.02	3
Subtotal fixed costs	1,780,000	396	0.23	32
Total operating costs	5,605,000	1,246	0.72	100
Revenue	5,760,000	1,280	0.74	
Profit (loss)	155,000	34	0.02	

Source: Authors' fieldwork.

A more serious problem might lie at the capture level. Fishermen do not generally have access to fish lockers and ice, and therefore the catch is prone to being left in the open sun for extended periods. The problem here might not be a lack of cheap methods to reduce quality deterioration but may simply be a lack of knowledge of storage practices.

Other losses simply occur through poor handling. One member of our team visibly winced each time he saw a sack of fish being dropped with a bone-crunching thud onto the concrete inspection platform of a gazetted export landing site. Simple training and enforcement of standards would reduce losses caused by rough handling.

Whatever the level of postharvest rejection, it is likely that significant improvements can be made before the costs outweigh the benefits. The GoU is soon likely to receive an African Development Bank loan of approximately US\$35 million in order to upgrade landing sites and improve Uganda's capacity to prevent illegal exports of fish to Kenya and Tanzania. Plans for upgrading landing sites include the provision of ice-making plants at several locations on lakes Victoria and Kyoga. Providing these facilities have been planned and located with commercial justification, and that competent private sector players are available to run the installations, we believe that the loan will make a positive contribution to reducing postharvest rejection rates.

Simple training in methods of fish provided to fishermen, transport boat operators, and processing factory operators would also help to reduce rejection rates. A source of funding could come from the largest overseas importers, particularly those in Europe who showed considerable commitment to the Lake Victoria fishery at the time of the last EU export ban. These companies have an interest in ensuring that the maximum sustainable quantity of fish is exported from the region and they might therefore be willing to contribute jointly to a training fund. We recommend that the Fisheries Department or, when it is established, the new Fisheries Agency, should approach suitable importers with a request for help.

Allowing fishermen access to ice would also have an impact on reducing postharvest rejection. In practice, this will be hard to achieve, particularly as transport boat operators have vested interests in ensuring that ice does not reach fishermen.

Finally, the Fisheries Department could consider introducing minimum standards for transport boats to ensure that rejection rates are kept to a minimum. While existing transport boat operators appear well able to afford further investments, the introduction of standards would have to be handled carefully to ensure that competition among operators is not restricted by discouraging new entrants to the business.

Value addition

Processing profits have decreased over recent years largely because of investment in raising quality standards and increases in raw material prices. As profit margins have narrowed, factory owners have been increasingly concerned to maximize the revenue that they receive from fish fillets and by-products. This has involved increasing the size of fillets through more skilful filleting and is now concentrating on the further processing of fillets into consumer-sized portions. The export of Nile perch swim bladders is well established but

there are probably other fish by-products that can be cost-effectively processed into higher value products for the domestic and export markets. The Common Fund for Commodities has granted money to the East African Community's Lake Victoria Fisheries Organization to research value-adding opportunities. The project has only just begun but will investigate the market potential for new fish products and assess the financial and technical feasibility of producing and marketing the products.

With the current private and public sector initiatives underway, there appears to be little point in recommending further action on increasing value addition.

Although the fish factory owners recognize that they have to increase the value gained from fish to remain competitive, there is a view that the innovations will have little effect on profitability because the benefits will be passed upstream through stiff competition among factories for fish. Whether the full benefits of innovations will reach fishermen is a moot point and depends on how competitive the transport boat business becomes.

Air freight

At US\$1.40 to 1.50/kg, the cost of air freighting fish from Entebbe is considerably more than from Nairobi, where rates range from US\$1.00 to 1.10/kg. Uganda's Civil Aviation Authority (CAA) believes that there is no reason why freight rates from Entebbe cannot be at least as competitive as those in other parts of the region.

Competition between airlines is a key factor. In 1999, when scheduled freight flights were being operated by British Airways, Sabena, as well the two current scheduled operators, Air France and Egypt Air, fish freight rates came down to US\$1.10 to 1.20/kg. Most fish is currently exported on charter flights but the imminent re-entry of British Airways to the market may mark a return to significant competition among scheduled carriers.

The CAA has been working hard to reduce the costs of using Entebbe airport for freight. For instance, runway lighting fees have been abolished, and landing and air-navigation fees have been rationalized to make overall aeronautical charges significantly cheaper than in both Nairobi and Dar es Salaam (CAA 2002). Unfortunately, the CAA has so far had less success in tackling three other constraints that inflate the cost of freight from Entebbe:

The high cost of fuel: Aviation fuel currently has to be piped from Mombasa to Kisumu and Eldoret in Kenya and then transported by road tanker to Entebbe. The CAA believes that fuel costs can be reduced by up to 36% if Uganda can negotiate concessionary rates with the Kenya Pipeline Company and the fuel can be ferried on Lake Victoria directly to Entebbe.

The high cost of airport handling: Although the CAA has forced ENHAS (Entebbe's principal handling agent) to reduce its handling charges, the rates are still uncompetitive with those in Nairobi. Two freight consolidation companies currently hold licenses from the CAA to handle their own cargo, but only ENHAS has a general freight-handling license. This monopoly on general freight handling compares unfavorably with the situation in Nairobi, where six companies compete for business and handling charges

are substantially lower. We recognize that there are political sensitivities involved in the potential liberalization of the freight-handling market in Entebbe.

Empty space on inbound flights: Air freight operators nearly always have empty space on inbound flights. To cover costs and maintain profits, airlines have to compensate for this by charging higher rates for outbound freight. The CAA believes that this situation can be turned around if it can promote Entebbe as a regional freight hub for Central and Eastern Africa. In part, this can be done through upgrading the second runway at Entebbe and encouraging the private sector to invest in new handling and storage facilities. A reduction in imported freight-handling charges would also help.

The CAA's plans have been on the drawing board for at least three years. Although most of them would be reasonably cheap to implement, progress has been slow, probably because of other priorities in the Ministry of Works, Housing and Communications (the CAA's line ministry).

We believe that valuable foreign exchange earnings are being lost to the country through inaction on reducing air freight rates. The CAA estimates that rates can come down by as much as 40%. Even if they come down by just 33%, equivalent to US\$0.50/kg of fish, a total of over US\$7.5 million/year could be saved in freight charges on fish alone (substantially more would be saved on freight rates for flowers and fresh produce). Because of strong demand for Nile perch in Europe, there is genuine reason to believe that a large proportion of the savings would remain in Uganda.

Reducing international freight rates is a key element in enhancing Uganda's export competitiveness. We therefore suggest that the group of donors (EC, USAID, World Bank, and DFID) who are currently involved in discussions with the GoU on its export competitiveness strategy should meet representatives from the CAA, the Ministry of Works, and MoFPED to investigate how the CAA's plans could be implemented.

Raising fishermen's incomes

There can be little doubt that some of the money released by the cost-efficiencies and value addition described in the previous section would find its way into fishermen's pockets. However, fishermen's lack of bargaining power limits the extent to which they can gain a greater share of export earnings.

The most enduring way to ensure that fishermen receive bigger prices would be to encourage fishermen's marketing organizations. Collective bargaining with traders would allow fishermen to realize higher prices. Also, the greater access to formal sector finance that legalized group structures tends to promote would also allow the organizations to gain improved access to ice and, in some cases, to integrate vertically into the transport boat business.

All this sounds wonderful on paper but, as noted in a previous section of this report, the history of primary producer organizations in Uganda and the rest of sub-Saharan Africa is littered with failure. This bitter experience has taught practitioners that groups must be self-selecting (i.e., not formed by external agencies) and must not be encouraged to undertake commercial operations that are beyond their capacities.

With these simple rules in mind, we recommend that the Fisheries Department (or Agency), donors, and NAADS should consider establishing a specialized unit that would promote the benefits of marketing associations to existing fishermen's groupings and then to build commercial skills in those groups that volunteer for assistance. Given DFID's interest in sustainable livelihoods and artisanal fishing communities (through the Integrated Lake Management Project), we recommend that it should consider acting as a catalyst in this process.

Summary of key findings

- Insufficient information exists on domestic and regional trade in fresh and processed fish.
- Most fishermen are in weak bargaining positions due to their remote locations and inability to store fish.
- The only sustainable way of improving fishermen's bargaining positions is to encourage marketing associations. This must be done sensitively to avoid the mistakes of the past.
- Profits in the transport boat business are high, even when adjusted for risk. This suggests the existence of anticompetitive practices at this level of the supply chain, although how practices are maintained is not clear.
- Competition in other parts of the supply chain appears to be healthy.
- Postharvest rejection rates for export are coming down and are probably not as high as are generally perceived. However, there is almost certainly still room for improvement at all levels of the supply chain in terms of fish handling and storage.
- Several export processors are experimenting with ways of adding greater value to their outputs. In time, all factories will have to adopt similar practices to remain competitive.
- Large amounts of revenue from the export of fish, flowers, and fresh produce are lost to Uganda because of uncompetitive air freight rates. Rates can be significantly reduced if competition between scheduled carriers can be increased and the cost structure at Entebbe can be reduced.

Recommended implementation plans

Information on domestic and regional fish marketing

Although various analyses of domestic and regional marketing are supposed to have been conducted by three of the projects encountered during our fieldwork, in reality very little progress has been made. We recommend that the donors that support these projects (DFID and the EC Delegation) ensure that appropriate research on trade flows, volumes,

costs, and margins is conducted. The research should be designed to yield information that will inform policy decisions.

Improving the bargaining position of fishermen

We recommend that the Fisheries Department (or Agency, when it comes into existence), donors, and NAADS should consider establishing a specialized unit. This would promote the benefits of marketing associations to existing fishermen's groupings and then build commercial skills in those groups that volunteer for assistance. Given DFID's interest in sustainable livelihoods and artisanal fishing communities (through the Integrated Lake Management Project), we recommend that it should consider acting as a catalyst in this process.

Reducing postharvest losses

We suggest that the Fisheries Department (or the Agency) should investigate the possibility of introducing minimum standards for transport boats to ensure that rejection rates are kept to a minimum. While existing transport boat operators appear well able to afford further investments, the introduction of standards would have to be handled carefully to ensure that competition between operators is not restricted by discouraging new entrants to the business.

Reducing postharvest losses

We recommend that the Fisheries Department (or the Agency) should approach large European importers of Nile perch to request contributions to a fund that will be used to teach fishermen, transport boat employees, and landing site laborers good practice in storing and handling fish. Importers' interest in ensuring maximum exports from the Lake Victoria Fishery should ensure a sympathetic hearing.

Reducing air-freight charges from Entebbe

We recommend that the group of donors (EC, USAID, World Bank, and DFID) who are currently involved in discussions with the GoU on its export competitiveness strategy, should meet representatives from the CAA, the Ministry of Works, and MoFPED to investigate how the CAA's plans for reducing air-freight rates could be implemented.

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Maize

Introduction

This section addresses the specific issues relating to the transaction costs of maize marketing.

On the advice of sector stakeholders, the following maize producing districts, exhibiting representative, yet contrasting, features of the country's maize trade, were visited:

Kapchorwa (Eastern Region). The district is relatively unusual having only one main road link with the rest of the country. It is one of the smallest districts in Uganda (about 1740 sq. km in area) and is located at relatively high altitude (1200–2500 m a.s.l.). It has one maize season (March–February), it is a surplus maize producer, and has a substantial trade with the rest of the country and nearby Kenya.

Mbale (Eastern Region). The district produces a wide variety of agricultural crops and generally has a maize surplus. It has two maize seasons, March–October and August–February. Although it is a large producer, trade outside the district is small, with much of its maize consumed locally.

Iganga (Eastern Region). The district is one of the most populous areas in Uganda, grows a large variety of crops, and serves as a transit point for goods and services from both Eastern Uganda and Kenya, and Kampala, Jinja, and southern Uganda. It is a major surplus maize producing district, with a substantial trade outside the district and two seasons, March–October and August–March.

Masindi (Western Region). This is a major surplus maize producing district, with a substantial trade outside the district and two seasons, March–October and August–March. Maize is the district's main traded agricultural crop.

Consultations were held with farmers, farmers groups, roadside traders, village traders, urban traders, Kampala market traders, transporters, *posho* millers, District Agricultural Officers, the National Animal and Agricultural Research Institute (NAARI), the World Food Program (WFP), and Uganda Grain Traders Ltd (UGT Ltd).

Background to production and marketing

Uganda's small-scale farmers have traditionally cultivated maize for food and for income generation. It forms an important part of the farming system, particularly in Eastern Uganda. In common with most African countries, postindependence grain production and marketing in Uganda were subject to state control. However, Government intervention through its parastatals, the Produce Marketing, and Food and Beverage Boards ceased in the 1990s. The market is now completely liberalized. However, it should be noted that Uganda does not have, as yet, a formal trade structure for the marketing of maize.

Contribution to the economy

Maize is an important part of the agricultural sector, which in 1999–2000 accounted for 41.6% of GDP. Maize also contributes, in most years, to foreign exchange earnings, being an important component of the nontraditional export sector. As mentioned elsewhere in this report, export statistics are incomplete and monetary values doubtless considerably understated, as most export activity is informal trade with Kenya. However, the official value of maize exports in 2000 was stated as US\$2.43 million, and averaged about US\$12 million/year in the period 1995–2000 inclusive. Maize export values have declined from a high of US\$20.617 million in 1995 to US\$2.43 million in 2000. The decline is considered to be a result of the unavailability of accurate export statistics covering the informal trade to Kenya. Our study illustrates that maize, given the development of a formal marketing structure, has the potential to develop into a significant export crop.

Poverty eradication

Maize is a traditional annual crop grown in most regions of the country, almost exclusively by small-scale farmers, for both home food consumption and income generation. It is an important part of the country's farming system, being grown in pure stands, intercropped, and in association with other crops.

Supporting institutional framework

Following the liberalization of the cereals market during the 1990s, the key parastatal bodies controlling the maize trade, the Produce Marketing Board and Food and Beverages Board, became defunct. According to leading sector stakeholders, there are no major institutional and/or regulatory constraints to the development of Uganda's maize sector.

Under the Plan for the Modernisation of Agriculture (PMA), the delivery of agricultural services to farmers is the responsibility of the National Agricultural Advisory Services (NAADS) reporting to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), and working closely with local governments. The National Agricultural Research Organization (NARO) has a long standing Cereals Research Program.

The pivotal private sector organization supporting the maize trade is Uganda Grain Traders (UGT), registered on 5 September 2001, whose shareholders comprise sixteen leading Uganda-based grain-trading companies. UGT is representative of the majority of the trade, and only five trading companies declined to become shareholders. To a large extent, UGT has replaced the Uganda Grain Exporters Association (UGEA) which is inactive. UGT, as a representative trade organization, has the advantage of being a limited company, rather than an association. This is a definite advantage in dealing with private financial institutions and other trade partners.

UGT interacts, and claims to be driving the agenda, with the following major public sector bodies in matters relating to the grain trade:

- Ministry of Trade.
- Ministry of Finance.

- Bank of Uganda.
- Uganda Export Promotions Board (UEPB).
- Uganda Bureau of Statistics.

Sectoral issues

Given the free market in maize following the liberalization of the sector, the main issue does not concern policy, institutional, and regulatory matters, but relates to the lack of a formal maize marketing structure. This key issue affects all aspects of the marketing chain, and if resolved, could have a significant influence on the improvement of farmers' incomes and their move towards commercial agriculture. Furthermore, the reform of the maize sector, driven by private sector innovation and initiative, has the potential to contribute significantly to the country's economy, in terms of rural and urban employment and incomes, poverty alleviation, and foreign exchange earnings. Full details of the constraints facing maize sector reform and an implementation plan for achieving this objective is contained elsewhere in this report. In summary, the main issues involved are as follows:

- Improved net prices to farmers to encourage production.
- National standardization of maize quality and contracts.
- Crop finance.
- Finance for investment in storage and handling facilities.
- The creation of an authoritative mechanism for maize price discovery and the countrywide dissemination of market information.
- The future of the informal export trade to Kenya.

Maize supply

Maize is grown in all regions of Uganda, with the Eastern Region currently producing over 50% of annual output.

The area planted to maize in 1999–2000 (two seasons) was stated by UBS (ref: Crop Survey Module) at 665 000 ha, yielding 739 000 t.

Whilst production is influenced by climate patterns, farmers' planting intentions, in excess of subsistence requirements, are largely influenced by price levels and overall output tends to fluctuate accordingly. For example, maize prices in Iganga District in the first season 2001 (Jan/June) declined from almost Ush 250/kg at the beginning of the year to around Ush 100/kg by the third quarter (source: Nakisenhe Adult Literacy Group (NALG) market information reports). Consequently, lower production for 2002 is being forecast.

Comparative production totals for 1995–1996 and 1999–2000 are given below (Table 5.1).

Maize production data should be treated with caution as the crop is almost exclusively grown by small-scale farmers with over half of the production area being mixed or

associated stands. Official statistical data are based on figures given in survey samples, which are extrapolated to give national average farm sizes and yields. The reliability of the data collected under the UBS Crop Survey Module 1999–2000, has been evaluated in terms of coefficients of variation (CVs), defined as the percentage ratio of standard deviation to the mean, generally accepted by statisticians as a measure of relative variability. The overall national CV for 1999–2000 maize production was stated by the UBS to have been 4.57%, a level considered acceptable. However, there are anomalies in the Crop Survey Module, as regional CVs varied from a low of 6.6% in the Central Region to 12.2% in the Northern Region.

Maize demand

It has been estimated that Uganda's domestic market for maize is around 350 000–400 000 t/year: Source: UGT/Investment in Developing Export Agriculture (IDEA Project).

Whilst maize has long been a major annual crop for farmers in Uganda, unlike neighboring countries such as Kenya and Tanzania, it is not the major part of the population's traditional diet. Therefore, maize is mainly grown for income generation rather than food security. However, maize, eaten grilled, whole, or as porridge, is an element in the urban diet particularly. The main domestic market for maize is the institutions, such as prisons, schools, and hospitals. The increasing cost of the traditional staple *matooke* may influence staple food consumption patterns and result in increased domestic maize consumption.

The main domestic maize market is Kampala, accounting for around 50% of formal trade. The main buying center is the Kisenyi market, which is dominated by the Kisenyi Millers Association, a group of 88 *posho* millers.

In normal production years, Uganda has a surplus available for export. Traditionally, demand from Western Kenya has acted as a safety valve for the disposal of surplus maize from Uganda's eastern region. This trade is almost entirely informal and accurate volume statistics do not exist. However, in good production years, traders estimate that around 100 000 t of Ugandan maize are sold to Kenya.

Table 5.1. Maize production: 1995–1996 and 1999–2000.

Region	Seasonal production (t)		Increase / (decrease)
	1995–1996	1999–2000	
Eastern	282,000	408,000	+ 45 %
Western	149,000	124,000	–(16 %)
Central	46,000	151,000	+ 228%
Northern	61,000	57,000	–(3%)
Total	538,000	739,000	+ 37%

Source: UBS, Crop Survey Module, 1999–2000.

In 2001, the UGT exported 20 000 t to Zambia, and the World Food Program purchased 30 000 t, therefore, the formal export trade accounted for 50 000 t, and the informal export trade, possibly, for 100 000 t.

The UGT considers that the Kenya market, which in normal production years is usually in deficit, represents an opportunity for Ugandan exporters. Currently, the Kenyan deficit is satisfied by imports from (primarily) South Africa.

The World Food Program (WFP). In 2001, the WFP purchased around 50 000 t of food under their aid program including the 30 000 t of maize already mentioned from Ugandan traders. Maize is bought for delivery to their warehouses in Tororo (destined for distressed areas in North Eastern Uganda and Northern Kenya) and Kampala (destined for distressed areas in the DRC, Burundi, and Rwanda).

The standard terms of purchase by the WFP are as follows:

- Contracts are usually for a minimum of 50 t, and payment is in US\$.
- A performance bond of 5% of contract value, valid for 90 days, in favor of the WFP is required.
- Payment by the WFP is 30 days after presentation of documents.
- Quality standards (maximum permissible percentages) are currently:
moisture 14%; insect damage 3%; broken grains 2%; shriveled, diseased, discolored grains 5%; other colored grains 4%; foreign matter 0.5%; total defective grains 14%; Aflatoxin 10 ppb.

International traders have commented that the quality standards of the WFP are lower than those for internationally traded maize. However, the WFP stated during discussions that their purchases of Ugandan maize were, generally, of lower quality than that purchased from South Africa, the EU, and the USA, due it being classified as what they term “peasant maize”. They expressed interest in supporting any measures aimed at improving farmers’ maize quality, as they view Uganda as a regular source of maize supply to their food aid program in the East African Region. However, it should be noted that the WFP operates its procurement policy on a commercial trading basis and will curtail its Ugandan maize buying activity at import parity price levels, currently around Ush 200/kg.

The UGT Ltd. The UGT was formed in September 2001 by 16 major Ugandan grain trading companies with the objective of coordinating the sourcing, drying, cleaning, and grading of maize for sale to the WFP, export markets (currently only Zambia), and the domestic market. Since its formation a major activity has been sourcing maize to fulfill the Zambian export contract, totaling 40 000 t. It is unlikely that the contract volume will be fully met as a domestic maize deficit is forecast by April/May/June 2002. Probably, final shipments against the Zambian contract will be made in March 2002, resulting in around 60% fulfillment of the contact. The Zambian contract has highlighted a number of constraints in the marketing system, particularly the inability to bid from stock (which needs adequate financing), poor quality, an inefficient regional transport system, and a lack of hedging facilities and timely market information.

With regard to maize export quality standards, the quality parameters for Unga Kenya Ltd, Kenya Bureau of Standards and Kenya National Cereals Producers Boards (NCPB) are listed in Annex 4. This information was obtained in mid-2000, and may have changed. However it is included for reference purposes in the context of establishing Uganda national standards (*Source: Feasibility study on the improvement of grain marketing Systems in Western Kenya. NRI July 2000*).

Price determination. There is no formal domestic price determination point. However, the development of market information is growing through the activities of organizations such as the IITA-FoodNet MIS program, and the recently introduced MTN market information service, using the medium of the mobile telephone.

Global maize marketing information is available from the daily price information reported by the Chicago Board of Trade (CBOT), the South African Futures Exchange (SAFEX). Regional commodity exchanges, quoting maize prices, also exist in Zambia (ZIMACE) and Kenya (KACE), although they are not futures markets or auctions.

The maize marketing chain

The marketing chain for maize is illustrated diagrammatically (Fig. 5.1). The chain is based on that in Kapchorwa and Iganga areas with a surplus of maize, both of which have a substantial trade at district, intraregional, and export levels (mainly informal trade to Kenya).

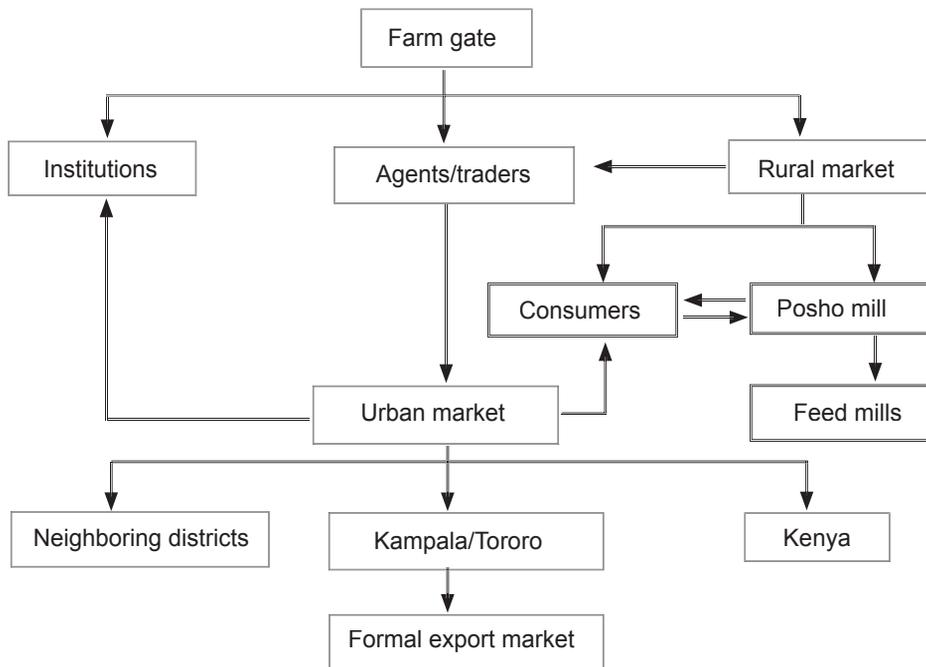


Figure 5.1. Maize marketing flow diagram.

Regional differences in the marketing chain are minimal in other maize surplus districts such as Masindi and Kasese. Districts that normally have a deficit in maize production, such as Rakai and Masaka, have shorter marketing chains, usually terminating at district urban center level.

The various stages in the marketing chain are defined as follows:

Farm gate: The farmer's point of sale after harvest, involving no transport cost and only rudimentary packing.

Agent/trader: Various "middlemen", acting as agents for rural and urban market traders or trading on their own account. They can be itinerants, usually on bicycles, or roadside store-based traders. They are normally located near to farmers' homes in their "catchment" areas.

Rural markets: Village markets, which can be either permanent or rotating, with different locations on different days of the week.

Institutions: Primarily prisons, hospitals, schools, and other public sector institutions, buying both maize to be contract milled and maize flour. This sector represents the largest single domestic market for maize and maize products.

Consumers: Buyers of maize for *posho* milling and maize flour for household consumption.

Posho mills: Small millers at farm (rare), rural, and urban-level, milling maize on a toll or own account basis, into flour for food consumption and by-products, e.g., maize bran/husks, for formulation into animal feed compounds.

Feed mills: Buyers of maize and maize milling-products for animal feed compound formulation. They can be located in rural, urban, and major centers, such as Kampala.

Urban markets: Usually major buying centers in district capitals, such as Iganga and Kapchorwa, in the regions surveyed, where there is a wider spectrum of market participants and greater trading activity.

Neighboring districts: Buying centers for maize emanating outside the district, e.g., Mbale buying from Kapchorwa, and Kampala, buying from Iganga.

Kampala/Tororo/Kenya/the formal export market: This stage in the chain refers to maize bought and assembled, stored, and treated for export through the formal market. Destinations are Zambia, for example, and WFP. It also refers to the informal market from Eastern Uganda to Kenya, particularly to Kitale and Bungoma, that appears to be a regular seasonal trading feature in this area.

Transactions

The transactions involved in marketing maize are complex; for the purposes of this study, four broad functional steps have been recognized in the maize marketing chain.

1. From farm gate to agents/traders' store/rural market in rural areas.
2. From rural market to urban market.
3. From urban market to major buying centers outside the district of maize production.
4. The export market.

The various stages in the supply/value chain are shown in Figure 5.1 and brief descriptions above; however, it must be noted that some of the elements making up the chain are bypassed. In reducing overall transaction costs market participants endeavor to shorten the chain by, for example, eliminating “middlemen”, either because they have no perceived economic role to play or by pooling produce in order to achieve economies of scale.

The pooling of produce and its sale through farmers’ marketing groups are the most important method of reducing transaction costs by achieving economies of scale, improved quality, minimizing losses, and improving net prices to farmers. Farmers’ marketing groups are not widespread in the Uganda maize trade; however, three illustrative case studies are now described

Further economies of scale have been achieved through the formation of the trading group, UGT, whose activities are described under “Demand” above, and the Kampala based *posho* millers group, the Kisenyi Millers Association.

At the level of rural and urban trader, there are innovations and developments to improve transaction efficiency. These include the greater use of mobile phones to elicit market information, the trend towards younger, better educated traders, and the reduction of unit transport costs through a greater appreciation of the significance of “back cargoes” and the use of larger capacity vehicles.

Farmers’ groups: case studies

Farmers’ groups have the potential to reduce overall transaction costs and to improve relative net prices to farmers. The following three case studies, which illustrate encouraging developments for the future of FCEs in Uganda, were analyzed during the course of the assignment.

(1) The Nakisenhe Adult Literacy Group (NALG), Iganga

The NALG is a farmers’ maize marketing group, located in Iganga. It was formed in 1993 as an adult literacy group and developed into a farmers’ group with the aim of encouraging the pooling of their produce to improve marketing efficiency, quality, and prices. NALG claim to be pioneers of a system, now in its fifth season, which has transformed farmers into farmer/traders. NALG currently receives technical and financial support from the IDEA Project.

The NALG currently has about 850 active members, all farmers; 60% are women; all are drawn from the Iganga, Kamuli, Bugiri, and Mayuge districts. The group’s organization involves a management committee of seven members, a secretariat of six members, and a general assembly of all members.

In 2001, NALG sold a total of 1367 t of maize (450 t in season 1 and 917 t in season 2), and have a target of 2200 t (1200 t + 1000 t) in 2002.

NALG—function and services. NALG functions as a sales/commission agent for its members. It operates 16 (ex-cooperative) stores in the four districts from which membership is drawn. It provides (1) training and advice on postharvest handling and quality standards (2) agricultural inputs, and (3) marketing information to farmers.

Stores are a standard 50 ft × 150 ft (capacity 300 t), and are rented at Ush 100 000/season (6 months). When visited, the stores seemed to lack any security.

Sales commission is currently Ush 10/kg, and is approximately 10% of sales value (Note: the current maize price is only about Ush 100/kg, compared to Ush 200 to 250/kg last year)

Postharvest extension services are geared to meeting buyers' quality standard requirements.

Agricultural inputs are provided by making credit available, or in "kind", and are secured against the value of farmers' maize in store.

Marketing information on maize prices is provided weekly at NALG stores, and show levels at NALG store, town, and village.

NALG operations. Farmers deliver maize to NALG stores or NALG arranges collection. Maize is cleaned and checked for quality before storage is permitted. If the maize is of marginal quality, NALG will clean it, but if it is of poor quality and highly infested, it is rejected and usually sold to local *posho* millers.

When a farmer's maize has been accepted into a NALG store, he/she is given an official storage certificate, issued by the Nakisenhe Produce Centre (NPC) that states:

- Item (maize).
- Grade (A or B, as tested before acceptance).
- Quantity (minimum 1 bag of 100 kg).
- Received by (store manager's signature).

The owner (farmer) authorizes the NPC to sell the certified produce at a minimum price, less deduction of fees which are as follows (current Ush rates in brackets):

Drying (4/kg) from 18/20% to (for example) 14%. This usually takes 2 days at 2 kg/day.

Packing/stitching (2/kg).

Bagging (5/kg).

Storage (5/kg). No time limit/until sale is made.

Transfer (3/kg). Transport from farm to store, if required.

Sales commission (10/kg).

Total costs = 29/kg.

The maize is either sold by the NPC or can be taken back by the certificate holder, after deduction of fees. The certificates are transferable, usually between farmers with the endorsement of the NPC. The system is a basic form of warehouse receipt system, but without credit availability except for agricultural inputs where, apparently, the stored maize is used as collateral.

Marketing and sales: A primary aim of NALG is to obtain premium prices for its members by pooling quantities, improving and standardizing quality, and contracting with larger buyers/traders, i.e., eliminating certain of the middlemen in the marketing chain (e.g., itinerant traders, roadside assemblers, village market operators).

A main market is the WFP whose terms require delivery to a specified location, e.g., WFP warehouse, Tororo. Contracts are usually for a minimum of 100 t, and payment is in US dollars.

For obvious practical reasons, NALG contracts with the WFP as principal, and not as agent on behalf of its farmer members. It would appear that farmer members are not aware of the margin made by the NALG between NALG store and delivered to the WFP store. There are costs involved in this aspect of the transaction, which were advised as follows:

Cost of performance bond in favor of WFP, 5% of contract value, valid for 90 days.

Interest, payment by the WFP is 30 days after presentation of documents.

Inspection and certification charges (SGS), Ush 1/kg.

Fumigation certificate charges (Ministry of Agriculture), Ush 40 000 per contract.

Membership of Associations (ACC), Ush 100 for each registration.

Notwithstanding the above costs, there may be an additional profit margin over and above their sales commission, which may cause problems (lack of transparency, maybe not deliberate) in the future, as NALG expands volume.

Other markets are Kampala-based traders, e.g., UGT. Quality standards were not available but are believed to be higher than those of the WFP.

Conclusion. The NALG model is of great interest in view of its potential as a model for replication in maize production areas countrywide, in other crop marketing systems, e.g., beans and cassava, and for development as a genuine warehouse financing systems, benefiting small-scale farmers.

The key issue is whether NALG is a sustainable operation without the financial and technical support currently being given by Investment in Development for Export Agriculture (the IDEA Project).

(2) The Masindi Seed and Grain Growers Association, Value-Added Center (MSGGA), Masindi

The MSGGA was originally formed in 1984 as a cooperative, but its current constitution dates only from 1995. It comprises about 100 farmer members (about 50 active members) located within a radius of approximately 50 km from Masindi town. Its objective is to buy, dry, clean, and market maize with a view to adding value for the benefit of farmers. It also handles maize for third parties, e.g., community-based organizations (CBO) and refugee groups, and operates in other commodities, primarily beans.

In 2001, the Association handled between 800 and 1000 t of maize including volumes traded on its own account.

Services. It provides agricultural extension and crop postharvest/storage training to farmers.

Costs. The following were given:

Transport (farm to Masindi town central store), Ush 10/kg.

On-loading/weighing, Ush 2/kg (weighing at the farm gate is discouraged).

Off-loading/stacking, Ush 3/kg.

Local taxes, Ush 2/kg.

Fumigation, Ush 3/kg/round, depending on level of infestation (for example, once every 30 days).

Drying, Ush 4/kg.

Cleaning and sorting, Ush 3/kg.

Rebagging/stitching and stacking, Ush 1.5/kg.

Cost of storage facility and management, Ush 5/kg.

MSGGA commission, Ush 3.5/kg.

Total, Ush 37.00/kg

Maize is “pooled” and when economic quantities are available in store (say, 100 t), sales are made to the WFP and UGT on a delivered Kampala and/or Tororo basis. Additionally, lorry loads (100 × 100 kg bags = 10 t) are sold on an “off lorry” basis at the Kampala Kisenyi market, and occasionally, sales are also made to traders (local and Kampala-based) on an ex-store Masindi town basis.

The following tertiary marketing costs were given:

Fumigation, Ush 3/kg (WFP and UGT sales).

50 kg WFP bagging expenses, Ush 13/kg.

Security, fixed cost/not given.

Transport, Ush 40/kg (to Tororo) and Ush 25–30/kg (to Kampala).

Contingencies/taxes/losses/damage/administration, Ush 5/kg.

General comments. The following comments were made by the MSGGA management:

- Farmers are not keen to invest in machinery and equipment to clean their maize, e.g., shellers and sticks for threshing. The threshing cost is estimated Ush 10/kg, including equipment, and farmers consider both the cost and labor involved to be prohibitive.
- Farmers deliver their maize in trust and receive a storage (warehouse) receipt, which can be traded between members.
- Farmers are not given credit.
- Major constraints are:
 - The system is based on trust, which has been abused in the past (during the cooperative movement period).
 - There is no price differential according to farmer’s quality supplied (MSGGA will not accept substandard maize into its central store).
 - Lack of affordable credit.
 - Poor infrastructure for intraregional trade.
 - The need for capacity building, particularly in marketing skills.
 - Lack of reliable, regular market information.

Conclusions. As in the case of the NALG model, the MSGGA is of great interest in view of its potential as a model for replication in maize production areas countrywide, and for development as a genuine warehouse financing system, benefiting small-scale farmers.

MSSGA appears to be a sustainable operation, but whether donor financial and technical support is being received was not revealed.

(3) *The Uganda National Farmers Association (UNFA)–Agribusiness Ltd (AL)*

AL has been established as the commercial wing of the UNFA and is a shareholder in UGT. In 2001, it purchased around 650 t of maize from UNFA members, which it dried, cleaned, and bagged as part of UGT's export stock for the fulfillment of the Zambian contract. Unlike NALG and MSGGA, AL pays its farmers only for fair average quality (FAQ) maize, therefore, they have not been trained to improve quality and have no access to premiums. AL's volume operation is currently limited by limited access to trade finance. Despite its limitations, AL seems to have the potential to develop into a genuine farmers' marketing group, accruing benefits in terms of increased net incomes, at farm-gate level.

Note: *Source:* EU commodity market information risk management report, Mandl and Mukhebi, February (2002).

Marketing cost analysis

In ascertaining marketing costs from farm gate to export market, the methodology used by Vinlaw Associates Ltd in their report, *Farm gate to export market study of maize and beans*, March 1997 for ADC/the IDEA Project has been adopted as a reference.

The sources used for ascertaining unit costs/prices/kg of maize were farmers, farmers' groups, roadside traders, village traders, urban traders, transporters, *posho* millers, Divisional Agricultural Officers, and UGT Ltd.

Time availability did not permit a comprehensive survey of rural, urban, and tertiary markets and costs have been calculated on averages, estimates, and previous studies.

It should be noted that not all costs are incurred at each stage, and a degree of duplication is included in the costs.

Primary marketing costs

Primary marketing costs are defined as those incurred at the first point of contact between the farmer and trader, which can be at the farm gate, agents/buyers store, or the nearest rural market. They consist mainly of bagging, labor, transport, and market operational costs. (See Table 5.2.)

Note: Bagging material costs comprise the purchase of 100 kg bags and twine.

- Transport costs comprise the estimated costs of bicycle and head loading, the usual means of carrying maize at this level. In some districts, agents/traders also use pick up trucks. An average distance for transportation has been taken at 3–5 km.
- Much of the trade is into agent's stores and market fees are applicable only where rural markets exist.

Secondary marketing costs

Secondary marketing costs are defined as those involved in the movement of maize from primary market to urban center (e.g., Kapchorwa, Mbale, Iganga, and Masindi towns). They consist, mainly, of bagging materials, labor, storage, transport, losses (in eight due to drying and cleaning), security, and taxes/license fees. (See Table 5.3.)

Table 5.2. Primary marketing costs.

	Unit cost (Ush/kg)			
	Kapchorwa	Mbale	Iganga	Masindi
Farm-gate price (FGP)	50.00	65.00	60.00	60.00
Bagging materials	1.00	1.00	2.00	5.00
Labor costs (loading, sorting, Weighing costs)	–	–	–	3.00
Transport (farm gate to primary market)	10.00	10.00	10.00	10.00
Market dues/local tax	–	–	2.00	2.00
Margins	4.00	9.00	6.00	5.00
Total	15.00	20.00	20.00	26.00
Primary market price (PMP)	65.00	85.00	80.00	85.00

Table 5.3. Secondary marketing costs.

	Unit cost (Ush/kg)			
	Kapchorwa	Mbale	Iganga	Masindi
Primary market price (PMP)	65.00	85.00	80.00	85.00
Bagging materials	–	2.00	2.00	2.00
Labor costs (loading, sorting, unloading /weighing costs)	4.00	5.00	5.00	4.00
Transport (rural to urban market)	10.00	5.00	5.00	10.00
Storage	0.50	1.00	1.00	1.00
Losses	2.00	2.00	2.00	2.00
Market dues/local tax	1.00	1.00	1.00	1.00
Trading license and security	–	0.50	0.50	0.50
Margins	5.00	3.50	5.00	4.50
Total	22.50	20.00	21.50	25.00
Secondary market price (SMP)	90.00	105.00	101.50	110.00

Note

- Bagging material costs are usually incurred at the primary market level.
- Labor costs include the use of subagent/loading and offloading.
- Transport costs vary in accordance to the distance and type of vehicle used and averages for each district have been used.
- Storage costs are incurred when traders rent stores. In some cases, they store maize in their own homes at no cost.
- Losses in weight occur during the process of drying, cleaning, and sorting. The most common causes of loss are due to moisture loss/chaff/insect damage/discoloration and shriveling of grains.
- The quoted SMP were lower at the time of the visit.

- Examples of how transaction costs may be reduced through the operation of farmers groups pooling their produce are illustrated by the cost figures given by the two case studies above, NALG, Iganga and MSGGA, Masindi.

1. NALG's costs from farm gate to ex-store, secondary market, are Ush 29/kg and cover drying, packing and stitching, bagging, storage, transport from farm to store, and sales commission

2. MSGGA's costs from farm gate to ex-store, secondary market are Ush 37/kg and cover transport, on-loading/weighing, off-loading/stacking, local taxes, fumigation, drying, cleaning and sorting, rebagging/stitching and stacking, cost of storage facility, management, and MSGGA commission.

Whilst transaction cost comparisons in this context must be treated with caution, it is apparent that farmers' marketing groups are able to reduce costs through greater efficiencies and economies of scale.

Note: According to traders at Kampala's Kisenyi market, transport cost could be considerably lower if they collected maize from urban centers with their own vehicles, carrying "back cargo".

- Kampala traders commented that prices in urban centers are often not much lower than in Kampala, therefore transport cost efficiency is the key to successful trading.
- Greater marketing information would assist in identifying suitable "back" cargoes.

Tertiary market costs

Tertiary market costs are defined as the costs involved in the movement of maize from main urban buying centers within the district to locations outside the district, e.g., Kampala or Tororo. Only Kapchorwa, Iganga, and Masindi, of the districts visited, had substantial intraregional trade. The main cost elements in this operation are transport, and labor for loading and unloading, storage, security, and losses.

Processing costs

Large-scale maize milling is not a feature of the sector. Processing is mainly undertaken by small-scale rural and urban-based *posho* millers. Urban millers in Iganga, rural millers outside of Mbale, and the Kisenyi Millers Association, Kampala, were visited. The basic maize milling process is as follows:

- Drying and threshing (cleaning)—loss 3 kg
- Hulling (grain is hulled more than once depending on final flour quality requirements).
 - loss 42 kg (27 kg at first hulling, 15 kg at second hulling).
 - the discarded husks are sold as maize bran at Ush 50 kg.
 - Milling into flour.
 - loss 10 kg.

Note: The above assumes losses from 100 kg maize entering the process.

The ratio of maize to flour can vary according to desired quality and fineness of the flour required, however, the average quoted is 100 kg maize = 45 kg maize flour.

Urban millers charge Ush 40/kg for toll milling a minimum of 100 kg of maize. They also purchase maize on their own account, mill, and sell the resultant flour and bran. Rural millers charge Ush 30/kg, and will accept smaller quantities for toll milling.

The actual milling costs were not revealed. The main complaint of millers is high power costs.

Posho millers indicated that the milling business was highly profitable with margins > 50%.

Kampala *posho* millers at Kisenyi market were buying maize at Ush 120/kg and selling maize flour, wholesale, at Ush 320/kg (super quality) Ush 250/kg (first quality), and Ush 210/kg (standard quality). Retailers at Owino market, Kampala, were selling super quality at Ush 400/kg.

Constraints and opportunities

The following constraints and opportunities to increase efficiency in production, transaction, marketing, and processing were identified during the study.

Primary and secondary market levels: (farm gate, agents/traders' store, and /or village market, urban center)

Small farm units, a lack of credit for the purchase of inputs, and the high unit cost of maize production result in low profitability for farmers and discourage higher farm output, particularly in periods of low market prices. Poor quality at farm-gate level due to maize being harvested at too high moisture levels (18–22% rather than the optimum of 12–14%), and generally inadequate postharvest handling techniques result in lower prices to farmers. Additionally, poor quality results in a high percentage of rejection by traders sourcing for the WFP and export markets (Note: the UGT claim to reject about 50% of the maize offered to them by urban-based traders). Rejected maize at agents store/urban center level is normally offered at lower prices to *posho* mills. This also influences negatively farm-gate prices.

Market information at the farm-gate level is poor or non-existent. An inadequate rural road network results in some farms being inaccessible to traders, particularly in the rainy season. Inadequate storage facilities or the lack of them, particularly at farm and rural trading center level, also result in marketing inefficiencies. Farmers have limited trading opportunities and are inevitably price takers at farm-gate level with little, or no, bargaining power to enable them to exploit competition amongst traders.

Trader ability to expand volume purchases, thus increasing competition, is constrained by lack of working capital requirements. The microfinance movement and/or commercial banks should be encouraged to enter this sector, as has been seen in other countries (e.g., cassava and maize traders in the Mwanza district of northern Tanzania).

At the tertiary market level

High transport costs, particularly from the Fort Portal and Kapchorwa areas to Kampala are a particular constraint to improving transaction cost efficiencies. Distance, high fuel cost, wear and tear on vehicles, time involved (drivers' occasional overnight accommodation and subsistence), and inadequate "back cargoes" are the major reasons. Traders in Kampala commented that if transport costs could be reduced, they could increase substantially maize purchase from this region. They also mentioned intradistrict taxes and dues and high electricity costs in the maize processing operation as being a burden on trading profitability. See (Table 5.4.)

These constraints are common to other sectors and are dealt with in the section of the report covering "crosscutting" issues.

The informal export market to Kenya is uncontrolled and involves the sale of low and variable quality maize. It is a constraint to the penetration of the formal Kenya market represented by large millers, such as Unga (K) Ltd. Furthermore, Uganda lacks an authoritative price determination point, e.g., a central commodity exchange or futures market, national maize quality standards, and a legal and regulatory framework covering grain warehousing and handling operations. These deficiencies, together with inadequate finance to enable the development of an efficient warehouse receipt financing system, constrain the holding of stocks, essential for the exploitation of export marketing opportunities in particular.

Table 5.4. Tertiary marketing costs (transport costs only)

	Unit cost (Ush/kg)			
	Kapchorwa	Mbale	Iganga	Masindi
Secondary market costs (SMP)	90.00	105.00	101.50	110.00
Bagging materials	–	–	–	–
Labor costs (loading, sorting)	–	–	–	–
Weighing costs	–	–	–	–
Transport				
Mbale	20.00	–	–	–
Kampala	45.00	–	20.00	25.00
Tororo	–	–	–	–
Kenya	–	–	–	–
Market dues/local tax	25.00	–	–	–
Total	–	–	–	–
Tertiary market price (TMP)				
Mbale	115.00	→	→	→
Kampala	120.00	→	→	→
Kenya	120.00	→	→	→

The above constraints are interrelated and concern the need for a formal maize trading structure. The formation of the UGT, bringing together leading stakeholders in the maize sector, presents an opportunity to develop an efficient and formal grain marketing system. However, UGT should exercise care to avoid exploiting its potential monopsony.

Raising farmers' Incomes

The poor profitability of maize at the farm level is due, primarily to low yields, high postharvest losses, lack of or inadequate on-farm storage, poor quality, and low prices. Raising farmers' incomes and improving quality are essential to ensure the long-term sustainability and growth of the sector. Farmers' incomes must be raised through efficiencies within the production and marketing system.

Both production and marketing efficiencies can be improved by encouraging farmers groups to enhance their ability to access input credit and improve net farm-gate prices. Past experience in Africa and other developing regions of the world, particularly related to the cooperative movement, warrants caution in this regard. However, the formation and operation of groups such as NALG, Iganga, MSSGA, Masindi, and the Agribusiness Ltd venture of the UNFA offer encouraging signs for the replication and growth of farmers' groups in Uganda. As in the cases of NALG and the MSSGA, successful farmers' groups should be formed from within the farming community, be owned by farmers themselves, have a clear objective, and eschew commercial activities which are beyond their capacity. Whilst external assistance is required as a catalyst to formation and capacity building, such outside involvement such be minimal with a view to disengagement when long-term sustainability is achieved.

Related topics

The EU study Commodity market information and risk management: The case for a commodity exchange and warehouse receipt system for Uganda (Mandl and Mukhebi, February 2002) recommends the implementation of plans to introduce a commodity exchange and a warehouse receipt financing system for the Ugandan commodity sector. We concur with the findings of the report which address two of the key elements required for developing a formal maize marketing structure in Uganda.

Summary of key findings

- Whilst maize is not the traditional staple food crop for Uganda's population, which is plantain, it plays an important part in the urban diet and has the potential to become more popular.
- The small scale of maize farming units, poor quality, low yields, unavailability of input credit, postharvest losses and low net farm-gate prices relative to market levels, all contribute to the maize enterprise being of marginal profitability. This is particularly true in times of low prices, such as during the period of the study.

- Although there is keen competition amongst traders for maize, farmers are in a weak bargaining position due to inadequate economies of production scale and inadequate marketing information.
- The poor rural road network in many areas results in farmers being unable to access markets regularly, particularly during the rainy season.
- Encouraging signs of small and scattered but active farmers' groups, are evident in the surplus maize growing districts of Iganga and Masindi.
- High transport costs due to high fuel prices and the cost of vehicle maintenance particularly hamper transaction cost efficiency.
- There is no large-scale maize milling industry in Uganda. Processing into flour is undertaken mainly by *posho* millers at the rural and urban level and in the Kisenyi market, Kampala. The *posho* milling operation can be highly profitable.
- Following the liberalization of the grain sector, there are no significant policy, regulatory, or institutional constraints to the development of the sector. However, to realize the potential to develop a vibrant domestic and export market it will be necessary to institute a formal maize marketing structure. This will involve finance for investment and working capital, the establishment of national standards, and a suitable regulatory framework for the introduction of an authoritative price determination point, e.g., a commodity exchange, and warehouse receipt financing techniques.

Recommended implementation plan

1. The improvement of farm-gate maize quality

We recommend that existing programs be expanded and new programs implemented to reduce farmers' losses, through optimal crop postharvest handling techniques and on farm storage. We suggest that NAADS and the NAARI Cereal Program are the most appropriate bodies to implement these initiatives.

2. The encouragement and capacity building of farmers' groups

We recommend the encouragement of farmers' groups as the key to improving maize growing profitability and marketing efficiency. We suggest that initiatives in this context are undertaken by the Community Enterprise Development Organization, NAADS, and MAAIF and that assistance is sought from DFID under their sustainable livelihoods program.

3. The development of rural finance

We recommend the improvement of rural financial services to enable greater access to credit for agricultural inputs and trading working capital, and suggest that NGOs and donors, such as the World Bank, EU, and DFID, together with the Bank of Uganda, are encouraged to assist with such initiatives.

4. The improvement of maize storage and handling facilities

We recommend that adequate and efficient stores for maize be promoted at rural and urban level. Some facilities, formerly operated by the cooperative movement, are lying idle and should be rehabilitated and brought back into use by FCEs. We suggest that NGOs and donors, such as the IDEA Project, be encouraged to assist with such initiatives.

5. The promotion of marketing information at rural level

Current initiatives such as the IITA-FoodNet marketing information service (MIS) and the MTN mobile telephone marketing information service are disseminating maize prices at the rural level. We suggest that the PMA, NAADS, NGOs, and donors, such as the IDEA Project, be encouraged to assist with such initiatives.

6. The development of a formal maize marketing structure

We propose that immediate steps are taken to initiate the required elements involved in developing a formal maize marketing structure, as follows.

- National quality and contractual standards.
- Crop and trade (working capital) finance access.
- A warehousing receipt financing regulatory framework.
- A commodity exchange.

We propose that the UGT drive the agenda in cooperation with MTTI, MAAIF, MFPED, Bank of Uganda, UEPB and the UBS.

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Cassava

Supply

The eastern region is the dominant cassava producing region in Uganda, followed by the northern and western regions. The smallest amount produced comes from the central region. Given its resilience to drought conditions, cassava plays an important role for smallholders in the farming systems of the east and north of the country. Table 6.1 provides a summary of production figures comparing 1995–1996 and 1999–2000. During the 1980s and early 1990s, cassava production in Uganda suffered from the cassava mosaic virus. In response to this, around 12 new disease-resistant varieties were introduced by extension and research services (e.g., NARO, IITA, NGOs), which, in turn, led to a renewed increase in production. Low rainfall was the main reason for a lower level of output in 1999–2000.

During the course of data collection for this study, January–February 2002, traders and farmers alike confirmed that the most recent levels of production were very favorable. In fact, the bumper harvest of cassava and other, “competing” food crops in 2001 resulted in depressed market prices, and farmers complaining about lack of market outlets.

As in most parts of sub-Saharan Africa, cassava is one of the staple food crops in Uganda and is predominantly traded in the form of fresh roots, and dried chips/flour. During the period of the survey, Kampala was mainly supplied with dried cassava from the eastern region (e.g., Pallisa and Kumi districts), and fresh roots from the west (e.g., Masindi, Kigumba, and Bweyale). This was most certainly conditioned by seasonality (i.e., dry season) and, as already indicated, the recent bumper harvest. Soroti, Apac, and Lira are other supply centers for dried cassava reaching the Kampala market during “normal years”. In addition, if there is scarcity of supply of chips in the capital, in particular during the wet season, supplies also arrive from Paidha in northwest Uganda, Tanzania, and the Democratic Republic of Congo (DRC). As for the latter, however, in early 2002 it was reported that wholesale traders based in Jinja occasionally supply the northeast of DRC via Arua due to high food prices in that region. Another export route exists to Kenya via Tororo, although very few exports were observed during the course of the survey.

Table 6.1. Production of cassava by region ('000 t).

	1995–1996	1999–2000
Eastern	1,659	1,213
Northern	447	457
Western	531	381
Central	110	195
Total	2,747	2,246

Source: Uganda Bureau of Statistics, January 2002.

Demand

Cassava flour consumption

The bulk of the Ugandan cassava that is not consumed in fresh form (i.e., boiled) is peeled and sliced into pieces, usually referred to as chips. The latter are dried and milled into flour that can be stored for several months. Cassava flour is often mixed in high proportions with millet flour (a relatively expensive product) to produce a more nutritious and tasty food staple.

Tables 6.2 and 6.3 provide estimates of cassava flour consumption in 1997 (Collinson et al. 2000). The figures were derived from data collected during the 1996–1997 Uganda Household Monitoring Survey. However, 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.

Nevertheless, 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 among regions and between rural and urban areas.

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 (Table 6.2). 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.

Consumers in the 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 (Table 6.3). 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 the central region has almost certainly increased over the last decade and may still be rising (Collinson et al. 2000).

The 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 that producing one's own food is risky 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 6.2. Rural/urban estimates of cassava flour consumption, 1997.

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

Source: Collinson et al. (2000), based on data from 1996–1997 Uganda National Household Survey.

Table 6.3. Regional estimates of cassava flour consumption in 1997.

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

Source: Collinson et al. 2000, based on data from 1996–1997 Uganda National Household Survey.

Industrial utilization of dried cassava

Although cassava is a major raw material in a number of agroindustries in other parts of the world, very little dried or fresh cassava is industrially used in Uganda. According to Graffham et al. (2000), industries that can use cassava include:

- Animal feed manufacturing.
- Plywood, paperboard, and textile industries.
- Biscuits and bread production.
- Starch.
- Brewing.
- Sugar syrups.
- Industrial alcohol.
- Industrial chemicals.
- Biodegradable plastics.

According to Graffham et al. (2000), locally made cassava flour was used as a replacement for imported starch by three out of six plywood, paperboard, and textile factories in Uganda. These industries consumed 216 t of cassava, representing less than 1% of total dried cassava production.

Cassava chips in animal feed is the sector with most potential for industrial utilization in the near future (i.e., market is equivalent to about 20 000 t of fresh roots). The technology for production is quite simple and well suited to rural areas, and quality specifications should be relatively easy to meet. At the same time, the major feed millers, some of whom have already used dried cassava in the past (i.e., early 1990s), provided the following reasons why it is not included in feed formulations nowadays:

- It is too expensive in view of the ample supply of other starch-based raw materials, (e.g., maize and milling by-products).
- Supply is unreliable.
- The crop is considered a food crop for human consumption.

In early 2002, Uganda Breweries reportedly planned to undertake cassava-based brewing trials. Follow-up visits to the brewery are required to obtain information about the results of the trials.

Cassava flour and chip prices

Tables 6.4 and 6.5 indicate cassava chip and flour prices observed in January/February 2002. The left-hand column of the table states the location and the operator in the marketing chain obtaining the price.

When comparing price trends for major staple foods at retail level in Kampala, Collinson et al. (2000) observed that cassava flour prices had increased in real terms (i.e., adjusted for inflation) between 1989 and early 2000. By comparison, *matooke* and millet flour prices showed no significant real long-term trend over that period. For more detailed price information, please consult with the Bureau of Statistics and IITA- Foodnet.

Table 6.4. Cassava chip prices in January–February 2002.

Operators in the marketing chain/location	Ush/kg	Source of information
Traveling traders, Kampala.	120–140	Kampala wholesalers, who use custom mills and sell flour.
Village dealers in Kumi district.	50–55	Wholesalers in Jinja.
Village dealers in Soroti district.	60	Wholesalers in Jinja.
Farmers in villages of Pallisa, Kumi, or Soroti districts.	40–50	DAO Pallisa, farmers, wholesalers in Jinja, Kumi, and Soroti, AO Kumi.
Farmers delivering chips at roadside markets in Kumi district.	50–60	Farmers, traders.
Farmers in Lira district.	50–60	Wholesalers in Lira town.
Village dealers in Lira district.	70–80	Wholesalers in Lira town.
Wholesale price in Lira town.	110–120	Wholesalers in Lira town.
Arua market.	Approx. 200	Farmers in Bweyale.

Table 6.5. Cassava flour prices in January–February 2002.

Operators in the marketing chain/location	Ush/kg	Source of information
Kampala, Kisenyi market; wholesalers.	180	Kisenyi market wholesalers, and Owino market retailers.
Kampala, Owino market; retailers.	250–300	Owino market retailers.
Jinja town, wholesalers; flour from Soroti (better quality), flour from Kumi, Pallisa.	110	Traveling traders
Kumi town, wholesalers.	90–95	Wholesalers in Jinja
Soroti town, wholesalers.	120	Wholesalers in Kumi.
Lira Town.	Approx. 100?	Wholesalers in Soroti.
Moroto.	140–150	Wholesalers in Soroti.

Dried cassava marketing chain

Figure 6.1 (Collinson et al. 2000) reveals the complexity of dried cassava marketing. 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 participant in the marketing chain 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 or hired transport, they can sell directly to rural retailers, rural consumers, or to wholesalers, if they are near major district-level towns. Alternatively, they can sell to traveling traders (who provide links with major consumer markets) or village assemblers. Farmers rarely extend credit to their customers, and will do so only 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 (i.e., usually wholesalers from local towns or traveling traders) 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 grade, white and well dried, 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.

concentrate on cassava chips and flour in the wet season, when sourcing quality 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 district wholesalers secure credit from their sellers. On the contrary, it was reported that they provide assembly traders with cash advances when supply is short. This practice is less common when there is an ample supply of dried cassava. When asked about their access to the Kampala market, wholesalers based in Jinja indicated that traders in the capital would prevent them from directly selling to retailers in markets such as Owino. As a consequence, it tends to be traveling traders from Kampala who come to Jinja to buy chips or flour there. No trade in dried cassava was observed between Jinja town and Kampala in February 2002.

Traveling traders. These traders supply the majority 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 allows them to operate on a larger scale. Whereas district-level wholesalers may trade in one week between 5 and 15 × 100 kg sacks of cassava flour, urban wholesalers commonly sell between 50 and 100 sacks.

Miller/wholesalers. A number of specialist businesses in major towns such as 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 turnover is usually in the range of 10 to 15 t/week 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 larger towns, millers are often specialized and run electrically powered mills.

Urban retailers. The majority of food retailing in urban areas is characterized by a large number of small, nonspecialized stores. These sell small quantities of numerous products, often trading food alongside manufactured goods such as pens and razor blades. Nevertheless, there are signs that some retail traders in urban centers are able to increase the scale of their business. For example, in Owino market in Kampala, food retailers have been encountered who have 10 or more bags of flour (i.e., of maize, cassava, or peas) on display, each worth Ush 25 000 to Ush 60 000 (in February 2002).

Marketing and processing costs

The following costs have been identified:

- Transport.
- Milling.
- Handling.
- Packaging and dressing of bags.
- Storage.
- Capital costs.
- Taxes, levies, and fees, that may change depending on Local Authorities.

Transport. This is one of the most significant cost elements in the commodity chain. It varies according to factors such as mode of transport, distance, road conditions, and season (Table 6.6). Usually, the following stages of transport can be distinguished in the cassava marketing chain:

- Local transport from the farm to the village collection center.
- Transport from village to town.
- Transport from town to another district, Kampala, or export.
- Local transport at destination point, i.e., mostly inner-urban.

Head loading and the bicycle are the predominant modes of transport in the village. In particular, head loading, which is almost exclusively done by women, is an inefficient mode of transport. Aside from health implications, it is very expensive due to the opportunity costs of time involved, limited carrying capacity, and limited distance that can be covered. Animal-pulled carts or tractor-trailers are used but only on a very limited scale.

The use of pickup trucks plays an important role in the transport of agricultural produce from the village to smaller towns. At the same time, larger wholesale traders based in urban centers such as Kampala or Jinja also hire trucks to go directly to rural areas where they buy from village dealers who have assembled relatively large quantities of produce.

Transport between urban centers is by trucks and lorries of varying sizes (i.e., most commonly 10 tonnes). It was pointed out that the carrying capacity of the vehicle influences the transport cost, i.e., the use of larger lorries leads to economies of scale resulting in lower per unit transport charges. Other factors highlighted as influencing transport costs are the level of fuel prices and the fact that vehicles often have to travel empty to the more remote areas to collect agricultural produce.

Inner-urban transport is characterized by a multitude of modes of transportation reflecting usually congested marketplaces. They include, often in combinations:

- Humans carrying goods on their heads or backs.
- Intermediate means of transportation such as pushcarts or wheelbarrows.
- Motorized transport such as minibuses and taxis.

Table 6.6. Transport costs for dried cassava product.

Locations	Product	Transport cost Ush/kg	Mode of transport
Village in Soroti district to Jinja, truck	Chips	25	Jinja wholesalers,
Village in Kamuli district to Jinja	Chips	15	= // =
Village in Iganga district to Jinja	Chips	15	= // =
Jinja–Kampala	Flour	15	= // =
Jinja–Masaka	Flour	18	= // =
Jinja–Arua	Flour	65–70	= // =
Jinja–Kasese	Flour	45	= // =
Jinja–Kabale	Flour	40	= // =
Village in Iganga district to Iganga town	Chips	10	Bicycle or pickup truck
Village in Kumi district to Kumi town	Chips	10	Pickup
Kumi town to Kampala	Flour	20	Truck
Kumi town to Tororo	Flour	10	= // =
Village in Kumi district to Tororo	Flour	15	= // =
Village in Soroti district to Soroti town, 20 km	Chips	15	Pickup
Soroti town–Lira	Flour	15	Cotton trucks
Soroti town to Arua	Flour	60–70	Lorries
Soroti town to Moroto	Flour	30	Lorries, pickups
Soroti town to Kotido	Flour	40	= // =
Village in Lira district–Lira town	Chips	10	Pickups
Lira town–Arua	Flour	50–60	Lorries
Lira–Kampala	Flour	30	= // =
Lira–Kotido	Flour	50	= // =
Paidha–Kampala	Chips	40–45	= // =

According to the survey, transport costs including loading and off-loading represent approximately 20–30% of the final selling price of dried cassava when transported from village to a major urban center.

Milling. So-called *posho* mills are generally used for milling both maize and cassava. They are common in the main trading centers, where they are based on electricity. Village mills, which are much smaller in scale, are powered either by diesel or petrol engines.

The milling sector appears to be dynamic in that, particularly in the main district towns, there is a multitude of milling enterprises. On the one hand, new milling enterprises are starting business (e.g., in Kumi), on the other, established enterprises face closure due to strong competition (e.g., in Jinja).

Table 6.7. Milling costs of dried cassava.

Location	Ush/kg	Observation
Kampala	20	Ush 20/kg of flour.
Jinja	13	Ush 1300/100 kg bag of flour.
Kumi	10	
Soroti	10	
Lira	20	Milling cost includes transport of chips from wholesale market to mill. Source: wholesalers in Lira.

At the same time, high electricity costs were repeatedly mentioned as one of the main constraints of milling operations. Calculations in Annex 5 provide an indication of the extent of electricity charges as part of total milling costs. Assuming that the miller charges Ush 20/kg of flour, and 750 bags are milled per month, then the milling business is likely to operate at a loss. This is based on the assumption that milling one bag of cassava flour would attract Ush 1280 of electricity charges (according to millers in Kisenyi market, Kampala). Profits appear to be possible only if other cost items such as depreciation and management costs are not taken fully into account. In addition, in some parts of the country (e.g., Kumi), millers complained about the high costs of connection to the electricity grid. Most millers charge Ush 10–20/kg of flour (Table 6.7). This may be an indication that, due to stiff competition, the recent increase in electricity charges (at the end of 2001) has not yet been passed on to customers, or that millers are able to avoid paying the full charges. However, in the longer term, an increase of milling charges and further closures of less dynamic businesses can be expected.

Handling. In the majority of cases, this consists of Ush 200 each for loading and off-loading. In cases where the same persons are involved in these operations, charges may be combined to Ush 300 per bag.

Packaging material. Polyethylene bags costing Ush 450–500 are generally used to transport cassava on trucks and for storage. Nevertheless, cases were reported where dried chips were transported in a loose form on trucks from villages in Kumi or Soroti Districts to Jinja town. Dressing of bags includes stitching and strings, costing together about Ush 300/bag.

Storage costs. Rental costs of stores obviously depend on location and type of building. It was reported that monthly rent of a store with a capacity of holding 200 bags was of the order of Ush 200 000. Building new stores can be relatively inexpensive in district towns (e.g., Ush 1 500 000 in Kumi). In addition, the opportunity cost of capital tied up in the merchandise stored needs to be taken into account (see section below on capital costs).

Taxes, levies, and market fees. These are mostly fees determined by the Local Authorities. They can vary from district to district. For example, fees in a village market are likely to be of the order of Ush 200/bag leaving the subcounty.

As for District Development Fund (DDF) contributions for a traveling trader from Jinja, these may be of the order of Ush 15 000 per 10-tonne truck, Ush 5000 in Kamuli

district, and no contributions in Iganga. Wholesalers indicated that the DDF charge was Ush 400/bag in Lira. Generally, no DDF contributions are paid if the produce is moved within a district.

Also, licensed traders who are based in a certain market are not expected to pay any additional market fees there whereas farmers and traders coming from outside are likely to incur a market fee. Parking fees in district towns are of the order of Ush 3000/truck of 100 bags.

Although, during the course of the survey, few complaints were heard about the size of these marketing-related fees, in some instances it was indicated that the amount and types of taxes incurred by millers was confusing. For example, it was felt that millers in Jinja were doubly taxed (i.e., by being obliged to hold a processing license and a trading license). Although it was not possible to confirm details of this, it indicated that there is a need for more transparency and provision of information at Local Government level.

Capital costs

It was confirmed during the course of the survey that operators in the cassava marketing chain hardly ever obtain credit through the formal banking sector. Most transactions are cash-based with few banking services involved. To a large extent, traders rely on their equity capital when undertaking their marketing activities. It is estimated that a medium-sized wholesaler dealing in 50 bags of cassava chips/week requires a working capital of the order of Ush 500 000 to Ush 1 000 000 to undertake purchasing and selling activities and pay for transport.

If traders require additional capital to “top up” their equity, they would try to obtain it from friends/family or on the informal credit market, where they reportedly have to pay up to 10% interest/week. This indicates the extent of opportunity cost of capital associated with private trading businesses largely operating in the informal sector.

Margins

Overall, trader margins do not point to excessive profits by individuals in the marketing chain of dried cassava. On the contrary, some of the traveling traders and wholesalers appear to operate only on a relatively small profit basis, bearing in mind that they tend to have comparatively large turnovers. However, the “length” and relatively complicated structure of the dried cassava marketing chain are noteworthy (see Tables 6.8 and 6.9). The involvement of numerous players, especially if the produce is transported to Kampala, leads to a high total marketing margin. As a consequence, the farmers’ share of the final price tends to be low. In particular, this is the case when there is a glut on the market following a bumper harvest (the situation in early 2002). In February 2002, farm-gate prices for dried cassava in villages of cassava producing districts such as Kumi are only about 15–20% of the retail price of flour in Kampala.

This points to the need to identify measures to reduce the overall length of the marketing chain and to create economies of scale, both at the production and retail levels. (More on this below in sections on constraints and opportunities).

**Table 6.8. Dried cassava trading costs and margins.
Case study: Kampala-based traders buying in villages of Paidha,
Kumi, or Pallisa districts.**

	Ush/ 100 kg	Percentage of selling price
Farmer		
Selling price, chips	4,000	
Village assembler		
Purchase price	4,000	
Selling price	6,000	
Gross margin	2,000	33
Costs		
Transport	1,000	
Market dues	200	
Capital costs (@ 3% of all costs)	36	
Net margin	764	13
Traveling trader, Kampala- based		
Purchase price	6000	
Selling price	13,000	
Gross margin	7,000	54
Costs		
Miscellaneous labor	700	
Transport (average of several districts)	3,500	
Packaging	500	
DDF "contribution" district	200	
Market levy, Kampala	500	
Capital costs (@ 3% of all costs)	162	
Total costs	5,562	
Net margin**	1,438	11
Urban wholesaler		
Purchase price, chips	13,000	
Selling price, flour*	18,000	
Gross margin	5,000	28
Costs		
Various labor charges	500	
Milling	2,000	
Capital costs (@ 3% of all costs)	75	
Total costs	2,575	
Net margin**	2,425	13
Urban retailer		
Purchase price	18,000	
Selling price	27,000	
Gross margin	9,000	33
Costs		
Store costs	3,300	
Miscellaneous. incl. labor	1,500	
Capital costs (@ 3% of all costs)	144	
Total costs	4,944	
Net margin**	4,056	15

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

** Before income tax and payment of trading licence.

Table 6.9. Dried cassava trading costs and margins.
Case study: Jinja-based traders buying in villages of Soroti, Kumi, or Kamuli districts, in order to mill and sell in Jinja.

	Ush/100kg	Percentage of selling price
Farmer		
Selling price, chips	4,000	
Village assembler		
Purchase price	4,000	
Selling price	6,000	
Gross margin	2,000	33
Costs		
Transport	1,000	
Market dues	200	
Capital costs (@ 3% of all costs)	36	
Net margin	764	13
Traveling trader, Jinja-based		
Purchase price, chips	6000	
Selling price, flour*	11,000	
Gross margin	5,000	45
Costs		
Loading and off-loading	300	
Transport	2,000	
DDF "contribution", Soroti and Jinja	250	
Milling	1,300	
Packaging	400	
Capital costs (@ 3% of all costs)	128	
Total costs	4,378	
Net margin**	622	6

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

** Before income tax and payment of trading license.

Fresh cassava

Fresh cassava consumption and prices

According to Collinson et al. (2000), the data source that yielded consumption data for dried cassava could not be used to provide a similar insight into 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, and therefore are unable to provide fresh cassava consumption figures.

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

Table 6.10. Fresh cassava prices in January–February 2002.

Operators in the marketing chain/location	Ush/bag (150 kg)	Source of information
Farmers selling “standing-crop”, Masindi district.	4,000	Kalerwe market wholesaler.
Farmers selling uprooted fresh cassava, Bweyale.	6,000	Bweyale farmers/traders.
Kampala, Kalerwe wholesale market.	18,000	Kalerwe Market wholesaler, Owino market retailers, Bweyale farmers/traders.
Kampala Owino retail market, cassava sold in 3 kg heaps costing Ush 500 each.	20,000– 25,000	Owino Market retailers. Kalerwe Market wholesalers.

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.

Based on data of fresh cassava from September 1989 to January 2000 (Collinson et al. 2000) there is clearly a positive long-term price trend in Kampala (i.e., cassava prices are increasing in real terms). Although a definite reason for this could not be provided, 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.

Table 6.10 indicates the prices for fresh cassava observed between Masindi district and Kampala during the course of the survey. More detailed price information on cassava roots can be obtained from the IITA-FoodNet and the Bureau of Statistics.

Fresh cassava marketing chain: players and transactions

As indicated in Figure 6.2, fresh cassava trading is 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 cannot be sold.

Figure 6.2 indicates the key players 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 them 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 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 roadblocks.

Traders arrive at the Kampala markets as early as 2am, 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, in return for a fee, use their knowledge of local market conditions to negotiate sales to retailers. 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 a price risk for traders, who cannot 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.

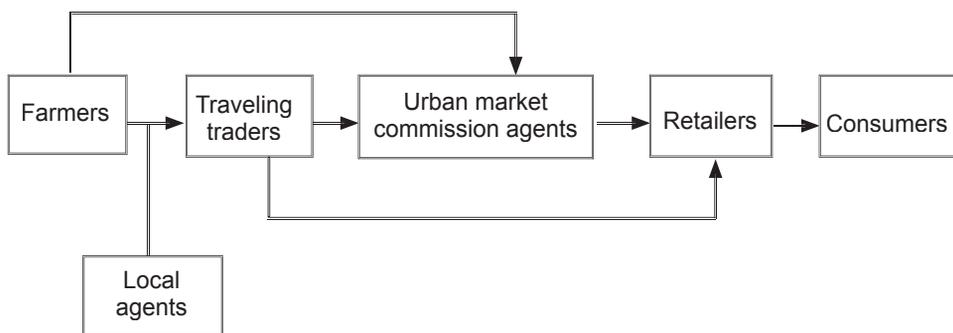


Figure 6.2. The fresh cassava trading chain.

Marketing costs

As already indicated, fresh cassava marketing is much more streamlined in comparison to the marketing of dried cassava. This is a reflection of the perishability of the crop. Given that several of the key cost elements were dealt with above in the section on dry cassava, the following summarizes only those elements where differences are likely to occur.

Transport. As with dried cassava, this is one of the most important cost elements in the marketing chain of fresh cassava. In addition, the bulkiness and weight of fresh roots and the requirement that the perishable crop is moved within a short period of time compound the transport cost factor. This starts at farm level where transport costs can be very high if no adequate means for bulk transport are available. Lorries are used for longer distance transport. In addition, urban transport from the wholesale to the retail markets requires porters, bicycles, or taxis, all adding an additional transport cost element. Depending on the form of marketing arrangement, total transport costs including on-loading and off-loading represent 30–40% of the final retail price.

In February 2002, the transport of one bag of fresh cassava (i.e., approx. 150 kg) cost Ush 5000 between Masindi or Bweyale and Kampala. Compared to this, the transport between farm and roadside can cost about Ush 2000 for the same amount of fresh cassava if undertaken by bike. This points to the need for economies of scale and means of bulk transport at village level. Traveling traders from Kampala overcome this problem by traveling directly to villages known for high levels of supply, where they often buy the standing crop. This reduces not only the total transport cost but also transaction costs.

Commission agents. Traveling traders who are based in the producing areas complained about the need to go through an intermediary (i.e., commission agent) if they want to sell their produce in Kampala markets such as Kalerwe. As outsiders, they feel prevented from entering the market and dealing directly with the retailers of the capital.

Other costs. These are similar to the ones dealt with above in the section on dried cassava. They include items such as market dues, capital costs, and packaging material. Traders avoid physical losses by adjusting selling prices accordingly, i.e., even if it means selling the roots at a very low price.

Margins

The two case studies below Tables 6.11 and 6.12 for fresh cassava marketing highlight the importance of economies of scale in the trade. By traveling directly with a lorry to villages where substantial quantities of cassava are produced, the Kampala-based trader is in a position to reduce his marketing costs. In addition, given that he himself is based in Kalerwe market, he is not obliged to go through a commission agent reducing his margin. As a consequence, he is able to achieve a much higher net margin (i.e., 20%) than small-scale itinerant traders based in districts where cassava is produced (4%). Obviously, capital endowment plays a major role as to the type and size of transactions a trader can undertake. The traveling trader based in Kalerwe market has a working capital of

approximately Ush 0.5 million whereas his colleague from Bweyale subcounty has a capital base of about Ush 50 000. Although the retailer's margin may appear to be on the high side, she sells only about one bag of roots/day; this needs to be taken into account.

Costs and margins

Table 6.11. Costs and margins within the fresh cassava trading chain case study: Trader based in Kalerwe market buying directly from farmer's field in Masindi district.

	Ush/bag of 150 kg	Percentage of selling price
Farmer		
Selling price (standing crop).	4,000	
Traveling trader, based in Kalerwe Market, Kampala.		
Purchase price	4,000	
Selling price*	18,000	
Gross margin	14,000	78
Costs		
Miscellaneous labor (incl. Ush 2,000 for uprooting of cassava)	4,000	
Transport	5,000	
Packaging material	500	
Market dues	500	
Capital costs (@3% of all costs)	420	
Total costs	10,420	
Net margin*	3,580	20
Urban retailer		
Purchase price*	18,000	
Selling price*	23,000	
Gross margin	5,000	22
Various costs and charges (incl. transport)	1,000	
Net margin	4,000	17

* Before income tax and payment of trading license.

Constraints and opportunities

The following constraints and opportunities to increasing cassava production, transaction, marketing, and processing efficiency were identified during the study.

- For a start, agricultural marketing and transaction costs cannot be seen independently from production and final demand. During the course of the survey, constraints related to cassava production and demand seemed equally if not more important than the actual trading activities in determining farmers' income. The glut of food commodities on the domestic market and limitations to increase demand have led to

Table 6.12. Costs and margins within the fresh cassava trading chain case study: Trader based in Bweyale buying roots from local farmer and selling them in Kalerwe market of Kampala.

	Ush/bag of 150 kg	Percentage of selling price
Farmer		
Selling price (standing crop)	6,000	
Traveling trader, based in Bweyale.		
Purchase price	6,000	
Selling price*	18,000	
Gross margin	12,000	67
Costs		
Transport from village to roadside, bicycle	2,000	
Miscellaneous labor (incl. loading and unloading)	2,000	
Transport to Kampala	5,000	
Packaging material	500	
Market dues, Kalerwe	500	
Commission agent fee, Kalerwe	1000	
Capital costs (@ 3% of all costs)	330	
Total costs	11,330	
Net margin	670	4
Urban retailer		
Purchase price*	18,000	
Selling price*	23,000	
Gross margin	5,000	22
Various costs and charges (incl. transport to market)	1,000	
Net margin	4,000	17

very low current farm-gate prices. These constraints are common to other sectors and are dealt with in the section of the report covering “crosscutting” issues.

- Small farm units, low yields, and the high unit cost of cassava production, results in low profitability for farmers and discourages higher farm output, particularly in periods of low market prices. Poor quality at farm-gate level and, generally, inadequate postharvest handling techniques result in lower prices to farmers.
- Although matters are improving, there is often poor, or nonexistent, market information at farm-gate level, and an inadequate rural road network, resulting in some farms being inaccessible to traders, particularly in the rainy season. Farmers have limited trading opportunities and are inevitably price takers at farm-gate level with little, or no, bargaining power to enable them to exploit competition amongst traders.
- Production and marketing efficiencies may be improved by the development of the farmer group movement. In particular, this should lead to a shorter commodity chain and economies of scale, resulting, in turn, in lower trading costs.

- Some of the major wholesale markets in Kampala such as Kalerwe and Kisenyi are notoriously congested. In addition, operators in the marketing chain who are based in other districts complain about lack of access to these markets because they feel obliged to go through local middlemen. New wholesale market facilities are required allowing better access to producers and traders from other parts of the country.
- Trader ability to expand volume purchases, thus increasing competition, is constrained by lack of working capital. The microfinance movement should be encouraged to enter this sector, as has been seen in other countries (e.g., cassava traders in the Mwanza district of Northern Tanzania).
- High transport costs from rural areas to Kampala are a particular constraint to improving transaction cost efficiencies. Distance, high vehicle operation costs, and inadequate “back cargoes” are the major reasons. Processors mentioned high electricity costs in the cassava milling operations as being a burden on profitability.
- The difficulty in improving production, processing, and marketing efficiencies to the benefit of the farmer is hampered by many farming communities being innately conservative. Farmers are reluctant to take up new village-level processing technology in view of perceived costs and time/labor constraints. They are reluctant to appreciate the benefits of forming themselves into marketing groups and processing cassava into flour for income generation.
- During the course of the survey, it became apparent that the link between potential industrial users of cassava and farming communities is missing. As a consequence, building this link is important for a future cassava economy producing not only for human consumption but also for the industrial sector (e.g., domestic and regional animal feed or starch manufacturers). In addition, cassava producers and small traders are not sufficiently aware of alternative uses for dried and fresh cassava.

Raising farmers’ incomes

The poor profitability of cassava at the farm level is due, primarily, to low yields, scattered production, inadequate processing technology, and poor prices due to lack of market outlets and farmer bargaining power. Farmers’ incomes must be raised through efficiencies within the internal production and marketing system, and through the identification of alternative market outlets.

Both production and marketing efficiencies can be improved by encouraging farmers’ groups to enhance their ability to access input credit and improve net farm-gate prices. Past experience in Africa and other developing countries, particularly related to the cooperative movement, warrants caution in this regard. Successful farmers’ groups should be formed from within the farming community, owned by the farmers themselves, have a clear objective, and eschew commercial activities which are beyond their capacity. Whilst external assistance is required as a catalyst to formation and capacity building, such outside involvement should be minimal with a view to disengagement when long-term sustainability is to be achieved. As mentioned elsewhere in this report, DFID has a particular interest in

sustainable livelihoods in the rural sector and should be recommended to act as a catalyst in this context. NAADS also have a key role in facilitating the formation and building the capacity of farmers' groups.

Summary of key findings

- Cassava, consumed primarily fresh or as flour made into a porridge, plays an important part in the rural and urban diet, and has the potential to become more popular if consumption trends alter due to the increasing cost of *matooke*.
- The small scale of cassava farming units, low yields, inadequate postharvest handling and processing technologies, and low net farm-gate prices relative to market levels, all contribute to cassava growing being of marginal profitability. This is particularly true in times of low and stagnant prices, such as during the period of the study.
- Although there is keen competition amongst traders for cassava, farmers are in a weak position due to inadequate economies of production scale and inadequate marketing information and bargaining power.
- The poor rural road network in many areas results in farmers being unable to access markets regularly, particularly during the rainy season.
- High transport costs due to, amongst other things, high fuel prices, lack of “back-cargo”, and vehicle maintenance, particularly hamper transaction cost inefficiency.
- Encouraging signs of small and scattered, but active farmers' groups, are evident in some surplus maize growing districts which have lessons for cassava farmers and the potential for replication.
- Processing cassava into flour is mainly undertaken by *posho* millers at rural and urban level, with electricity being a major cost factor in milling operations.

Recommended implementation plan

The improvement of farm-gate cassava quality

We recommend that existing programs be expanded and new programs implemented to reduce farmers' losses, through optimal crop postharvest handling techniques and on-farm storage. We suggest that NAADS and the NARO Cassava Program are the most appropriate bodies to implement these initiatives.

The encouragement and capacity building of farmers groups

We recommend the encouragement of farmers' groups as the key to improving maize growing profitability and marketing efficiency. We suggest that initiatives in this context are undertaken by the Community Enterprise Development Organization, Cooperative Development Organization, and NAADS/MAAIF and that assistance is sought from DFID under their sustainable livelihoods program.

The development of rural finance

We recommend the improvement of rural financial services, particularly microfinance to enable greater access to credit for agricultural inputs and trading working capital, and suggest that NGOs and donors, such as DFID, together with the Bank of Uganda, are encouraged to assist with such initiatives.

The promotion of marketing information at rural level

Current initiatives, such as the IITA-FoodNet marketing information service (MIS) and the MTN mobile telephone marketing information service, are disseminating cassava prices at the rural level. We suggest that NGOs and donors be encouraged to assist.

Improved markets in Kampala allowing better access for farmers and traders from other parts of the country

We recommend that improved wholesale market facilities, preferably located at the outskirts of the city, be planned and constructed by Kampala City authorities in consultation with trader associations.

Improved linkages between farming communities and agroindustries

It is recommended that these linkages be established through the dissemination of information (e.g., workshops), supply of adequate samples of raw material to industries interested in trials (e.g., poultry feed), and identification of viable options establishing the link between cassava producing communities and industrial end-users (e.g., contract farming). We suggest that NAADS, research organizations (e.g., NARO and IITA), and NGOs facilitate such initiatives. If after trials there are clear signs that cassava is not preferred as a raw material by agroindustries, then farmers should be encouraged to produce alternative commercial crops.

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Dairy

Introduction

The current structure of the dairy industry has its origins in the creation of the parastatal Dairy Corporation in the late 1960s and the subsequent removal of its monopoly milk marketing powers in the early to mid-1990s. Dairy Corp., as it is widely known, was established to regulate the dairy industry and to process and market dairy products. As a government monopoly, one of its tasks was to ensure that dairy farmers in traditional milk producing areas were able to sell their milk into the consumer markets, principally in Kampala. In periods when war did not intervene, the Dairy Corp. achieved this task effectively, albeit with considerable state subsidy and donor support. However, in so doing, it could be argued that the Dairy Corp. encouraged the perpetuation of a suboptimal geographical pattern of commercial production. Today, one of the principal districts supplying milk to Kampala is Mbarara, whose milk producing areas lie 200 to 300 km from the capital. Even in temperate climates, milk is a highly perishable product. In tropical climates, problems of spoilage are compounded and the logistical costs of collecting small quantities of milk from scattered locations and then transporting it quickly to market in bulk, and preferably through a cold chain, are very high. A high proportion of spoilage is nevertheless difficult to avoid and adds to the costs. In such circumstances, locating production near to consumption makes good sense.

When Ugandan milk marketing was deregulated in the early 1990s, the private sector saw an opportunity to outcompete the Dairy Corp. that they saw as bureaucratic and inefficient. Over the course of the next few years, thirteen private processing factories were installed. What the owners of these factories did not foresee was the rise of the informal milk-marketing sector. By avoiding substantial capital expenditure and adulterating milk with water and chemical preservatives, the informal sector has been able to outbid the formal sector in the raw milk market. Today, at least 80% of all marketed milk is sold in loose form by the informal sector. The inability to source sufficient milk has created severe financial problems for the formal processing sector. Of the thirteen original private sector processing factories, only five are still operating.

In the late 1990s, the regulatory and development roles of Dairy Corp. were removed and invested in a new industry body, the Dairy Development Authority (DDA). Although the Authority is mainly funded by government and is tasked with implementing government dairy policy, its board contains members from the farming, processing, and informal marketing industries. Important DDA roles of particular relevance to this study are the regulation of dairy marketing for health safety and the promotion of dairy consumption.

Other industry stakeholders are the Uganda National Dairy Traders' Association, which represents the interests of the informal milk marketing sector, and the Uganda National Dairy Farmers' Association, which is receiving substantial support from the DDA to assist the organization of dairy farmers.

Dairy Corp. is now being prepared for privatization and the offer for sale will be issued by the end of this year. A 70% stake in the core assets will be sold to a single buyer. What will happen to the assets after the sale is not clear, although a certain amount of rationalization is bound to occur, particularly in milk collection, which is generally regarded to be the least efficient part of the business.

Of the donors, DANIDA has patiently provided support to Dairy Corp. over recent years, and GTZ, the Dutch NGO Stichting Nederlandse Vrijwilligers (SNV, Foundation of Dutch Volunteers) USAID, and Assistance Française have been supporting various aspects of dairy production. Assistance Française is about to launch a new project that will support farmer organizations and strengthen dairy statutory and technical environments.

The dairy sector's contribution to the economy is difficult to state. Marketed milk is estimated by the DDA to be 30 to 50% of production. Estimates provided by the private sector suggest that the lower estimate might be closer to the truth. Assuming that annual production is correctly estimated at 700 million liters, and that the retail value of milk is Ush 500/liter, the value of domestically marketed milk to the economy is about Ush 100 billion (US\$58 million). Including the subsistence production (valued by us, somewhat arbitrarily, at Ush 200/liter), the contribution to the economy might be as much as Ush 200 billion (US\$116 million). From a foreign exchange perspective, approximately US\$3 million was earned through UHT exports to Rwanda and Kenya in 2001 (King 2002).

Only about 10% of the marketed milk is pasteurized. We could find no figures that relate the incidence of diseases such TB and brucellosis to raw milk consumption. However, in Uganda, milk is often consumed as a major constituent of tea and consequently brewing temperatures are likely to kill harmful bacteria contained in milk. Perhaps a more serious health concern is the widespread practice employed in the informal sector of adding chemical preservatives such as hydrogen peroxide and caustic soda.

Supply

According to DDA figures, approximately 52% (360 million liters/year) of Uganda's milk comes from 12 districts in the southwest of the country, with Mbarara alone producing 15% (105 million liters) of the national total. The only other region of the country that contributes significantly to production is the northeast, where in Kotido and Moroto nomadic cattle herders produce an estimated 16% (112 million liters) of national milk output. The proportion of this milk that is marketed is probably low.

Milk is produced from an estimated 5.9 million cows, of which only 0.278 million cows (4.7% of the total) are exotic and crossbreeds. These aggregate figures suggest an average daily milk yield/cow of just over 3 liters of milk/day, which indicates the low input/low output nature of dairy production. By comparison, milk production/cow among the most productive herds in Uganda is between 18 and 20 liters/day during lactation.

Kenyan products also supply Uganda's dairy market, chiefly UHT milk but also cheese and flavored milks. We are not aware of the quantities involved but believe that sales have declined over recent years because of the poor performance of the Kenyan dairy industry.

Demand

The domestic market

By far the largest market in Uganda is Kampala. During our fieldwork, a private sector source estimated that Kampala's daily milk requirement is 300 000 liters. Of this total, the formal processing sector probably supplies less than 60 000 liters; the remainder of demand is satisfied by the informal sector.

In general, the market for fresh milk is driven by price and convenience much more than by quality. The informal milk marketing sector has realized this and supplies cheap (albeit often adulterated) milk directly to urban consumers' dwellings.

Limited demand also exists for yoghurt, butter, ghee, and flavored milk. The continued growth of one particular dairy processing company, which specializes in selling high quality dairy products through supermarkets, suggests that middle-class urban demand for well-presented products is not yet fully satisfied. Despite this, demand for these products amounts to only a few thousand liters raw milk equivalent/day.

The potential for growth in the domestic market is substantial. Averaged across the whole country, milk consumption per capita is only about 30 liters/year. Average per capita consumption in Kampala is probably between 120 and 140 liters/year. By comparison, the World Health Organization recommends an annual consumption of 200 liters. Providing that incomes continue to rise and that the DDA promotes consumption adequately, there is every reason to believe that domestic demand for dairy products can rise substantially.

The export market

Opportunities for Ugandan UHT milk are already being exploited in Rwanda and Kenya, and there is some possibility of markets emerging in Sudan and Tanzania. In 2001, Uganda's two UHT milk factories exported milk worth approximately US\$3 million to Kenya and Rwanda. Both countries once had healthy dairy sectors that supplied the majority of their needs. However, civil war in Rwanda, and climatic and institutional problems in Kenya have left these markets in deficit. While the domestic supply of dairy products will probably recover in Kenya and Rwanda in the long run, the current deficits will provide Uganda with a export opportunity for several years.

Currently Dairy Corp. is packaging 20 to 30 000 liters of UHT milk per week for a Rwandan dairy, and is also collaborating with Sunshine Dairy in Kisumu to expand sales in western Kenya. GBK, Uganda's other UHT producer, has registered companies in Kenya and Rwanda and is currently expanding its sales.

Marketing chains

From the farm, milk is either taken directly by the farmer to a roadside collection point or purchased by a rural trader who then takes the milk, usually by bicycle, to a collection point. Most collection points have no facilities. Those run by Dairy Corp. and a few that are operated by farmers' associations in towns have electric milk cooling tanks.

Two types of buyer come to the collection points, employees of milk processing factories, and informal sector traders. Milk purchased by private sector factories is transported by pickup in plastic milk churns to the factory, where it is cooled, pasteurized, usually homogenized, and then packaged. Dairy Corp. milk waits at the collection point until a corporation vehicle can collect it and take it to a bulking center in a major town. From here, the milk is transported by refrigerated tanker to the processing factory in Kampala.

Once private factories have processed their milk, it is taken overnight to depots in Kampala from where most of it is distributed early in the morning to retail outlets. During our fieldwork we discovered a few instances of formal sector milk being sold from depots to informal sector distributors (the “bicycle men”).

Competition in the formal processing sector has been intense, not only between factories but also with the informal sector. The evidence for this lies both in the number of factories that have closed down and in the dire financial position of some of the factories that remain in operation. (The section on marketing chain players’ costs and margins gives more evidence of this.)

Informal sector traders purchase milk from the rural collection centers. The first type of trader merely collects milk in a rented pickup (usually shared with two other traders because of working capital constraints) and then transports it in 20-liter jerry cans to a wholesale market in Kampala. Here, providing that the milk is still in a fresh state, it is sold directly to “bicycle men” for distribution to households. Milk that is left unsold after a certain time of day is boiled over wood fires to lengthen its shelf life.

The second type of informal sector trader collects milk in his own pickup and then transports it to his cooling facility in Kampala, from where he sells it to “bicycle men” distributors and, on occasion, directly to consumers. In 2001, the DDA registered approximately 160 such milk-cooling facilities in Kampala, an increase of 60 over the previous year. Assuming that the average daily turnover of one of these operators is 1000 liters, this group of businesses supplies approximately 160 000 liters of milk to Kampala each day. If true, this would represent a very substantial proportion of the Kampala wholesale milk market. It is possible that either our estimate of average daily turnover is too high or that our estimate of the size of the milk market in Kampala (300 000 liters/day) is too low. However, despite these doubts, it is quite clear that this section of the informal milk trade is capturing a large and growing proportion of the market (see Table 7.1).

Its rise to prominence must partially be the result of failures in the other section of the informal trade, where cooling is not practiced. While on paper, this less sophisticated form of trade looks profitable, in many instances, and particularly during the dry season, the problem of milk spoilage becomes so severe that traders lose money. The high entry and exit rate of participants in the trade gives further evidence of the losses.

In an attempt to maintain profitability, informal sector traders who do not have access to milk-coolers have turned to boiling and to readily available chemical preservatives such as soda and hydrogen peroxide to reduce spoilage. Traders also add water to milk in an attempt to increase revenue. Precisely where these practices occur in the informal sector

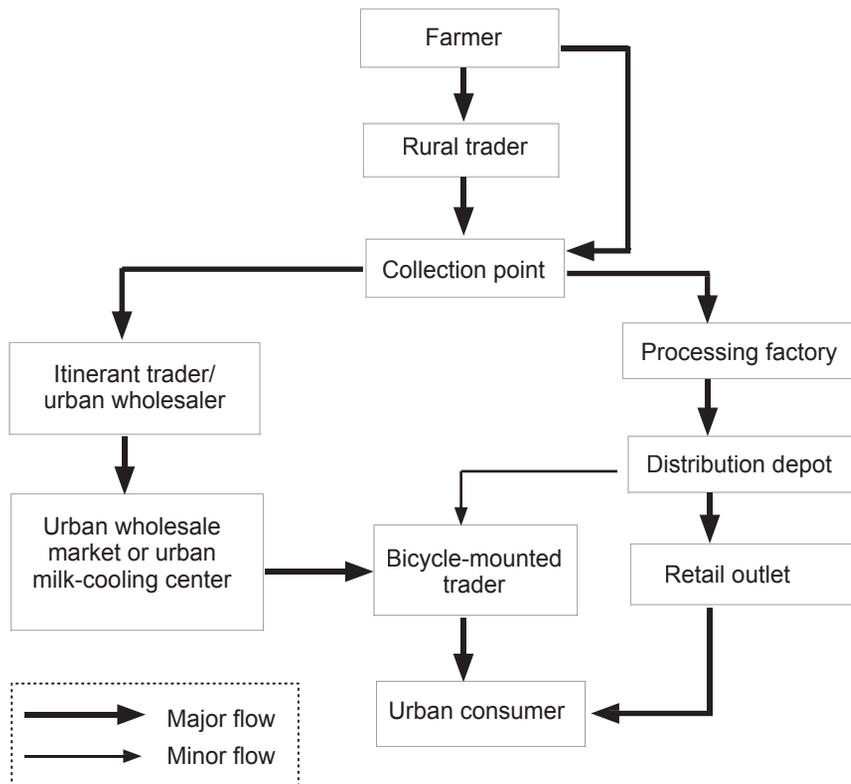


Figure 7.1. Milk marketing flow.

supply chain is not clear. Milk wholesalers tend to blame the bicycle men but there are incentives for sellers to adulterate milk at all levels of the supply chain, so in reality the problem is probably widespread.

The bicycle men buy milk from wholesale markets or milk-cooling facilities and transport it to urban homes in plastic containers and metal milk churns. They sell loose milk in approximately half-liter measures to householders.

All evidence suggests that competition within the informal sector is intense. Further evidence is provided later in this report, where the profitability of various types of informal sector trader is analyzed.

Transactions

In the main, transactions in milk supply chains are conducted on a spot cash basis, thereby minimizing transaction costs for sellers. Another feature of this type of instant transaction is that risk (particularly that of spoilage) is transferred at each link of the chain. During our fieldwork we heard anecdotal evidence of some informal sector traders buying from farmers on credit. One allegation concerned traders who offer substantially higher prices

to farmers but who, after the third or fourth successfully completed transaction, do not return to pay the farmer. We were unable to verify either the existence or prevalence of this practice. However, farmers, particularly those located far from milk collection points, are in a particularly weak bargaining position and are vulnerable to cheating.

The only other dubious transaction in the chain is between informal sector bicycle men distributors and household consumers, who may not be aware that they are purchasing adulterated milk.

Marketing chain players' costs and margins

Farmers

In the southwest, prices that farmers receive for their milk can range significantly depending on distance from collection centers and on the season. In the dry seasons, when a lack of forage reduces milk supply, prices offered by informal sector traders at milk collection points can be as high as Ush 300/liter. In the wet seasons, informal sector prices drop to between Ush 200 and 220. Of course, unless farmers can deliver their own milk to the collection points, these are not the prices that they receive. In the most extreme cases, where farmers are far away from collection points, farmers receive as little as Ush 100/liter.

Formal sector buyers in southwest Uganda pay between Ush 200 and 220/liter, regardless of the season. Farmers and rural traders, therefore, generally prefer to sell to informal sector traders, although the factories have the advantage of being cash buyers who can be depended on to buy milk regularly. By comparison, farmers lucky enough to be located near to Kampala are able to sell their milk to the formal and informal sectors at between Ush 300 and 400/liter, depending on quality and season.

Farmer association milk collecting points

Tables 7.1 and 7.2 give actual examples of two milk-collecting centers operated by farmers' associations in southwest Uganda. Example "number 1" runs a 2500 liter capacity milk-cooler, while "number 2" runs two 5000 liter capacity units. Both associations accept milk only from members and sell either to local traders or take milk to Mbarara for sale to processing factories. All assumptions and workings appear in Annex 6.

For example number 1, profits are zero. This is entirely in keeping with the nature of the business, which works on a cost recovery basis, thereby passing all financial benefits immediately on to members. For example number 2, there is a substantial loss because of poor cost management and low throughput.

Although both associations are urban-located (necessary for access to power), they are nevertheless remote from formal sector processors and major urban markets. Their success, or otherwise, rests on their ability to give higher prices to members than if members sold directly to traders. They achieve this by providing buyers with bulk quantities of fresh chilled milk. This reduces buyers' costs in two ways: first, buyers do not have to travel so far to collect sufficient quantities of milk, and secondly, the milk is likely to remain fresher for a longer time.

Formal sector milk processors

Table 7.3 gives the costs and margins for a typical, medium-scale fresh milk processor (pasteurization, homogenization, and packaging) based in southwest Uganda. All assumptions and workings appear in Annex 6.

The most obvious feature of Table 7.3 is that the factory is making a substantial loss. In fact, it only continues to operate by eating into its private equity. Over recent years, costs have been reduced to an absolute minimum, yet profitability remains elusive. The principal reason is that the factory is operating at only 20 to 25% of capacity. The factory would have to double its current output in order to break even. At full capacity, the factory would become a reasonably profitable enterprise, earning approximately Ush 670 million (US\$350 000)/year (or US\$0.04/liter of output). At this level of output, the factory could afford to pay more for its raw material. But here is the essential catch: at its current level of throughput, the factory cannot afford to pay more for milk but at the same time, it cannot increase its throughput unless it *does* pay more for milk, thereby attracting greater quantities from farmers and rural traders.

Two of the major contributors to high costs of the business are milk collection and distribution. These costs are embedded in Table 7.3. However, stated explicitly, the costs are as follows: to collect a liter of milk costs the factory on average Ush 50. Once processed, the milk is transported to Kampala at a cost of Ush 50/liter and then distributed to retail outlets at a cost of Ush 55 to 60/liter. The milk is sold to retail outlets at Ush 500/liter. The total cost of collection and distribution is therefore approximately 31% of the factory's revenue.

Collection costs are so high because of the distances involved. Round trips range from 20 to 100 km and often involve distances traveled on unsealed roads. Unless the factory could afford to pay higher prices for milk and therefore expect to be able to collect from less remote areas, there is little prospect for reducing collection costs.

The cost of transporting milk to Kampala is unavoidable. The cost of distribution to consumers once it arrives could possibly be reduced by adopting an alternative strategy that does not involve retail outlets. The cost of packaging is also a significant component of overall costs (8%), one that the informal sector avoids entirely. The cost presented in Table 7.4 is based on a polyethylene sachet. The cost of packaging in a Tetra-Pak carton is at least twice as high.

Fresh milk retailers

Having purchased milk at Ush 500/liter, retailers in Kampala typically add Ush 200 to 300 as their margin. Retail margins tend to be so high because, in most cases, the volumes traded are low and the risk of spoilage is high.

UHT milk processors

Table 7.4 gives our estimated costs for a large UHT milk producer based in southwest Uganda (assumptions and workings appear in Annex 6). The factory is clearly sustaining large losses, some of which can be attributed to poor cost management. However, at 20%

Table 7.1. Farmer association milk collecting point (number 1).

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Percen- tage of costs
Operating costs—variable:					
Raw material		210	110,462	0.12	83
Energy	1,800,000	2	1,040	0.00	1
Direct labor	1,620,000	2	936	0.00	1
Fuel	16,632,000	18	9,614	0.01	7
Subtotal variable costs	211,152,000	232	122,053	0.13	92
Operating costs—fixed:					
Management	3,840,000	4	2,220	0.00	2
Water	1,500,000	2	867	0.00	1
Rent	1,800,000	2	1,040	0.00	1
License	200,000	0	116	0.00	0
Fixed asset maintenance	1,456,000	2	842	0.00	1
Subtotal fixed costs	8,796,000	10	5,084	0.01	4
Subtotal operating costs	219,948,000	242	127,138	0.14	96
Contingency—1% (miscellaneous)	2,199,480	2	1,271	0.00	1
Total operating costs	222,147,480	244	128,409	0.14	97
Capital costs	7,907,307	9	4,571	0.01	3
Total annual costs	230,054,787	253	132,980	0.15	100
Annual revenue	229,950,000	253	132,919	0.15	100
Profit (loss) before tax	(104,787)	(0)	(61)	(0.00)	

Source: Authors' fieldwork

utilization, low throughput is a crippling problem (as suggested by the 39% share that fixed costs contribute to total costs). If the plant could run at maximum capacity, then it would become reasonably profitable (estimated at US\$740 000/year).

The UHT plant faces the same milk collection costs as experienced by the fresh milk processor analyzed above. However, the much lower perishability of the product means that distribution costs should be considerably lower, at least in theory.

The Dairy Corporation

Figures provided by Dairy Corp. show that its production costs, at current levels of throughput, are considerably larger than those experienced by the private sector operators analyzed above. The ex-factory cost of one liter of Dairy Corp pasteurized fresh milk is Ush 855, compared with Ush 520 for the private sector company. For UHT milk, the comparison is Ush 1050 versus Ush 710. A large part of these differences is due to Dairy Corp's huge milk collection costs. Whereas the private sector firms pay the equivalent of Ush 100/liter, Dairy Corp.'s collection costs are Ush 231. Dairy Corp.'s management believes that the reason for this difference is that Corporation investments in milk-collecting assets are commercially unviable and its cost controls are poor.

Informal sector traders

Table 7.5 gives costs and margins for what we have chosen to call a “type 1” informal trader, who is characterized by not having his own milk-cooling facilities. Assumptions and workings appear in annex 6 but the chief assumptions are that the trader buys 1800 liters of milk/trip at an average price of Ush 245/liter and sells at an average of Ush 356/liter. (Both buying and selling prices have been estimated to represent a weighted average yearly price.)

The most obvious feature of Table 7.5 is that the trader is not making any money. The principal reasons are the high rate of milk spoilage in transit and the costs of preserving milk in Kampala. Hardly any wonder then that informal sector traders resort to adding water and chemical preservatives to milk in order to make a profit. The catch is that if everyone does it, the market will automatically discount the selling price and no one is better off. The existence of losses is also supported by evidence of the high turnover rate of traders who enter the business thinking that there is much money to be made and often soon quit, realizing that they are making losses.

Table 7.2. Farmer association milk collecting point (number 2).

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Percen- tage of costs
Operating costs—variable:					
Raw material	288,943,200	189	167,019	0.11	80
Energy	3,600,000	2	2,081	0.00	1
Direct labor	1,560,000	1	902	0.00	0
Fuel	16,632,000	11	9,614	0.01	5
Subtotal variable costs	310,735,200	203	179,616	0.12	86
Operating costs—fixed:					
Management	3,840,000	3	2,220	0.00	1
Water	1,500,000	1	867	0.00	0
Rent	1,200,000	1	694	0.00	0
License	200,000	0	116	0.00	0
Fixed asset maintenance	6,496,000	4	3,755	0.00	2
Subtotal fixed costs	13,236,000	9	7,651	0.01	4
Subtotal operating costs	323,971,200	212	187,267	0.12	90
Contingency—1% (miscellaneous)	3,239,712	2	1,873	0.00	1
Total operating costs		214	189,139	0.12	91
Capital costs	32,290,601	21	18,665	0.01	9
Total annual costs	359,501,513	235	207,804	0.14	100
Annual revenue	328,500,000	215	189,884	0.12	
Profit (loss) before tax	(31,001,513)	(20)	(17,920)	(0.01)	

Source: Authors' fieldwork

Table 7.3. Medium-scale fresh milk processor costs and margins.

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Percen- tage of costs
Operating costs— variable:					
Raw material	596,996,400	234	345,085	0.14	37
Energy	96,000,000	38	55,491	0.02	6
Direct labor	33,000,000	13	19,075	0.01	2
Packaging	122,304,000	48	70,696	0.03	8
Fuel	120,000,000	47	69,364	0.03	8
Subtotal variable costs	968,300,400	380	559,711	0.22	61
Operating costs—fixed:					
Management	51,900,000	20	30,000	0.01	3
Water	15,000,000	6	8,671	0.00	1
Fixed asset maintenance	40,000,000	16	23,121	0.01	3
Subtotal fixed costs	106,900,000	42	61,792	0.02	7
Subtotal operating costs	1,075,200,400	422	621,503	0.24	67
Miscellaneous	53,760,020	21	31,075	0.01	3
Total operating costs	1,128,960,420	443	652,578	0.26	71
Capital costs	466,603,674	183	269,713	0.11	29
Total costs	1,595,564,094	626	922,291	0.36	100
Revenue	1,274,000,000	500	736,416	0.29	
Profit (loss) before tax	(321,564,094)	(126)	(185,875)	(0.07)	

Source: Authors' fieldwork

Table 7.6 gives the costs and margins for a “type 2” trader, who is distinguished by owning a milk-cooling facility in Kampala. The data used in the analysis that produced Table 7.6 was taken from several Kampala-based owners of milk-coolers. All assumptions and workings appear in Annex 6. The important assumptions are that the trader pays and receives the same prices as the type 1 trader and makes six buying trips per week, collecting 1800 liters/trip.

Table 7.6 demonstrates that milk-cooling can be a profitable business. However, some caution should be given the interpretation of profits. In this instance, the “profits” include remuneration to the owner as the manager of the business.

The “bicycle men” milk distributors

These vital links in the informal milk sector buy milk at wholesale markets and urban milk-cooling centers at an average price of about Ush 360/liter (weighted annual average) and sell to consumers at about Ush 500/liter. Typically, they will only be able to carry about 50 liters on their bicycles and so the maximum profit from one trip is about Ush 7000. However, some of the milk may become unfit for sale due to spoilage, thereby reducing profits.

Adulteration with water. As noted above, there are incentives for sellers at each level of the informal sector supply chain to adulterate milk with water. The problem becomes

worse in dry seasons when the price of milk at the farm gate rises because of scarcity, yet the consumer price does not rise to the same degree. The prices used in the informal sector analyses above have been manipulated to represent weighted average annual prices and therefore mask seasonal differences. However, in the height of the dry season, prices at rural collection points in southwest Uganda are as much as Ush 300/liter, while urban wholesale prices are about Ush 450/liter. This compares with wet season prices of Ush 220 (collection points) and Ush 300 (wholesale).

Consumer prices remain at about Ush 500/liter throughout the year and so the incentive to adulterate milk is higher in the dry season.

Constraints and opportunities

High collection costs

Collection costs for milk processed by the formal processing sector can range from Ush 50/liter to Ush 231/liter in the most extreme case. These high costs are a reflection of the scattered, remote, and low output nature of dairy production. Short of relocating dairy farming closer to consumer markets and increasing its production intensity, only a limited amount can be done to reduce costs. However, one such approach would be to encourage farmers' associations to bulk and cool milk in locations with good access to main roads and to the mains electricity. (The Dairy Corp. has, once and for all, proved that cooling-centers

Table 7.4. UHT processor costs and margins.

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Perce- tage of costs
Operating costs— variable:					
Raw material	1,783,236,000	245	1,024,848	0.14	30
Energy	240,000,000	33	137,931	0.02	4
Direct labor	145,600,000	20	83,678	0.01	2
Packaging	873,600,000	120	502,069	0.07	15
Fuel	380,000,000	52	218,391	0.03	6
Subtotal variable costs	3,422,436,000	470	1,966,917	0.27	57
Operating costs—fixed:					
Management	105,000,000	14	60,345	0.01	2
Office expenses	90,000,000	12	51,724	0.01	2
Fixed asset maintenance	171,200,000	24	98,391	0.01	3
Miscellaneous	325,717,000	45	187,194	0.03	5
Subtotal fixed costs	547,424,000	75.20	314,611	0.04	9
Total operating costs	4,168,353,000	573	2,395,605	0.33	70
Capital costs	1,817,789,863	250	1,044,707	0.14	30
Total costs	5,986,142,863	822	3,440,312	0.47	100
Revenue	4,004,000,000	550	2,301,149	0.32	
Profit (loss) before tax	(1,982,142,863)	(272)	(1,139,163)	(0.16)	

Source: Authors' fieldwork

that rely too heavily on generators are unprofitable!) This should not only raise farmers' incomes but will also reduce the costs that processing factories incur in terms of transport and milk spoilage.

Low or negative processor profitability

The Dairy Development Authority blames poor management, weak marketing strategies, and stiff competition with informal sector traders for the profitability problems faced by the dairy processing industry. Our own experience suggests that competition with the informal sector is by far the largest constraint. Processors argue that the competition is unfair because the informal sector has not been regulated by the DDA and can consequently get away with lowering costs through adulterating milk. (It would be interesting to discover whether dairy farmers, who generally get higher prices from the informal sector, believe that the competition is unfair!)

To some extent, the unfairness will soon come to an end when the DDA starts regulating the informal sector for milk quality and food safety. However, the DDA believes that it will never be able to regulate unsafe milk out of the market because as soon as it closes down one unhygienic raw milk operation, another will spring up somewhere else. The problem comes down to resources—the DDA can't be everywhere all the time. Despite this, we believe that the worst offenders, those informal sector traders who have not invested in milk-coolers, could be persuaded to leave the business providing enough

Table 7.5. Type 1 informal trader costs and margins.

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Percen- tage of costs
Operating costs—variable:					
Raw material	441,563	245	255.24	0.14	69
Consumables	2,430	1	1.40	0.00	0
District tax	31,500	18	18.21	0.01	5
Association levy	9,000	5	5.20	0.00	1
Kampala district levy	9,000	5	5.20	0.00	1
Milk preservation (half of milk purchased)	22,500	13	13.01	0.01	3
Subtotal variable costs	515,993	287	298.26	0.17	80
Operating costs—fixed:					
Vehicle hire (including driver)	57,500	32	33.24	0.02	9
Fuel	70,000	39	40.46	0.02	11
Subtotal fixed costs	127,500	71	73.70	0.04	20
Total operating costs	643,493	357	371.96	0.21	100
Revenue	628,875	349	363.51	0.20	
Profit (loss)	(14,618)	(8)	(8.45)	(0.00)	

Source: Authors' fieldwork.

Table 7.6. Type 2 informal sector trader costs and margins.

	Ush/year	Ush/liter of product	US\$/year	US\$/ liter of product	Percen- tage of costs
Operating costs—variable:					
Raw material	137,767,500	284	79,634	0.16	74
Consumables	758,160	2	438	0.00	0
District tax	9,828,000	20	5,681	0.01	5
Subtotal variable costs	148,353,660	306	85,754	0.18	79
Operating costs—fixed:					
Labor	4,200,000	9	2,428	0.01	2
Fuel	24,960,000	52	14,428	0.03	13
Rent	1,200,000	2	694	0.00	1
Electricity	900,000	2	520	0.00	0
Water	288,000	1	166	0.00	0
Traders' license	75,000	0	43	0.00	0
Council tax	50,000	0	29	0.00	0
Subtotal fixed costs	31,673,000	65	18,308	0.04	17
Total operating costs	180,026,660	372	104,062	0.21	96
Capital costs	7,012,190	14	4,053	0.01	4
Total costs	187,038,850	386	108,115	0.22	100
Revenue	196,209,000	405	113,416	0.23	
Profit (loss)	9,170,150	19	5,301	0.01	

Source: Authors' fieldwork.

pressure is applied. After all, profits from this type of trade are negligible if not negative. This would leave demand for informal sector milk serviced by the growing number of milk-cooling businesses that have an invested stake in the future of the industry. Regulating these businesses should be a much simpler task.

However, it will not necessarily solve the chief problem that faces the processing industry, that of severely underutilized capacity. Ideally, creating links between the milk processors and the informal sector milk-cooling centers could solve this problem. At least this way, the DDA could be sure that the majority of milk entering Kampala is clean and healthy, even if milk is adulterated after it arrives. The processors would be able to sell more milk and hence bring down their unit costs of production.

However, the chief constraint would be cost. Currently, the lowest price at which loose processed milk could be sold at a reasonable profit in Mbarara is about Ush 340/liter. Providing milk-cooling center operators in Kampala collected the milk from the processing factories in Mbarara, transport costs would probably be about Ush 60/liter. The operating margin (costs and profit) of the owner of the milk-cooling center is about Ush 40/liter. The selling price at the milk-cooler would therefore be Ush 440/liter. Once the "bicycle men" have delivered the milk to households, the price would be approximately Ush 580/liter. In other words, consumers would be paying at least Ush 80/liter more than they currently do. They would, however, stand a much better chance of getting clean,

fresh, healthy milk at a price that would be substantially less than if they bought packaged milk in a retail outlet at Ush 700 to 800/liter. Unfortunately, the bottom line is that the majority of consumers would be unlikely to pay more for a product that is ostensibly the same as another, cheaper product. Product differentiation between the processed and raw milk would not always be obvious.

Packaging

Perhaps one way of overcoming the product differentiation problem would be to sell packaged milk directly to urban households. This would give discerning householders confidence that their milk is unlikely to be adulterated and would also help to keep the DDA milk quality inspectors happy. However, unless a very cost-effective yet secure form of packaging can be found, cost might again be a problem. Polyethylene packaged milk could probably be sold from formal sector milk depots in Kampala at approximately Ush 440 (the current cost of packaging is at least Ush 45/liter). Once the bicycle men have added their margin, the price to householders would be approximately Ush 580. Little is currently known about the majority of consumers' attitudes to packaged milk and their willingness to pay extra for it. During our fieldwork we heard some anecdotal evidence that some consumers believe that processed milk is not "the real thing" and has been adulterated by the factories. (Informal sector traders almost certainly do not deny such rumors!)

Low consumption levels and the role of promotion

If such fears are widespread, they could be allayed by promotional campaigns that contain consumer educational messages. If handled correctly, promotion could also stimulate consumer demand to grow from its current low per capita levels. The DDA is currently preparing promotional campaigns along these lines. If dairy production and consumption in Uganda are to have a long-term future, we cannot overstress the importance of these campaigns. However, our impression is that though much is surmised, very little is actually known about Ugandan milk consumers. We therefore recommend that the DDA, perhaps with support from a donor that has traditionally supported the sector, should commission consumer market research on quantities consumed, product preferences, consumer perceptions, and willingness to pay. Such information will be crucial in planning promotional campaigns for dairy products. It will also provide useful guidance to dairy processors on product development.

Value addition

One formal sector dairy processor located near to Kampala has made a considerable success of selling high quality dairy products, such as yoghurt and butter, to relatively affluent consumers through supermarket outlets. However, the manager of this business concedes that this niche market is limited by the number of people in the required income bracket. Although consumer incomes are rising in Uganda, there is clearly a constraint on the number of companies that can profitably supply this market.

Whether a substantial market exists for lower value factory processed nonmilk dairy products is a moot point. Ghee is already sold but quantities are unknown and according to a private sector processor, profit margins are extremely low. Once again, careful consumer market research would provide useful insights.

Export

The chief constraints to exporting UHT milk are technical. Regional export markets are stringent about quality standards and Uganda's UHT milk processors have had problems in this regard. Raw milk entering the UHT process has to be extremely fresh in order to produce a first rate product. Delays in collecting milk, particularly in the southwest of the country, and problems in the cold-chain often mean that raw milk is not as fresh as it should be. Other problems exist in packaging. Because both of Uganda's factories are running at fractions of their full capacities and are therefore suffering substantial financial losses, money available for the routine maintenance of packaging machines is not always available. Consequently, the integrity of UHT packs coming from the factories is occasionally poor. One way to solve these problems is through greater investment. Unfortunately this cannot be sustainable unless factory throughput increases and profits can be made.

Raising dairy farmers' incomes

There is an argument that says that regulating the milk market will reduce farmer prices: If enforcing quality standards drives informal sector traders out of the market, then there will be less competition for farmers' milk. As a counter to this argument, in the new regulated environment, formal sector processors will probably be able to secure larger supplies of milk for their factories, thereby giving them the opportunity to return to profitability. If this is achieved, the factories will be able to pay higher prices for raw milk.

This analysis is certainly not meant to be an argument against market regulation. In fact, we believe that the long-term future of the industry depends on it. In the long run, a healthy dairy-processing sector is the best guarantee of sustainable incomes for dairy farmers.

As for raising farmers' incomes, the best route is probably through farmers' marketing associations that bulk and cool milk. The two contrasting examples of such organizations presented in this report point to the potential and pitfalls of this approach. The lessons are also fully in line with those learned about successful farmer-controlled enterprises both in Uganda and throughout sub-Saharan Africa. First, group cohesion requires that farmer-controlled enterprises must be self-selecting. In other words, individual farmers should not be grouped together by external interests. Secondly, technical and managerial functions should be kept simple in order not to overstretch farmers' capacities or their locally appointed managers. There is also a danger that if associations become too complicated, farmers lose control over them.

In the specific case of milk collection centers run by farmers' associations, there are geographical constraints on where they can successfully operate. First, they must be

near reliable mains electricity sources. The cost of running milk-coolers on generators is prohibitive and the financial consequences of losing a whole batch of milk due to spoilage would be serious. Secondly, a sufficient number of farmers must be within easy distance of the cooling facility. The commercial advantages of cooling milk are lost if milk arrives in a poor state. Thirdly, milk-cooling facilities have to be sufficiently near all-weather roads to attract buyers on a regular basis. Unfortunately, these three conditions for success rule out the creation of farmer-controlled bulking and cooling centers in many rural locations. Many dairy farmers will therefore not be able to participate.

The DDA is currently considering the creation of vertically integrated dairy farmer marketing associations that would use the services of dairy factories to process their milk. The associations would then distribute milk to consumers. One of DDA's chief reasons for promoting this idea is that regulating a single "farm to doorstep" organization would be much simpler for DDA than regulating a series of specialist organizations. Although DDA has yet to complete a feasibility study, we advise extreme caution in considering moves to implement the idea. We say this for two reasons. First, such organizations would be complicated to run and would therefore require specialist management. In most cases, farmers would lose control over decision making and opportunities for employees to cheat would be rife. Secondly, trading such a perishable product is a risky venture and is best handled by different specialist enterprises at each stage of the supply chain. Such specialists have much better control over physical losses.

Summary of findings

- With one or possibly two exceptions, Uganda's formal dairy processing factories are currently unprofitable.
- A return to profitability in this sector is dependent on increasing the utilized capacity of processing factories.
- For milk arriving from Kampala's chief area of supply, the southwest, collection and distribution costs account for a large part of the value of processed milk marketed in Kampala.
- The informal sector's distribution costs are considerably lower than those experienced by the formal sector. Lessons can be learned by the formal sector in this regard.
- Profitability in the informal wholesale milk sector is restricted to those operators who have invested in urban-based milk-cooling facilities.
- Little is known with certainty about dairy consumption in terms of volumes, consumer preferences, perceptions, and willingness to pay for value-added products.
- The export of Ugandan UHT milk is constrained by quality problems, which are mainly caused by company financial losses and the consequent inability to maintain standards.

- Farmers' associations that bulk and cool milk can be financially viable in certain geographic locations.

Recommended implementation plan

Regulation of milk marketing

We commend DDA actions to regulate the dairy market for quality and health safety, and recommend continued government support to this initiative until such time as revenues collected from a revived dairy processing and distribution industry can finance the regulation.

The promotion of dairy product consumption

We commend DDA initiatives to promote the consumption of high quality milk. The anticipated effect will be to increase consumption of processed milk and other dairy products, thereby assisting the return to profitability in the formal processing industry. However, to be fully effective we believe that such promotional campaigns should be informed by a better understanding of consumers. We therefore recommend that the DDA, with assistance from donors that have traditionally supported the sector, should commission consumer market research on quantities of dairy products consumed, product preferences, consumer perceptions, and willingness to pay for value-added products. Apart from assisting promotional campaigns, this information will also provide useful guidance to dairy processors on product development.

Exploiting efficiencies in milk distribution

We recommend that the formal milk-processing sector should explore links with the informal milk wholesale and distribution sectors. In a few instances, links have already been made. However, findings in this report suggest that closer links with urban-based milk-cooling facility operators might allow milk processors to increase their sales. The success of the initiative will depend on the ability to sell milk directly to urban households at a price that is competitive with today's informal sector milk.

Support to farmer associations

We recommend that the DDA, NAADS, the Uganda National Dairy Farmers' Association, the Agricultural Council of Uganda, and interested donors should collaborate to provide appropriate support to farmers' milk collection associations. We believe that "appropriate support" means promoting the benefits of farmers' milk collection associations to existing dairy farmer groupings and then building commercial skills in those groups that volunteer for assistance. In view of its current interest in this field, we believe that Assistance Française is well placed to be the donor participant in this initiative.

Caution where caution is due

We recommend that the DDA invite external expert scrutiny of its plans for vertically integrated farmer-controlled milk collection and distribution enterprises.

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Annex 1. Coffee

Coffee trader (buying *kiboko*, selling rough-hulled green bean)

US\$1 = Ush 1730

Working capital budget:

Assumed annual cost of capital	15%	
Assumed daily cost of capital	0.04%	
Price for <i>kiboko</i> (Ush/kg)		364
Cost of working capital (Ush/kg)		0.15

Raw material budget:

Out-turn	55%	
Price for <i>kiboko</i>		200
Equivalent green bean price		364

Analysis of profitability		Ush/kg of green bean	US\$/kg of green bean	Perce- tage of costs
Cost of sales:				
Raw material		364	0.21	85
Consumables	450	6	0.00	1
Total cost of sales		369	0.21	87
Trading costs:				
Local taxes		–	–	0
Processing fee		25	0.01	6
Transport	1250	32	0.02	8
Total trading costs		57	0.03	13
Cost of working capital		0.1	0.00	0
Total costs		427	0.25	100
Revenue		450	0.26	
Profit (loss)		23	0.01	

Coffee mill

US\$1 = Ush 1730

Capital cost budget — total investment and annualized cost:

Assumed real weighted cost of capital 15% per year

	Ush	Years	Annualized cost
Fixed capital costs			
Hullers (x 2)	12,000,000	10	2,391,025
Building	2,500,000	20	399,404
Land	4,500,000	99	675,001
Total	19,000,000		3,465,429
Working capital costs:			
Working capital required (Ush)	—		
Annual cost of working capital (Ush)	—		
Total capital investment (Ush)	19,000,000		
Total annualized capital cost (Ush)	3,465,429		
Revenue budget:			
Quantity rough-hulled green bean milled/day (kg)	10,000		
Number of days operated/week	6		
Number of operating weeks in a year	25		
Quantity milled in one year (kg)	1,500,000		
Average milling service charge (Ush/kg)	23		
Total revenue /year (Ush)	33,750,000		

Analysis of profitability	Ush	Ush/year	Ush/kg of green bean	US\$/year	US\$/kg green bean	Percentage of costs
Operating costs—fixed:						
Management and labor	600,000/month	3,000,000	2	1,734	0.001	30
Electricity	280,000/month	1,400,000	0.93	809	0.001	14
Repairs and maintenance		1,300,000	0.87	751	0.001	13
UCDA levy		150,000	0.10	87	0.000	1
Council tax		150,000	0.10	87	0.000	1
Revenue authority		300,000	0.20	173	0.000	3
Subtotal fixed costs		6,300,000	4.20	3,642	0.002	62
Miscellaneous	5%	315,000	0.21	182	0.000	3
Total operating costs		6,615,000	4.41	3,824	0.003	66
Capital costs		3,465,429	2.31	2,003	0.001	34
Total costs		10,080,429	6.72	5,827	0.004	100
Revenue		33,750,000	22.50	19,509	0.013	
Profit (loss)		23,669,571	15.78	13,682	0.009	

Annex 2. Cotton

Example of smallholder indicative price payment formulas

Oil Palm Products—PNG

In order to establish price transparency and link farm-gate prices more closely to market prices, the CDO and the UGCEA should consider introducing a mutually acceptable but voluntary, regular, fluctuating indicative price, based on an agreed formula calculated from world prices with cost deductions at each stage of the marketing chain. Such formulae work well for smallholders in other crops in other parts of the world and an example is given here (PNG oil palm smallholders' formula). The formula system lends itself particularly to contract farming/outgrower schemes and nucleus estates.

FFB Formula, September 2001

Formula component	Milling companies			
	A	B	C	D
	In US\$	In US\$	In US\$	In US\$
US\$ price for CPO, cif Rotterdam	362.00	362.00	362.00	362.00
Less sales costs to equate to fob	278.00	272.00	267.00	283.51
US\$ price for PK, CIF Rotterdam	N/A	134.50	134.50	N/A
Less sales costs to equate to FOB	N/A	64.50	64.50	N/A
US\$ price for PKO, CIF Rotterdam	363.00	N/A	N/A	363.00
Less sales costs to equate to FOB	279.00	N/A	N/A	284.51
US\$ price for PKE, CIF Australia	22.70	N/A	N/A	22.70
Less sales costs to equate to FOB	15.68	N/A	N/A	15.68
Palm Product Value of 1 t of FFB				
Standard extraction rate for CPO (22.88%)	63.61	62.23	61.10	64.87
Standard extraction rate for PK (4.97%)	N/A	3.21	3.21	N/A
Standard extraction rate for PKO (2.33%)	6.50	N/A	N/A	8.63
Standard extraction rates for PKE (3.10%)	0.49	N/A	N/A	0.49
US\$ Palm Product Value of 1 t of FFB	70.60	65.44	64.31	71.98
Exchange rate US\$ to Kina (0.2955)				
Exchange rate A\$ to Kina (0.528)				
	Kina	Kina	Kina	Kina
Kina Palm Product Value of 1 t of FFB	238.89	221.45	217.63	243.60
Farmers pay out ratio at 55%	131.39	121.80	119.70	133.98
Add 1% VAT	1.31	1.22	1.20	1.34
Less OPRA levy	0.90	0.90	0.90	0.90
Less Sexava levy	N/A	N/A	N/A	1.00
Less OPIC levy	3.50	3.50	3.50	3.50
Less VAT at 10% on OPIC levy	0.35	0.35	0.35	0.35
• Mill Gate Price	127.95	118.27	117.05	129.57
Less FFB transport costs	18.00	12.50	N/A	17.34
• Farm-gate price	109.95	105.77	N/A	112.22

Note:

CIF	cost, insurance, and freight	PK	palm kernels
CPO	crude palm oil	PKE	palm kernel expellers
FFB	fresh fruit bunches	PKO	palm kernel oil
fob	free on board	Sexava	an oil palm pest
Kina	PNG national currency		
OPIC	Oil Palm Industry Council (PNG body monitoring smallholder affairs)		
OPRA	Oil Palm Research Authority		

Annex 3. Fish

Assumptions and workings

Large transport boat operator

US\$1 = Ush 1730

Capital cost budget – total investment and annualized cost:

Assumed real weighted cost of capital 15% per year

Fixed capital costs	Ush	Years	Annualized cost
Boat (6 tonnes capacity)	3,500,000	6	924,829
Outboard engine (40 hp)	6,000,000	8	1,337,101
Total	9,500,000		2,261,930
Working capital costs:			
Working capital required (Ush)	5,752,500		
Annual cost of working capital (Ush)	862,875		
Total capital investment (Ush)	15,252,500		
Total annualized capital cost (Ush)	3,124,805		
Raw material budget:			
Quantity purchased/trip (kg)	3835		
Trips/week	1.5		
Operating weeks/year	52		
Total annual purchase (kg)	299,130		
Average price paid to fishermen (Ush/kg)	1,500		
Total annual raw material cost	448,695,000		
Revenue budget:			
Quantity purchased/year(kg)	299,130		
Spoilage (not sellable to export factory)	1.3%		
Total sold to export factory (kg)	295,241		
Total sold into local market (kg)	3,889		
Landing site price for export quality (Ush/kg)	1,800		
Landing site price for local market (kg)	650		
Total annual revenue (Ush)	533,962,007		

Large transport boat operator (Contd)

US\$1 = Ush 1730

Labor budget:	
Number of crew	3.5
Wages/crew member/trip	30,000
Labor/trip	105,000
Annual labor budget	8,190,000
Fuel and oil budget:	
Fuel utilized/trip (liters)	100
Oil utilization per trip at 20:1 (liters)	5
Cost of fuel (Ush/liter)	1,480
Cost of oil (Ush/liter)	3,500
Annual cost of fuel and oil	12,909,000

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	Ush/year	Ush/kg of fish	US\$/kg of fish	Percentage of costs
Analysis of profitability:				
Operating costs —variable:				
Raw material	448,695,000	1,500	0.87	95
Subtotal variable costs	448,695,000	1,500	0.87	95
Operating costs—fixed:				
Labor	8,190,000	27	0.02	2
Fuel and oil	12,909,000	43	0.02	3
Repair and maintenance	500,000	2	0.00	0
License	500,000	2	0.00	0
Subtotal fixed costs	22,099,000	74	0.04	5
Total operating costs	470,794,000	1,574	0.91	99
Capital costs				
Total costs	3,124,805	10	0.01	1
Revenue	473,918,805	1,584	0.92	100
Profit (loss) before tax	533,962,007	1,785	1.03	
	60,043,202	201	0.12	

Fish processing plant

US\$1 = Ush 1725	Ush
Output budget:	
Export sales (kg/month)	163,150
Local sales (kg/month)	244,725
Operating months/year	12.0
Annual export output (kg)	1,957,800
Annual local output (kg)	2,936,700
Raw material budget:	
Annual fresh fish requirement (kg)	4,894,500
Cost of fresh fish at landing site (Ush/kg)	1,800
Annual raw material budget (Ush)	8,810,100,000
Revenue budget:	
Annual export output (kg)	1,957,800
Annual other output (kg)	2,936,700
Revenue/kg fob delivered Entebbe (Ush)	6,003
Average revenue/kg other sales (Ush)	351
Total annual revenue (Ush)	12,783,147,447
Labor budget:	
Direct labor cost at 163150kg/exp output/month (Ush/year)	289,314,600
Change factor (for output not equalling 163150 kg/month)	0.00
Total direct labor cost	289,314,600
Energy budget:	
Energy cost at 163150kg/export/mth (Ush/yr)	360,000,000
Change factor (for output not equalling 163150 kg/month)0.00	
Total energy cost	360,000,000
Fuel budget:	
Energy cost at 163150kg/export/month (Ush/year)	44,201,028
Change factor (for output not equalling 163150kg/month)0.00	
Total energy cost	44,201,028

Fish processing plant (contd)

Analysis of profitability	Ush	Ush//year	Ush/kg of fillet	US\$/year	US\$/kg of fillet	Percentage of total cost
Operating costs — variable:						
Raw material		8,810,100,000	4,500	5,107,304	2.61	76
Packaging	259 per kg	506,580,750	259	293,670	0.15	4
Energy		360,000,000	184	208,696	0.11	3
Direct labor		289,314,600	148	167,719	0.09	2
Fuel		44,201,028	23	25,624	0.01	0
Subtotal variable costs		10,010,196,378	5,113	5,803,012	2.96	86
Operating costs — fixed:						
Management	23,000,000 per month	276,000,000	141	160,000	0.08	2
Lab expenses	11,600,000 per month	139,200,000	71	80,696	0.04	1
Admin expenses	14,800,000 per month	177,600,000	91	102,957	0.05	2
Fixed asset maintenance	5,600,000 per month	67,200,000	34	38,957	0.02	1
Capital costs (interest and depreciation)	45,800,000 per month	549,600,000	281	318,609	0.16	5
Subtotal fixed costs		1,209,600,000	618	701,217	0.36	10
Subtotal operating costs		11,219,796,378	5,731	6,504,230	3.32	96
Miscellaneous	3.5%	415,492,873	212	240,865	0.12	4
Total operating costs		11,635,289,251	5,943	6,745,095	3.45	100
Annual revenue*		12,783,147,447	6,529	7,410,520	3.79	
Profit (loss) before tax		1,147,858,196	586	665,425	0.34	

*Includes revenue from filler and fish parts

Ugandan trader selling fresh fish in Kigali

US\$1 = Ush 1730

Rwandan Franc = Ush 3.2

Raw material budget:

Quantity purchased/trip(kg)	4,500
Average price at landing site (Ush/kg)	850
Total raw material cost/trip	3,825,000

Revenue budget:

Quantity sold (kg)	4,500
Average price in Kigali (Ush/kg)	1,280
Total revenue per pickup load (Ush)	5,760,000

Analysis of profitability	Ush/trip	Ush/kg of fish	US\$/kg of fish	Percentage of costs
Operating costs—variable:				
Raw material	3,825,000	850	0.49	68
Subtotal variable costs	3,825,000	850	0.49	68
Operating costs — fixed:				
Vehicle hire (including driver)	600,000	133	0.08	11
Fuel	520,000	116	0.07	9
Labor	100,000	22	0.01	2
Local Ugandan taxes	50,000	11	0.01	1
Ice	350,000	78	0.04	6
Import duties	160,000	36	0.02	3
Subtotal fixed costs	1,780,000	396	0.23	32
Total operating costs	5,605,000	1,246	0.72	100
Revenue	5,760,000	1,280	0.74	
Profit (loss) before tax	155,000	34	0.02	

Annex 4. Maize

Kenya maize quality standards

(A) Unga Ltd

1. The maize shall be free from foreign odor, molds, rat droppings, and other extraneous material.
2. The maize shall be clean and dry.
3. The maize shall be free from infestation.

Grading

Moisture content	14.0% maximum if direct for milling 13.5% maximum if destined for storage
Foreign matter (includes sand, earth, stones)	1% maximum
Broken grains	3% maximum
Pest-damaged grains	4% maximum
Other colored grains	3% maximum
Discolored grains	3% maximum
Diseased grains	2% maximum
Infestation	absent
Moldy grains	absent
Aflatoxin (total)	10 ppb
Total defects	15%

(B) Kenya Standard Specification for dry shelled maize

(Extract from Kenya Bureau of Standards KS 01-42: 1977, amended October 1979)

Quality requirements

1. Shelled maize shall be free from foreign odors, molds, live pests, rat droppings, and other injurious contaminants.
2. Shelled maize shall not contain levels of chemical residues higher than those recommended by the Crop Storage Technical Committee of the National Agricultural Laboratories of the Ministry of Agriculture.
3. Shelled maize shall have a white or yellow color and may be dent or flint variety.
4. Shelled maize shall be clean and dry.

	Grade requirements (percentage by weight, maximum)			
	K1	K2	K3	K4
Foreign matter	1	1	1	1
Broken grains	2	3	4	6
Pest-damaged grains	4	7	10	15
Other colored grains	2	3	4	8
Total defective grains	10	13	20	30

Grades

Shelled maize shall be classified as grade K1, K2, K3 or K4.

In addition to the quality requirements prescribed above, shelled maize shall meet the purity standards shown below when the shelled maize is sampled and analyzed according to prescribed methods

Reject maize – shelled maize which has any commercially objectionable faulty odor or taste or which is otherwise of distinctly low quality shall be classified as reject maize and shall be regarded as unfit for human consumption.

Undergrade maize – shelled maize that does not come within the requirements of grades K1 - K4 and is not rejected shall be termed undergrade.

(C) Kenya NCPB FAQ grading system

This system stipulates that maize can only be purchased if it complies with a single set of quality criteria. These are:

Moisture content	13.5% (maximum)
Foreign matter	1% maximum by weight
Broken grain	2% maximum by weight
Insect damage	3% maximum by weight
Other colored grains	1% maximum by weight
Discolored grains	2% maximum by weight

None of the parameters for defining these categories could be obtained. However, on the assumption that they are the same as those described for the Kenya standard, then this single grade appears to approximate to somewhere between K1 and K2.

Annex 5. Cassava

Costs and profitability of cassava chip milling

Investment: motor and mill	2,000,000 Ush	
Life of equipment:	10	Years
Opportunity cost of capital:	20%	
Final value:	0	Ush
Annualized capital cost; equipment	477,046	Ush
Connection to electricity grid:	1,000,000	Ush
Duration	30	Years
Capital cost:	20%	
Final value:	0	Ush
Annualized capital cost; grid connection	200,846	Ush
Working capital:	500,000	Ush
Opportunity cost of capital:	20%	
Cost of working capital	100,000	Ush
Fixed costs (annual)		
Capital costs (mill, engine, grid connection, working capital)	677,892	Ush
Management costs (1 person Ush150 000/ month)	1,800,000	Ush
Rent for building (Ush 200 000)	2,400,000	Ush
Processing license	180,000	Ush
Revenue tax	150,000	Ush
Total fixed costs/year	5,207,892	Ush
Variable costs (based on 750 bags of throughput /month):		
Electricity/month	960,000	Ush
Spare parts/month	50,000	Ush
Lubricants/month	20,000	Ush
Casual labor/month	150,000	Ush
Monthly variable costs	1,180,000	Ush
Total variable costs/year	14,160,000	Ush
Total costs/year:	19,367,892	Ush
Income p.a. (9000 bags, milled at Ush 2000/bag)	18,000,000	Ush
Profit/year	(1,367,892)	Ush

* This is based on the assumption that electricity costs of milling one bag of dried cassava chips correspond to Ush 1280. Source of information: Wholesaler/miller in Kisenyi market, Kampala.

Annex 6. Dairy

Assumptions and workings

2500 liter capacity milk collection center

US\$1 = 1730

Capital cost budget - total investment and annualized cost:

Assumed real weighted cost of capital 10% per year

Fixed capital costs	Ush	Years	Annualized cost
Plant and machinery:	18,000,000	10	2,929,417
Genset	6,000,000	5	1,582,785
Vehicle	10,000,000	5	2,637,975
Carriage cans	2,400,000	4	757,130
Total	36,400,000		7,907,307
Working capital costs:			
Working capital required (Ush)	–		
Annual cost of working capital (Ush)	–		
Total capital investment (Ush)	36,400,000		
Total annualized capital cost (Ush)	7,907,307		
Output budget:			
Utilized capacity (liters/day)	2,500		
Operating days/week	7.0		
Operating weeks/year	52.0		
Annual output of milk (liters)	910,000		
Raw material budget:			
Spoilage	5.0%		
Annual raw milk requirement (liters)	955,500		
Cost of raw milk - Ush/liter	200		
Annual raw material budget (Ush)	191,100,000		
Revenue budget:			
Annual output of processed milk (liters)	910000		
Revenue per liter sold ex-store	220		
Quantity sold ex-store (liters/day)	900		
Revenue/liter delivered Mbarara (Ush)	270		
Quantity sold Mbarara (liters/day)	1,600		
Total annual revenue (Ush)	229,950,000		

2500 liter capacity milk collection center (contd)

Analysis of profitability	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material		191,100,000	210	110,462	0.12	83
Energy	150,000/month	1,800,000	2	1,040	0.00	1
Direct labor	135,000/month	1,620,000	2	936	0.00	1
Fuel	1,386,000/month	16,632,000	18	9,614	0.01	7
Subtotal variable costs	211,152,000	232		122,053	0.13	92
Operating costs—fixed:						
Management	320,000/month	3,840,000	4	2,220	0.00	2
Water	125,000/month	1,500,000	2	867	0.00	1
Rent	150,000/month	1,800,000	2	1,040	0.00	1
License		200,000	0	116	0.00	0
Fixed asset maintenance*		1,456,000	2	842	0.00	1
Subtotal fixed costs		8,796,000	10	5,084	0.01	4
Subtotal operating costs		219,948,000	242	127,138	0.14	96
Contingency—1% (miscellaneous)		2,199,480	2	1,271	0.00	1
Total operating costs		222,147,480	244	128,409	0.14	97
Capital costs		7,907,307	9	4,571	0.01	3
Total annual costs		230,054,787	253	132,980	0.15	100
Annual revenue		229,950,000	253	132,919	0.15	100
Profit (loss) before tax		104,787	—	0	—	
				61	0.00	

*4% capital value of fixed assets.

10000 liter capacity milk collection center

US\$1 = Ush 1730

Capital cost budget – total investment and annualized cost:

Assumed real weighted cost of capital 10% per year

	Ush	Years	Annualized cost
Fixed capital costs:			
Plant and machinery	70,000,000	10	11,392,178
Building	24,000,000	50	2,420,620
Genset	34,000,000	5	8,969,114
Vehicle	26,000,000	5	6,858,735
Carriage cans	8,400,000	4	2,649,955
Total	162,400,000		32,290,601
Working capital costs:			
No. of days operating costs required	–		
Total annual operating costs (see below) (Ush))	327,210,912		
Working capital required (Ush)	–		
Annual cost of working capital (Ush)	–		
Total capital investment (Ush)	162,400,000		
Total annualized capital cost (Ush)	32,290,601		
Output budget:			
Utilized capacity (liters/day)	4,200		
Operating days/week	7.0		
Operating weeks/year	52.0		
Annual output of milk (liters)	1,528,800		
Raw material budget:			
Spoilage		5.0%	
Annual raw milk requirement (liters)	1,605,240		
Cost of raw milk (Ush/liter)	180		
Annual raw material budget (Ush)	288,943,200		
Revenue budget:			
Annual output of processed milk (liters)	1528800		
Revenue/liter sold ex-store	200		
Quantity sold ex-store (liters/day)	3000		
Revenue/liter delivered Mbarara (Ush)	250		
Quantity sold Mbarara (liters/day)	1,200		
Total annual revenue (Ush)	328,500,000		

10000 liter capacity milk collection center (contd)

Analysis of profitability	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material		288,943,200	189	167,019	0.11	80
Energy	300,000/ month	3,600,000	2	2,081	0.00	1
Direct labor	130,000/month	1,560,000	1	902	0.00	0
Fuel	1,386,000/month	16,632,000	11	9,614	0.01	5
Subtotal variable costs	310,735,200	203	179,616	0.12		86
Operating costs—fixed:						
Management	320,000/month	3,840,000	3	2,220	0.00	1
Water	125,000/ month	1,500,000	1	867	0.00	0
Rent	100,000/month	1,200,000	1	694	0.00	0
License		200,000	0	116	0.00	0
Fixed asset maintenance*		6,496,000	4	3,755	0.00	2
Subtotal fixed costs		13,236,000	9	7,651	0.01	4
Subtotal operating costs		323,971,200	212	187,267	0.12	90
Miscellaneous—1% (miscellaneous)		3,239,712	2	1,873	0.00	1
Total operating costs		327,210,912	214	189,139	0.12	91
Capital costs		32,290,601	21	18,665	0.01	9
Total annual costs		359,501,513	235	207,804	0.14	100
Annual revenue		328,500,000	215	189,884	0.12	
Profit (loss) before tax	-	31,001,513	-20	- 17,920	-0.01	

*4% capital value of fixed assets.

30 000 Liter/day milk pasteurizing and homogenizing processing plant

US\$1 = Ush 1730

Capital cost budget – total investment and annualized cost:

Assumed real weighted cost of capital 15% per year

Fixed capital costs	Ush	Years	Annualized cost
Building	300,000,000	20	47,928,441
Machinery	900,000,000	10	179,326,856
Utilities	800,000,000	5	238,652,442
Total	2,000,000,000		465,907,739
Working capital costs:			
No. of days operating costs required		1.5	
Total annual operating costs (see below) (Ush)	3,464,731,500		
Working capital required (Ush)	14,238,623		
Annual cost of working capital (Ush)	2,135,793		
Total capital investment (Ush)	2,014,238,623		
Total annualized capital cost (Ush)	468,043,533		
Output budget:			
Utilized capacity (liters/day)	25,000		
Operating days/week		7.0	
Operating weeks/year		52.0	
Annual output of processed milk (liters)	9,100,000		
Raw material budget:			
Spoilage		6.5%	
Annual raw milk requirement (liters)	9,691,500		
Cost of raw milk at collection point – (Ush/liter)	220		
Annual raw material budget (Ush)	2,132,130,000		
Revenue budget:			
Annual output of processed milk (liters)	9100000		
Revenue per liter delivered Kampala (Ush)	500		
Total annual revenue (Ush)	4,550,000,000		
Labor budget:			
Direct labour cost at 7000 liters/day (Ush/year)	33,000,000		
Incremental factor (for output above 7000 liters/day)		0.51	
Total direct labor cost	49,971,429		
Energy budget:			
Energy cost at 7000 liters/day (Ush/year)	96,000,000		
Incremental factor (for output above 7000 l/day)		0.51	
Total energy cost	145,371,429		
Fuel budget:			
Energy cost at 7000 liters/day (Ush/year)	120,000,000		
Incremental factor (for output above 7000 liters/day)		2.57	
Total energy cost	428,571,429		

30 000 liter/day processing plant (contd)

Analysis of profitability	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material	2,132,130,000	234	1,232,445		0.14	54
Energy		145,371,429	16	84,030	0.01	4
Direct labor		49,971,429	5	28,885	0.00	1
Packaging	48 per liter	436,800,000	48	252,486	0.03	11
Fuel		428,571,429	47	247,729	0.03	11
Subtotal variable costs	3,192,844,286	351	1,845,575		0.20	81
Operating costs—fixed:						
Management	4,325,000 per month	51,900,000	6	30,000	0.00	1
Water (Ush 1.25 million/month)	15,000,000	2	8,671		0.00	0
Fixed asset maintenance*		40,000,000	4	23,121	0.00	1
Subtotal fixed costs	106,900,000	12	61,792		0.01	3
Subtotal operating costs	3,299,744,286	363	1,907,367		0.21	84
Contingency—5% (miscellaneous)	164,987,214	18	95,368		0.01	4
Total operating costs	3,464,731,500	381	2,002,735		0.22	88
Capital costs		468,043,533	51	270,545	0.03	12
Total annual costs	3,932,775,033	432	2,273,280		0.25	100
Annual revenue		4,550,000,000	500	2,630,058	0.29	116
Profit (loss) before tax	617,224,967	68	356,777		0.04	

*2% capital value of fixed assets.

UHT Processing Plant

US\$1 = Ush 1740

Capital cost budget — total investment and annualized cost:

Assumed real weighted cost of capital

15%/year

Fixed capital costs:	Ush	Years	Annualized cost
Building	1,810,000,000	100	271,500,231
Plant and machinery	5,170,000,000	10	1,030,133,163
Motor vehicles	850,000,000	5	253,568,220
Furniture and fittings	10,000,000	8	2,228,501
Office equipment	30,000,000	8	6,685,503
Carriage cans	690,000,000	4	241,683,093
Total	8,560,000,000		1,805,798,710
Working capital costs:			
No. of days operating costs required		7.0	
Total annual operating costs (see below) (Ush)	4,168,353,000		
Working capital required (Ush)	79,941,016		
Annual cost of working capital (Ush)	11,991,152		
Total capital investment (Ush)	8,639,941,016		
Total annualized capital cost (Ush)	1,817,789,863		
Output budget:			
Utilized capacity (liter/day)	20,000		
Operating days/week		7.0	
Operating weeks/year		52.0	
Annual output of processed milk (liters)	7,280,000		
Raw material budget:			
Spoilage		6.5%	
Annual raw milk requirement (liters)	7,753,200		
Cost of raw milk at collection point (Ush/liter)	230		
Annual raw material budget (Ush)	1,783,236,000		
Revenue budget:			
Annual output of processed milk (liters)	7,280,000		
Revenue/liter delivered Kampala (Ush)	550		
Total annual revenue (Ush)	4,004,000,000		
Labor budget:			
Direct labor cost at 20 000 liters/day (Ush/year)	145,600,000		
Incremental factor (for output above 20000 liters/day)		0.00	
Total direct labor cost	145,600,000		
Energy budget:			
Energy cost at 20 000 liters/day (Ush/year)	240,000,000		
Incremental factor (for output above 20 000 liters/day)		0.00	
Total energy cost	240,000,000		
Fuel budget:			
Energy cost at 20 000 liters/day (Ush/year)	380,000,000		
Incremental factor (for output above 20 000 liters/day)		0.00	
Total energy cost	380,000,000		

UHT Processing Plant (contd)

Analysis of profitability	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material		1,783,236,000	245	1,024,848	0.14	30
Energy		240,000,000	33	137,931	0.02	4
Direct labor		145,600,000	20	83,678	0.01	2
Packaging	120/liter	873,600,000	120	502,069	0.07	15
Fuel		380,000,000	52	218,391	0.03	6
Subtotal variable costs		3,422,436,000	470	1,966,917	0.27	57
Operating costs—fixed:						
Management		105,000,000	14	60,345	0.01	2
Office expenses		90,000,000	12	51,724	0.01	2
Water		54,000,000	7	31,034	0.00	1
Security		47,224,000	6	27,140	0.00	1
Promotion		25,000,000	3	14,368	0.00	0
Fixed asset maintenance*		171,200,000	24	98,391	0.01	3
Subtotal fixed costs		547,424,000	75	314,611	0.04	9
Subtotal operating costs		3,969,860,000	545	2,281,529	0.31	66
Contingency—5% (miscellaneous)		198,493,000	27	114,076	0.02	3
Total operating costs		4,168,353,000	573	2,395,605	0.33	70
Capital costs		1,817,789,863	250	1,044,707	0.14	30
Total annual costs		5,986,142,863	822	3,440,312	0.47	100
Annual revenue		4,004,000,000	550	2,301,149	0.32	67
Profit (loss) before tax		- 1,982,142,863	272	- 1,139,163	0.16	

*2% capital value of fixed assets.

Informal wholesaler

US\$1 = Ush 1730

Raw material budget:						
Quantity purchased/trip (liters)		1800				
Average price at collection point (Ush/liter)		245				
Total raw material cost/trip		441,563				
Revenue budget:						
Quantity purchased (liters)		1,800				
Spoilage		13.75%				
Total sold as fresh milk (liters)		1,553				
Total sold as spoiled milk (liters)		248				
Average wholesale price for fresh milk (Ush/liter)		356				
Average wholesale price for spoiled milk (Ush/liter)		306				
Total revenue per pickup load (Ush)		628,875				
Analysis of profitability						
	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material		441,563	245	255.24	0.14	69
Consumables	27/20 liters	2,430	1	1.40	0.00	0
District tax	350/20 liters	31,500	18	18.21	0.01	5
Association levy	100/20 liters	9,000	5	5.20	0.00	1
Kampala district levy	100/20 liters	9,000	5	5.20	0.00	1
Milk preservation (half of milk purchased)	500/20 liters	22,500	13	13.01	0.01	3
Subtotal variable costs		515,993	287	298.26	0.17	80
Operating costs—fixed:						
Vehicle hire (including driver)		57,500	32	33.24	0.02	9
Fuel		70,000	39	40.46	0.02	11
Subtotal fixed costs		127,500	71	73.70	0.04	20%
Total operating costs		643,493	357	371.96	0.21	100%
Revenue		628,875	349	363.51	0.20	
Profit (loss) before tax		-14,618	-8	-8.45	-0.00	

Informal sector Kampala milk-cooling center

Analysis of profitability	Ush	Ush/year of product	Ush/liter	US\$/year	US\$/liter of product	Percentage of costs
Operating costs—variable:						
Raw material		137,767,500	284	79,634	0.16	74
Consumables	27/20 liters	758,160	2	438	0.00	0
District tax	350/20 liters	9,828,000	20	5,681	0.01	5
Subtotal variable costs		148,353,660	306	85,754	0.18	79
Operating costs—fixed:						
Labor	350,000/month	4,200,000	9	2,428	0.01	2
Fuel		24,960,000	52	14,428	0.03	13
Rent	100,000/month	1,200,000	2	694	0.00	1
Electricity	75,000/month	900,000	2	520	0.00	0
Water	24,000/month	288,000	1	166	0.00	0
Traders' license		75,000	0	43	0.00	0
Council tax		50,000	0	29	0.00	0
Subtotal fixed costs		31,673,000	65	18,308	0.04	17
Total operating costs		180,026,660	372	104,062	0.21	96
Capital costs		7,012,190	14	4,053	0.01	4
Total costs		187,038,850	386	108,115	0.22	100
Revenue		196,209,000	405	113,416	0.23	
Profit (loss)		9,170,150	19	5,301	0.01	