Evaluating the marketing opportunities for banana and its products in the principal banana growing countries of ASARECA

Regional Report
Kenya, Rwanda, Tanzania, and Uganda

J. Spilsbury, J. Jagwe, K. Wanda, J. Nkuba, and R.S.B. Ferris

ASARECA Monograph 7

Association for Strengthening Agricultural Research in Eastern and Central Africa

Foodnet

IITA International Institute of Tropical Agriculture

About ASARECA

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

Background

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

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

Research Networks

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

Evaluating the marketing opportunities for banana and its products in the principal banana growing countries of ASARECA

Regional Report

Kenya, Rwanda, Tanzania, and Uganda

Compiled by

J. Spilsbury, J. Jagwe[1], K. Wanda[1], J. Nkuba[2], and R.S.B. Ferris[1]

[1] International Institute of Tropical Agriculture-FoodNet
[2] Agricultural Research & Development Institute, Maruku, Bukoba, Tanzania

Ibadan, Nigeria
Telephone: (234 2) 241 2626
Fax: (234 2) 241 2221
E-mail: iita@cgiar.org
Web: www.iita.org

To Headquarters from outside Nigeria:
c/o Lambourn (UK) Ltd, Carolyn House
26 Dingwall Road, Croydon CR9 3EE, UK

Within Nigeria:
PMB 5320, Oyo Road
Ibadan, Oyo State

ISBN 978 131 235 1

Printed in Nigeria by IITA

Correct citation. Spilsbury, J., J. Jagwe, K. Wanda, J. Nkuba, and R.S.B. Ferris. 2004. Evaluating the marketing opportunities for banana and its products in the principal banana growing countries of ASARECA. ASARECA Monograph 7. IITA, Ibadan, Nigeria. 51 pp.

Contents

Tables

Figures

Maps

Executive summary

Trend towards a decline in the cooking banana market

This regional report is a synthesis of country studies that covered local, regional, and international banana and banana product markets for the ASARECA countries of Kenya, Rwanda, Tanzania, and Uganda. The report provides a review of the investment options within the banana subsector that can contribute to more robust levels of environmentally sustainable economic growth through improved systems of banana production, processing, and marketing.

The methodology employed is based on a rapid market appraisal technique. Individual country fieldwork was performed in mid-2002 with reports written in the latter part of the year. This regional report was compiled in January 2003.

All study countries have ethnic groups for whom cooking banana is a dietary staple. The "banana eating" tribes located on the lakeshore areas of Uganda, southwestern Kenya, west and eastern Tanzania, and Rwanda include the Bugandans in Uganda, the Meros and Chaggas in eastern Tanzania, the Bahaya in the Bakoba region of northwestern Tanzania, the Luos in Kenya, and a combination of Tutsis and Hutus in Rwanda. The cultivation systems often combine coffee and bananas. These tribes all have highly developed sedentary chieftaincies or kingdoms and these tribes are often characterized by their considerable acumen in trade and business development.

According to official production statistics, which should be considered with due caution, domestic production of cooking bananas is growing but is not keeping pace with population growth. There is, however, increasing urban demand for banana products following the accelerating rate of urbanization. Changes in dietary habits away from crops such as banana towards crops with higher income elasticity such as maize and rice was only apparent in Kenya, where bananas are a minor food source. In the other countries increases in production are keeping pace with population as cooking bananas are a preferred and traditional staple, well suited to the farming systems.

Uganda is the largest banana producer in the region with significant demand growth in urban areas, particularly Kampala. Tanzania and Rwanda are also significant producers. Tanzania has areas of oversupply especially in the northwest. Kenya has a relatively small banana sector as maize and beans are the dominant dietary staples. In terms of regional trade, Kenya imports dessert bananas from Uganda and Tanzania, whereas Rwanda imports cooking bananas from Uganda. Tanzania also exports bananas to its southern and eastern neighbors. Uganda is the main country exporting bananas, with a small but growing trade in cooking bananas being air freighted to the Ugandan community in London. Uganda also leads in the export of dried organic bananas and this market has considerable potential for growth as long as prices are competitive with southeast Asia produce.

A more detailed summary of market opportunities follows in the table.

Overview of market opportunities.

Product	Market opportunity	Means of gain	Cost of gain	Magnitude of gain	Likelihood of success	INIBAP next steps
Domestic market		Ensure production.	Several million US dollars	Large	Moderate	Review farm level impact in addressing production constraints.
Cooking bananas	Growing urban markets	Ensure adequate infrastructure.	Several million US dollars	Large	Low	Inform policy. Lobby govts.
	Seasonal price movements	Develop production response.	US$10 000 to 100 000	Moderate	Moderate	Devise plan and implement.
Dessert bananas	Growing urban markets	Address Fusarium wilt susceptibility of Gros Michel and Sukali Ndizi.	Several US$ '000 000	Large	Low	Review impact in addressing *Fusarium* wilt susceptibility.
		Introduce appropriate existing new varieties.	US$50 000	Large	Moderate	Devise plan and implement.
		Develop new varieties	US$ '00 000s	Large	Low	

Overview of market opportunities. (contd)

Product	Market opportunity	Means of gain	Cost of gain	Magnitude of gain	Likelihood of success	INIBAP next steps
Disease free planning material	Tissue culture produced seedlings	Establishment/ development of private sector provision	US$5000 to 10 000 per country	Large	Moderate	Technical/business support to private sector.
Regional markets Cooking bananas	Ugandan cooking banana exports to Rwanda	Regional market information.	US$1000s	Moderate	High	Plan and implement with existing information providers (i.e., FoodNet).
		Speed border crossing procedures and reduce taxes.	Minimal	Large	Low	Inform policy. Lobby govts.
Dessert bananas	Ugandan Gros Michel exports to Kenya	As for Ugandan cooking banana exports to Rwanda.				
International markets Cooking bananas Ugandan "Matooke"	Sales to expatriate Ugandans, Congolese, and West Indians in Europe	Enhance supply chain especially airport facilities.	US$5000 to 10 000	Low	Moderate	Lobby for/advise on improved airfreight service.
		Further market research into customer requirements.	US$1000 to 2000	Low	High	Review, plan, and commission research.

Overview of market opportunities. (contd)

Product	Market opportunity	Means of gain	Cost of gain	Magnitude of gain	Likelihood of success	INIBAP next steps
Dessert bananas especially Gros Michel and Sukali Ndizi	EU market for naturally dried bananas	Development of improved solar drying technology.	US$ '0 000s	Moderate	Moderate	Review, plan, and commission research with private sector partners (i.e., Amfri Farms).
		Product packaging development.	US $ '0 000s	Moderate	Moderate	Review, plan, and commission research with private sector partners (i.e., fruits of the Nile).
	EU market of fresh and organic fruit	Improving fruit handling and supply chain facilities.	US$10 000 to 50 000	Moderate	Low	Training provision, lobby for improved airfreight service.
Tetra-packed juices using banana puree	Banana puree	Develop local supply of banana puree with private sector.	US$1000 to 5000	Moderate	High	Inform and support private sector.

Evaluating the marketing opportunities for banana and its products in the principal banana growing countries of ASARECA

Introduction

This regional report is a synthesis of four country marketing studies conducted in Kenya, Rwanda, Tanzania, and Uganda. The aim of this work is to provide the Banana Research Network for Eastern and Southern Africa (BARNESA) and its partners with an overview of the marketing status and options for agro-enterprise investments in the banana subsector of the principal banana producing countries of the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) region. This work is being done to increase the capacity of BARNESA to shift towards a more market-oriented approach to investments in research and development and to assist in the linkage of banana-based research to the private sector.

From the agro-enterprise perspective, the study also aims to shed light on the potential for developing more robust levels of environmentally sustainable economic growth through improved systems of banana production, processing, and marketing. The project reviews market segments including:

- Fresh cooking bananas.
- Dessert bananas.
- Processed banana fruit products.
- Non-food banana based products.

Coverage includes local, regional, and overseas markets. An important element of the work is to examine the comparative and competitive advantages of specific products across the region in terms of economic gain based on investment.

Methodology

The methodology employed is based on a rapid assessment technique developed by Holtzman et al. (1995). Due to its rapid nature the analysis is illustrative rather than rigorous. The method uses both secondary and primary data to determine the market prospects for bananas and banana products in the survey area. Primary data was obtained through limited interviews using a structured informal questionnaire (Annex 1) with key informants from target groups including producers, traders, retailers, and exporters. Secondary data, which guided the survey, was acquired through literature review and the collection of available statistics from government departments, NGOs, research and development organizations, and academic reports.

Individual country fieldwork was performed in mid-2002 with reports written later that year. This regional report was compiled during January 2003. The report begins with a broad overview of the economic situation in the countries. The analysis then examines critical aspects of the marketing chain including:

- production volumes
- consumption zones
- the importance of the subsector
- principal production and marketing constraints
- demand and supply side analysis
- and the medium- and long-term market outlook across the subsector for national, regional, and international export trade.

Major findings are summarized with recommendations made in the form of suggested ways forward.

Overview of the economic status of the countries and general macroeconomic developments

Kenya has the highest per capita gross national income (GNI) in the East African Community (ECA) region but is currently experiencing a slowdown in economic growth caused by the effects of poor governance over a considerable period of the Moi regime (1978–2003). Although there is hope that the economic outlook for Kenya may improve with the new Kibahki regime, there are no guarantees. As a result of poor performance and declining investment, Kenya currently has the lowest growth rate of GDP of the four countries (Table 1). Despite this unfavorable trend, Kenya still has the largest manufacturing base in the region with a relatively stronger trading processing capacity than the neighboring countries. The other study countries currently have higher levels of economic growth, based on smaller economies and, probably more significantly, a lower starting point caused by wars and economic collapse caused by experimental fiscal policies. It may also be argued that the more rapid recent growth is based on these countries executing policies that are more favorable to the private sector, as shown by macroeconomic indicators in Table 2, but this does not take into account the significantly higher levels of donor support.

All study countries have rapidly increasing populations. Due to its size, Rwanda has the lowest number of people but the highest population density at 929 people per square kilometer. Rwanda is a major importer of food although it has recently begun to export a small seasonal surplus of maize and beans to Uganda at harvest peaks. All countries have large agricultural sectors and this is likely to remain the case for some time. Economic development and urbanization is most advanced in Tanzania and Kenya. These countries also have trade advantages through access to coastal ports at Dar-es-Salaam and Mombassa. Kenya airport is the regional air hub giving advantages in the export of fresh fruit and horticultural produce. Tanzania and Uganda also have international airports with Uganda exhibiting examples of strong growth in some fresh produce exports by air.

Table 1. Overview of country economic status.

	Kenya	Rwanda	Tanzania	Uganda
Population (million)*	30.7	8.7	34.5	22.8
Population growth rate*	2.1%	2.3%	2.2 %	2.6%
Urban population (% of total)*	30.3% in 1997 34.3% in 2001	5.9% in 1997 6.3% in 2001	28.9 % in 1997 33.2 % in 2001	13.2% in 1997 14.5% in 2001
GNI per capita, Atlas method*	US$350 in 1997 US$340 in 2001	US$220 in 1997 US$220 in 2001	US$210 in 1997 US$270 in 2001	US$320 in 1997 US$280 in 2001
Growth in GDP*	1.1%	6.7%	4.6%	4.6%
Food secure	Yes	Major issue with consistently declining per capita calorie intake. Increasingly dependent on food imports.	Yes	Generally food secure, localized food needs in the north—linked with insecurity.

Source: * World Bank Country Profiles for 2001.

Table 2. General macroeconomic developments.

Country	
Kenya	Well-developed manufacturing sector. Current low to negative economic growth caused by crippling levels of graft. Effect of recent political change yet to be seen. Current low growth due to weak commodity prices, endemic corruption, and low investment both by both private sector and the international development community. Highest growth sector is fruit and vegetable exports over the past decade via Nairobi airport and Mombassa port.
Rwanda	The 1984 genocide caused a major shock to economic situation, asset base, and outlook. Unfavorable trade balance with a heavy reliance on imports. Main exports are primary commodities (coffee/tea). Coffee has suffered a secular decline in price. The government is promoting trade competitiveness through macroeconomic reform that aims to increase efficiency and promote private entrepreneurship. Positive developments in its trade balance include recent small amounts of exports of commodities such as beans to neighboring countries, mainly Burundi.
Tanzania	Slow evolution from centrally planned to market economy. Stable low growth economy. Policy changes (started 1985) towards increased private sector involvement. Including: • Restructuring and privatization of agricultural parastatals. • Liberalization of crop marketing. • Participation of the private sector in importation and distribution of farm inputs and veterinary drugs. • Establishment of a national farm input fund to ensure effective distribution of important farm inputs at reasonable prices. • Removal of subsidies on farm inputs. • Introduction of export tax on agricultural commodities and revival of cooperatives. Implementation of these policies has been slow leading to the failure to achieve targeted goals.
Uganda	After 10 years of political instability in the 1970s and 1980s, the economy has grown steadily over the past decade. Policy changes aim to: • reduce public expenditure • raise the tax base • dampen inflation • boost production and export earnings. Continuing investment in rehabilitation of infrastructure reduced inflation and improved incentives for production and exports. Currently declining terms of trade due to fall in international commodity prices, especially coffee. In most parts of the country gradually improved domestic security, and the return of exiled Indian–Ugandan entrepreneurs has strengthened the private sector.

Trade and competitiveness: recent reforms, performance, and market access

The main dessert banana exporters to world markets are the Caribbean and Central and South American countries that supply importers in North America and Europe. These exporters have a comparative advantage over East African producers due to economies of scale and lower priced, sea-based transportation costs.

Two of the main European consumers are the UK and Germany. The UK traditionally buys bananas from the Caribbean while Germany purchases from Central and South America.

Banana imports to the European Union (EU) are influenced by the Cotonou agreement, which replaced the Lomé Convention in February 2000 after a lengthy dispute with the USA. The Cotonou agreement substantially altered Lomé banana protocol arrangements, which had given preferential access to EU markets for Africa, Caribbean and Pacific (ACP) country bananas. Since the signing of the Cotonou agreement the EU has made special provisions for Least developed countries (LDCs) under an "Everything but Arms" measure. This amends the EU General Scheme of Preferences to extend duty free access to all LDC imports. For bananas this will be phased in with a gradual reduction of import tariffs on fresh bananas to zero by cutting the tariff rate by 20% every year between 1 January 2002 and 1 January 2006 (Robbins and Ferris 2002). Chiquita was assessing possible production sites in LDCs in Africa from which to supply (EU) markets.

There is potential for East African countries to benefit from tariff reductions for fresh bananas exported to the EU under the "Everything but Arms" measure. However, the removal of preferential access arrangements under the Cotonou agreement will place pressure on ACP countries to improve their competitive strength in bananas or find new market outlets and options. These pressures will affect Caribbean countries whose economies rely heavily on banana exports to Europe. International markets for banana products such as flours, fibers, and essences could therefore become increasingly competitive.

With reference to fresh fruit a number of trends in European consumer demand trends include increasing consumption for food perceived as being healthy, organic food, and food produced in an environmentally conscious manner. These trends offer potential for banana producers who currently use organic methods of production.

Uganda is by far the largest producer of bananas in the Lake zone region with a reported per capita consumption of 207 kg per year followed by Rwanda, Tanzania, and Kenya (Table 3). However, as with most informally traded goods, credibility of the production data for crops such as cooking bananas (*matooke)* is uncertain. There has been a 7.5% growth in production of matooke from 1996 to 2002, which translates to an annual growth of 1.05%, well below the population growth of between 2.7% and 3%. A recent review of production figures of *matooke* in Uganda from a number of sources provided a 50% variance in actual production (Table 4). This large range in figures suggests a critical need for better

Table 3. Comparison of total production and average yield.

	Production area (ha)	Production quantity (t)	Yield (average, t/ha)
Kenya**	77 244	1 077 932	13.95
Rwanda**	–	2 279 000	–
Tanzania	121 363***	2 000 000**	16.48
Uganda*	571 900	6 129 724	10.7

* 2000
** 2001
*** Based on average area between 1993 and 1999

Table 4. Cooking banana production (t) figures from various sources in Uganda.

Matooke	UBOS statistical abstract 2002*	UBOS crop survey module 1999/2000	FAO	Commodity study**	IFPRI data based on household surveys
1996	9 144 000	7 908 984	9 734 000		
1997	9 303 000		9 893 000		
1998	9 318 000		9 913 000		
1999	8 949 000		9 844 000		
2000	9 428 000	5 545 000	10 476 000		
2001	9 732 000		10 506 000		
2002	9 888 000		10 521 000	4 554 000	4 424 311

*2001 figures are estimates, 2002 figures are projections
**Spilsbury et al. 2002

statistics, but also that consumption of *matooke* in Uganda may be significantly lower than is considered.

Cooking bananas are, however, a main dietary staple in Southwest Uganda, Rwanda, and lakeshore Tanzania. In Kenya, the diet is dominated by maize and beans, except in the southwestern lake zone region of Nyanza where bananas are also an important part of the diet.

According to government statistics, which again should be treated with caution, banana production in Kenya rose by 8% from 1996 to 2001, an annual rate of 1.5% with production shifting from eastern and coastal areas to western and southwestern regions. At the same time, it is estimated that Kenyan consumption per head declined from 19.6 kg in 1993 to 16.5 kg in 2000, meaning that consumption did not keep pace with population growth estimated at 2.2% (Figs 1a and 1b).

Production growth in Tanzania was minimal and concentrated in the southern highlands (Mbeya and Ruvuma) and in Mara on the eastern side of Lake Victoria bordering Kenya.

Population movement through urbanization is rapidly shifting the weight and location of consumption centers. As an example, urbanization in Uganda is increasing banana

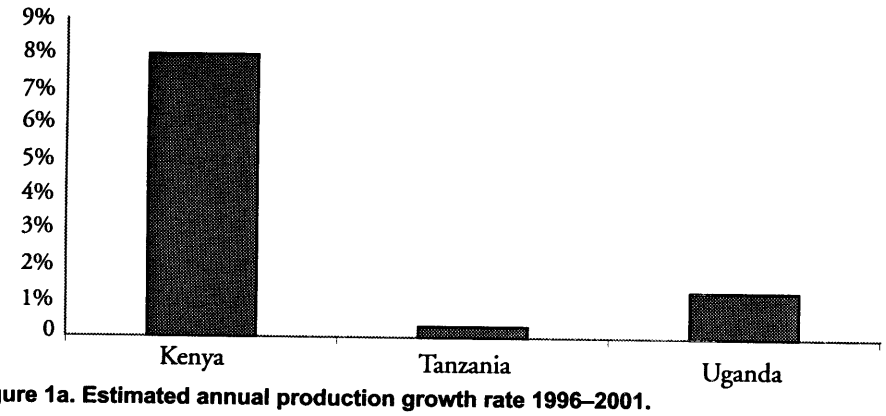


Figure 1a. Estimated annual production growth rate 1996–2001.

Source: Regional banana survey country reports

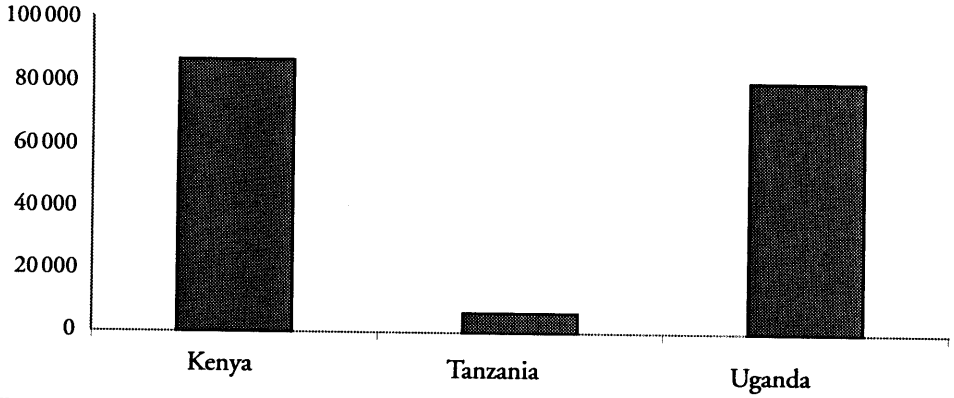


Figure 1b. Estimated annaul production growth in tonnage produced 1996–2001.

Source: Regional banana survey country reports

consumption levels in Kampala. It is estimated that annual increases in volumes for Kampala markets alone will be in the region of 20 000 tonnes per annum. Rising urban demand will place increasing pressure on rural production, supply chains, and market infrastructure.

Importance of the subsector to earnings, rural livelihoods, poverty alleviation, and economic growth

Most bananas are produced on small plots between 0.6 and 0.3 ha in all study countries. Continuous cropping of bananas throughout the year offers significant food security and income generation advantages. The advantage of bananas for small-scale farmers over traditional cash crops, such as coffee, resides in the fact that bananas can be eaten if they cannot be sold and prices on the domestic markets are less prone to problems with secular decline and volatility compared with global commodity prices.

Commercial removal of bunches means soil nutrient replenishment is important for sustainable production. However, minimal cultivation requirements and the perennial nature of the crop mean it can preserve soil structure by reducing sheet erosion. The banana crop also offers resource-poor farmers a range of other product possibilities including mulch, medicine, thatch, and rope.

Principal production and marketing constraints

Major production constraints include weevils, nematodes, *Fusarium* wilt, and black sigatoka (Table 5). Declining soil fertility is also a production problem in the three major banana producing countries of Rwanda, Tanzania, and Uganda. Poor crop husbandry and agronomy practices are mentioned in all countries except Uganda. Yet even in Uganda, inadequate crop husbandry is attributed to soil fertility decline.

Fruit perishability, poor infrastructure, and limited access to credit/capital are commonly cited marketing constraints. Infrastructure and access to finance will be of increasing importance to supply urban markets. Tanzanian field work demonstrated that farmers were isolated from markets due to poor roads and consequently received low prices, which was explained as the main reason for declining production.

Evidence from Uganda revealed that over time, production is being relocated further from consumption centers. This process may in some cases be caused by improving infrastructure in the southwestern corridor of the country, enabling more remote farmers to access markets competitively. Maintenance of the road network will be critical in maintaining these links to the main markets in Kampala.

Given adequate infrastructure, minimal barriers to entry (such as reduced collusion amongst main suppliers, access to credit, informal taxation) and sufficient market information, it is suggested that increasing urban demand will be supported. These factors may reduce urban prices and improve rural prices.

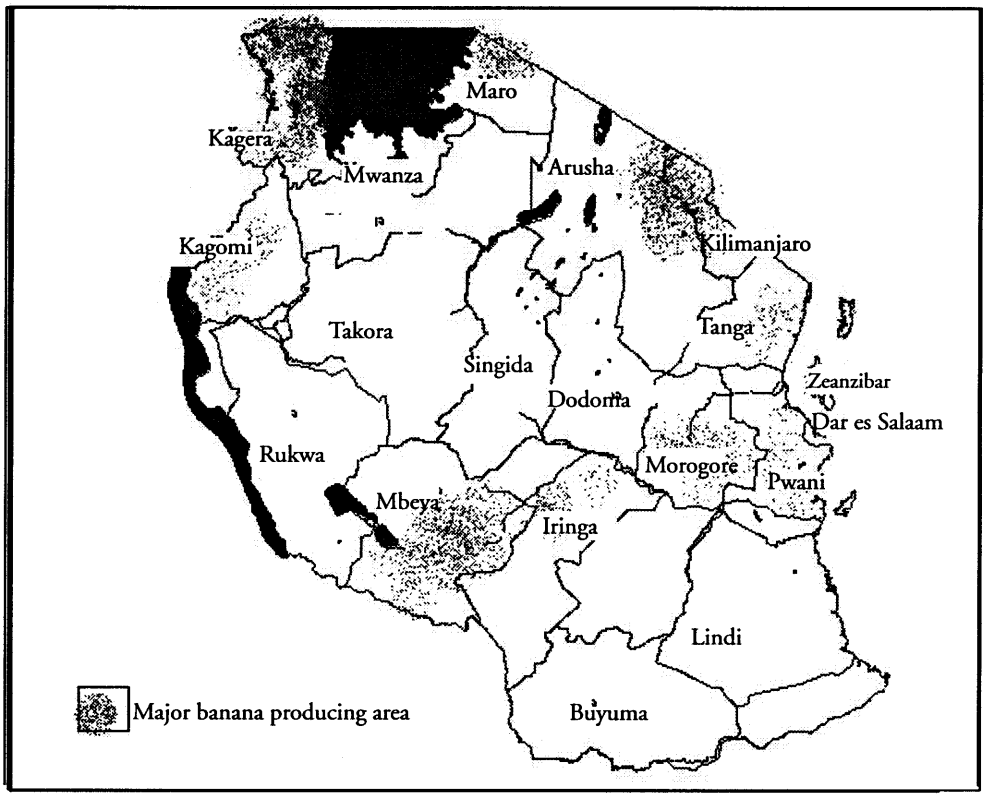
Rough and untrained handling is a constraint in all three countries. This factor is increasingly important when targeting higher value dessert markets where appearance influences final price.

Table 5. Summary of constraints from constituent countries.

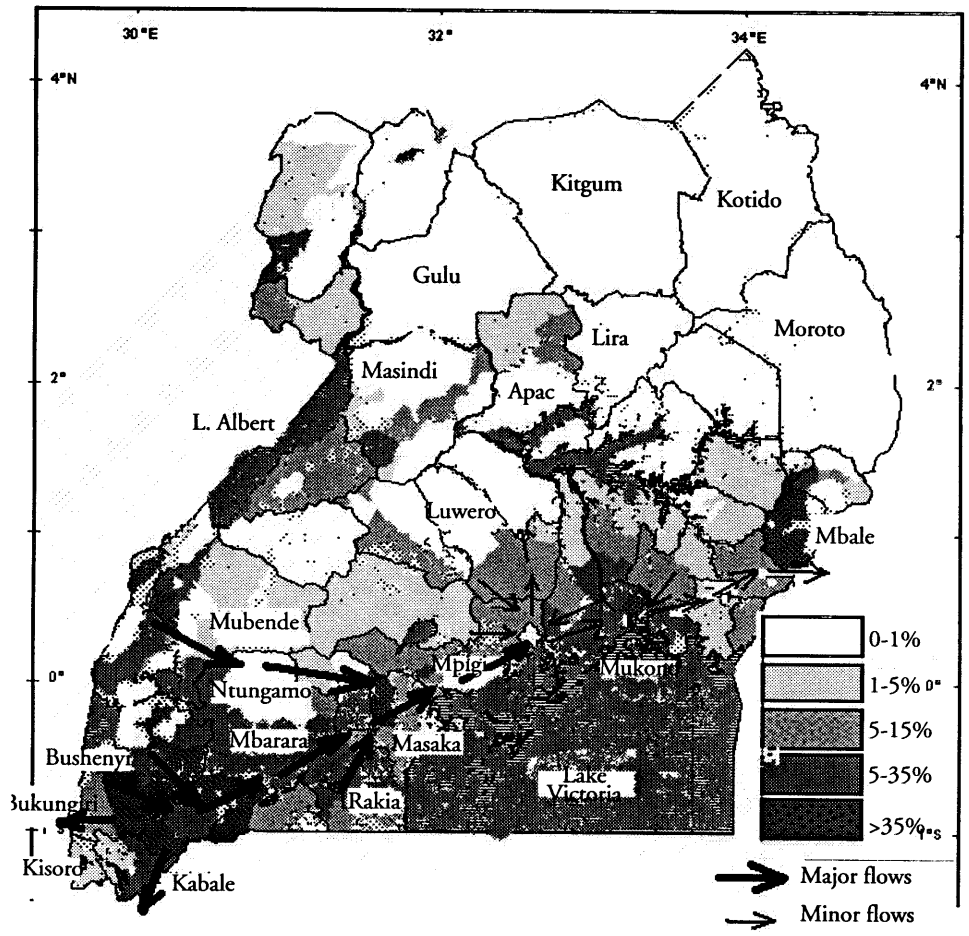
Production constraints	Kenya	Rwanda	Tanzania	Uganda
Weevils	x	x	x	x
Nematodes	x	x	x	x
Fusarium wilt (Panama disease)	x	x	x	x
Declining of soil fertility		x	x	x
Black sigatoka	x		x	x
Poor crop husbandry/agronomy	x	x	x	
Availability of disease free planting materials	x	x		
Cigar end rot	x			
Inadequate research and extension services			x	
Poor distribution system and high prices of farm inputs			x	
Labor		x		
Marketing constraints				
Perishability	x	x	x	x
Poor infrastructure	x	x	x	x
Access to credit/capital	x	x	x	x
Rough and untrained handling	x	x		x
Bulkiness			x	x
Security			x	x
Lack of market information		x	x	
Level of taxation	x		x	
Legal requirements				x
Air freight cost to European markets				x
Continuity of supply (market organization)				x
Certification for organic produce				x
Ripening of Sukali Ndizi				x
Poor marketing facilities			x	
Transportation		x		
Corruption	x			
Rapid deterioration in appearance of banana juice	x			

Regional production and consumption zones

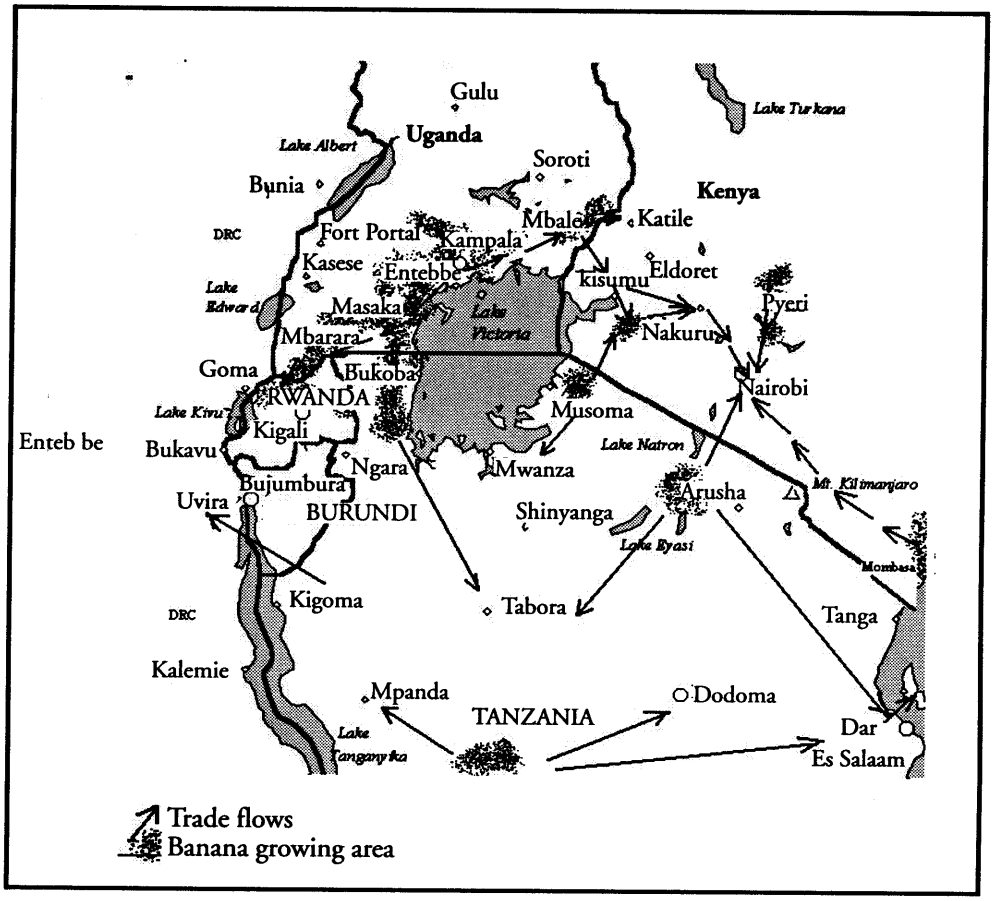
The regional production and trade flows are presented in Maps 1, 2a, and 2b.



Map 1. Regional production area.



Map 2a. Banana production and trade flows in Uganda.



Map 2b. Trade flows and banana growing area in East Africa.

Demand analysis

Size and growth rate of national markets

Market size

Estimates of volumes, based on sample surveys in major markets in each capital city, show that Kampala has the largest urban market followed by Dar es Salaam (Table 6). It was estimated that the markets sampled in Kampala represented only 25% of all *matooke* sales outlets in the city as there are many small markets, kiosks, and hawkers who also sell *matooke* as bunches and fingers. Total Kampala market size may be more likely in the range of 345 000 t per annum. A more detailed study would be required to further define this figure.

Urban market growth rates

A forecast of market size for the main urban markets used in Table 6 is provided in Table 7. This basic forecast uses constant population growth and urbanization rates based on figures from Table 1. Projected urban population growth is shown in Annex 2. The forecast shows significant market growth of over 42 000 t by 2010 for the three major Kampala markets[1].

Table 6. Market size (tonnes) for main markets in capital cities 2002.

	Kenya Nairobi	Rwanda Kigali	Tanzania Dar es Salaam	Uganda Kampala
Cooking	7300	16 000	17 123	75 282
Dessert	5475	6000	17 123	11 041
Total	12 775	22 000	34 246	86 323

Source: Survey data, see national reports for details.

[1]Personal communication. S. Abele, In general, population growth rates and/or urbanization growth rates are not sufficient to forecast consumption. Basic variables determining consumption are prices, prices of competing products (e.g., other starchy crops for cooking banana) and most importantly, income. Consumption changes should be calculated as a product of income growth, income elasticity, and growth of the respective income group. Data should, besides urbanization and population growth rates, cover expected income growth in urban areas and at best also cover price and cross price reactions of the investigated product. Due to the rapid nature of this study, there was not sufficient time to perform this work. Given the potential growth of urban consumption indicated above, particularly in Uganda, it is suggested that a more rigorous attempt to forecast urban consumption be performed.

Table 7. Estimated market size (t) for selected markets in capital cities by 2010.

	Kenya Nairobi	Rwanda Kigali	Tanzania Dar es Salaam	Uganda Kampala
Cooking	11 177	21 946	27 295	112 281
Dessert	8383	8230	27 295	16 467
Total	19 560	30 175	54 591	128 748
Total estimated increase from 2002	6785	8175	20 345	42 425

Source: Survey data.

Table 8. Ugandan exports to Kenya.

	1997	1998	1999	2000	2001	Decline
Cooking	5997	4672	5106	487	116	–98%
Dessert	7994	6670	7105	6825	6521	–18%

Source: ADC Idea Project.

Size and growth rates of regional trade

Uganda to Kenya

Over the past 10 years there has been a significant decline in cooking banana trade between Kenya and Uganda due in some part to increased Kenyan production (Table 8). Trade of dessert varieties has however declined less severely. Monthly data (see country reports) suggests volumes are seasonal and increase towards the end of the year. Trends in the total value of monthly trade in Ugandan Shillings (USh) are rising due to currency value changes, presenting an increasing opportunity for Ugandan dessert banana growers. The Kenyan study suggests that half of the Ugandan bananas exported to Kenya are destined for Nairobi. While this is an attractive market for Ugandan farmers and traders, Technoserve is developing a project in Kenya to supply the Nairobi dessert banana market and this may tighten this market (pers comm. S. Harris 2004).

Uganda to Rwanda

According to the Rwandan market survey 20 000 t of bananas are traded into Rwanda from Uganda annually. This mainly comprises *matooke* cooking bananas bound for Kigali where they supply an estimated 80% of the market. The Rwandan banana market study suggests that Ugandan exports have potential for expansion and that the market is being fuelled by the large number of Rwandan returnees that had been living in Uganda and had adopted *matooke* into their diet.

Uganda to DR Congo

Key informants report small levels of Ugandan imports of roasting banana from Congo. Some observers view the Congo as a potential export market for Ugandan *matooke* if

Congolese purchasing power increases. The tastes of Congolese Bantu related tribes in the Kivu region favor *matooke* as a dietary staple.

Tanzania to Kenya

Trade between Tanzania and Kenya is estimated in the range of 1000 t per year. These are primarily bogoya or a similar dessert banana bound for Nairobi via Kisii, Kericho, and Nakuru or Namanga. Tarime in Tanzania has a competitive advantage over Kagera to supply the Kenyan market due to Kagera's higher transport costs (Table 9).

Tanzania to Zambia, Malawi, and Botswana

Approximately 260 t of bananas are transported to each of the above destinations from Mbeya in Tanzania per week. Production in Mbeya is rising suggesting these regional export markets are growing.

Tanzania to Rwanda and Burundi

Between January 2001 to March 2002, 470 t of bananas were exported to Rwanda and Burundi. Trade was highest during October–December 2001.

Size and growth rates of world markets

The world export market for bananas is increasingly competitive. According to FAO, volumes of banana remained fairly static from 1997 to 2000 whereas market value declined by 15% (Table 10). Reasons for this include the increased levels of cheaper bananas on the world market, based on production from Latin America and the general secular decline in commodity prices.

From the regional reports, Tanzania had no export figures. Rwanda estimates 50 t being sold into the European Union per year. Uganda reported rising exports of cooking banana to supply the Ugandan community in London. In 2001, Uganda exported 832 t of *matooke* from a level of 451 t in 1997 (Fig. 2). The value of 2001 *matooke* exports was approximately US$2 080 000 (at US$2500/t).

Table 9. Annual tonnage of Tanzanian regional trade.

	Kenypa	Zambia	Malawi	Botswana	Rwanda	Burundi
Annual tonnage	1000	260	260	260	235	235

Table 10. World markets for fresh banana and plantain.

	Year			
Bananas and plantains	1997	1998	1999	2000
Exports—Qty (t)	14 878 530	14 338 569	14 479 990	14 654 317
Exports—Val (US$1000)	5 185 447	5 038 131	4 786 861	4 413 357

Source: FAO

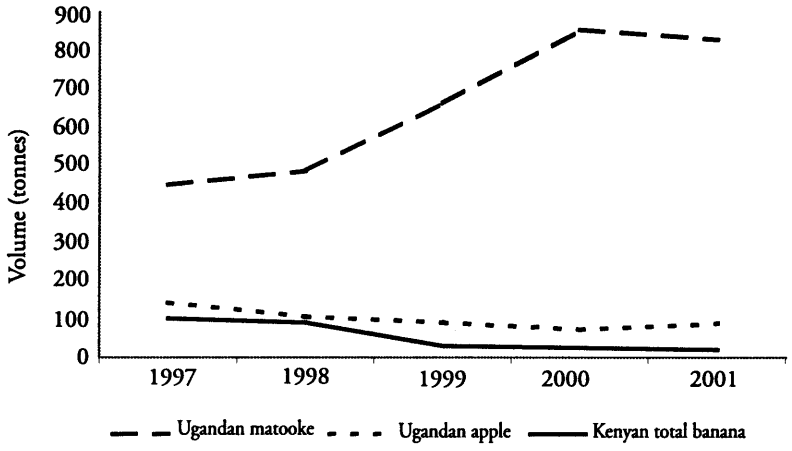


Figure 2. Ugandan and Kenyan international export volume.

Source: Civil aviation figures supplied by IDEA project Uganda, HCDA Statistics, Kenya.

Ugandan exports of the ladies finger banana, "Sukali Ndizi" have not performed so well with volumes shrinking from 144 t in 1997 to 92 t in 2001. The approximate annual value of this volume fall for Sukali Ndizi is US$156 000 (52 t at US$3000/t). Exports of Kenyan dessert bananas have also decreased significantly (Figure 2).

Potential for growth in *matooke* exports are possible if Ugandans living in the UK can be persuaded to increase consumption. Other expatriate ethnic groups such as West Indians are increasing *matooke* consumption and *matooke* is increasingly being transported to other European countries. The Congolese community-based market in Belgium offers such an export market.

Price trends

Nominal and real price comparison

There were no correlations found between price movements across the countries indicating a total lack of regional market integration. Nominal prices for Tanzanian cooking banana were the most volatile (Fig. 3). All countries experienced similar price levels with nominal prices suggesting an upward price trend in Uganda and Tanzania and flat to falling prices in Rwanda and Kenya. When prices were deflated, Uganda also showed a slight decline in *matooke* prices over time. This suggests that the increase in banana nominal prices in Uganda and Tanzania were equal to or less than the rate of inflation.

Figures 3 and 4 compare nominal prices for cooking and dessert bananas from the country reports converted to US$ at exchange rates relevant at the time of fieldwork.

The analysis of dessert banana prices revealed that in all countries, prices fluctuated within a similar range, with Tanzania the only country showing an upward trend in nominal prices. This again suggests real prices as falling in Rwanda and Kenya.

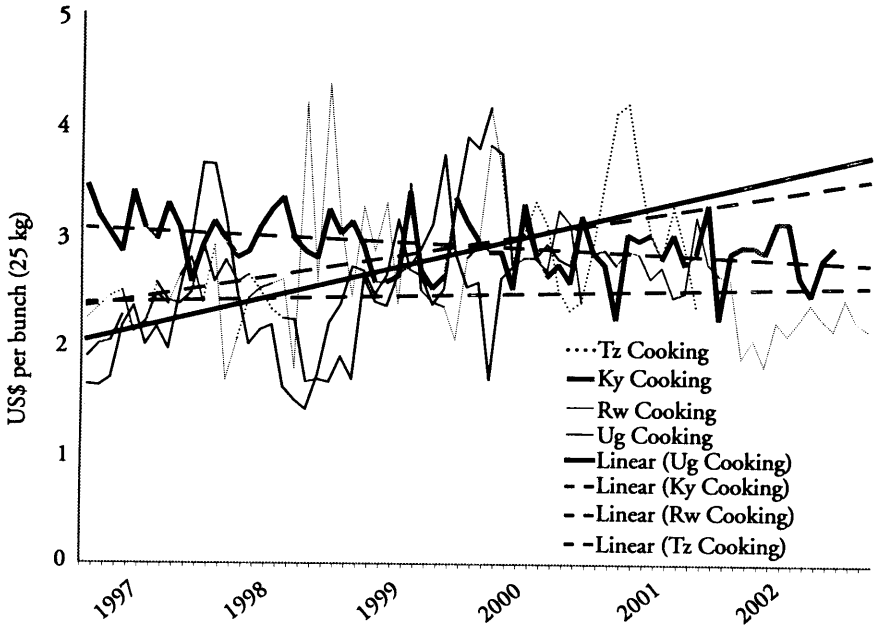


Figure 3. Nominal cooking banana prices.

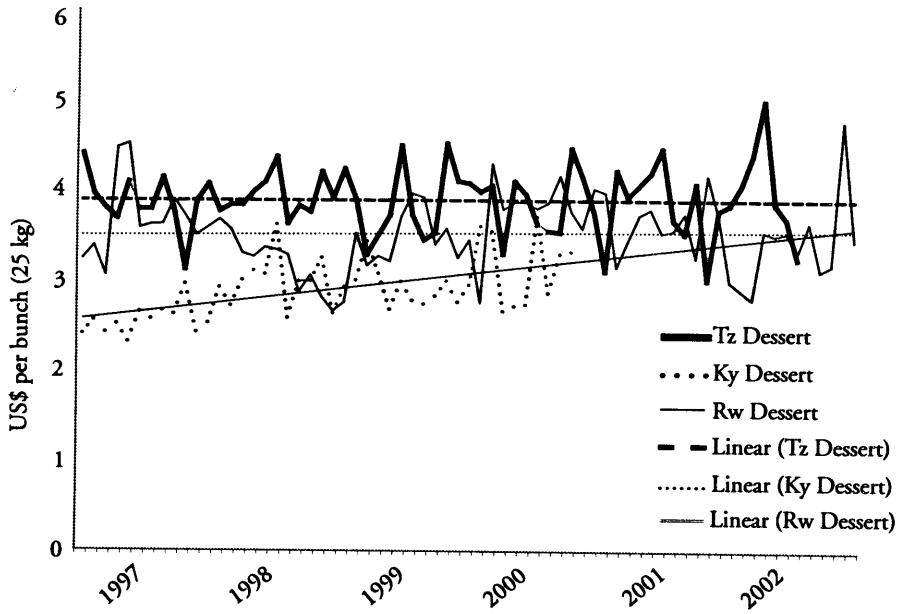


Figure 4. Nominal dessert banana prices.

Table 11. Short- to medium-term price forecasts.

	Kenya		Rwanda		Tanzania		Uganda	
	Cooking	Dessert	Cooking	Dessert	Cooking	Dessert	Cooking	Dessert
Nominal price	Constant	Constant	Constant	Constant	Rising	Rising	Rising	–
Real price	Falling	Falling	Falling	Falling	Constant	Constant	Constant	–

Source: Authors' estimates.

Based on the price analysis a summary of short- to medium-term price forecasts for each country was developed (Table 11).

Falling real prices suggests that the value of the matooke market is declining in general terms. Even when production increases are less than half of population growth, supply exceeds demand. Stable real prices would indicate that demand and supply are either constant or growing equally. The rate of market decline is most apparent in Kenya and Rwanda. Prices in Tanzania and Uganda indicate that supply and demand are more equally balanced.

Seasonal price movements

Significant predictable seasonal price movements exist in Uganda peaking in December with troughs in July to August. Fieldwork in Tanzania also reported seasonal price swings although the timing varies in different parts of the country due to differing climatic zones. Surveys did not find that producers were attempting to gear production towards this price signal and this may represent an opportunity for farmers to time production for peak price periods to obtain more income.

Product segmentation, where demand is growing

The product segmentation is summarized in Tables 12 and 13.

Table 12. Summary of product segments with estimates of market growth potential over the short to medium term.

Potential	Kenya	Rwanda	Tanzania	Uganda
Good	Nairobi market for quality Gros Michel and apple banana	International markets for fresh and organic fruit	Urban markets for cooking and dessert bananas	International markets for fresh and organic fruit
	Tetra-packed juices using banana puree	International markets for naturally dried bananas		International markets for *matooke*
	Tissue culture provision of disease free planning material	Local market for banana beer and juice		International markets for naturally and organic dried bananas
	Nairobi and western Kenyan markets for cooking bananas	Local market for dessert banana		Rwandan market for *matooke*
	Ugandan market for cooking bananas during festival periods	Local market for matooke		Kenyan market for *bogoya* (Gros Michel)
				Local gin, sold domestically and also potential for niche tourist market
Moderate	Tourist market for quality dessert bananas	International market for fiber products	Banana wines, sold into the local and tourist markets	Local market for *matooke*
		Local market for fiber and handicraft products	Banana beers (*rubisi*)	Pancakes (*kabalagala*)

Table 12. Summary of product segments with estimates of market growth potential over the short to medium term. (contd)

Potential	Kenya	Rwanda	Tanzania	Uganda
		Local market for plantain	Dessert varieties in rural areas	Banana paper
			Kenyan market for matooke and dessert bananas	Local roasting market
			Zambian market for matooke bananas	
Low	Fried banana crisps	International markets for cooking banana	Cooking bananas in rural areas	Local juice
	On-farm use of banana peelings and vegetative waste	Banana flour	Exports to Botswana	Banana beer
	Handicraft and art using banana fiber		Exports to Congo	Banana flavorings/essences
	Banana flavoring		Roasting bananas	Cosmetics, i.e., use in body shop products
			Banana spirit/gin	Replacement flour in bakery products
			Replacement flour in bakery products.	Banana flour used in baby/weaning foods
				Banana pulp
				Prepeeled matooke

Table 13. Principal buyers, chief competitors, and market requirements.

Market opportunity	Principal buyers	Chief competitors	Market requirements
Urban markets for cooking bananas	Women buying the dietary staple for home consumption.	Other dietary staple foods that vary depending on ethnic preference and local cultural norms, i.e., maize, cassava, and beans.	• Large uniform finger size • Round finger shape • Green color • Bunch that stays green for a long period after harvest • Low levels of finger damage
Urban markets for dessert bananas	Middle to high-income people consuming bananas as a snack. Hotels, restaurants	Other fresh fruit Snack products such as crisps and sweets	• Low levels of fruit injuries • Large size and uniform shape of fingers • Ripened so ready to eat at point of final purchase • Sweet taste • Gros Michel preferred
International markets for fresh and organic fruit	European supermarkets such as Waitrose, potential to supply wholesale markets and catering markets.	Least developed countries that come under the Cotonou agreements "Everything but Arms" measure, i.e., Ghana. Other developing countries and developed countries situated closer to the EU, i.e., Egypt and Israel.	• Clean, undamaged skin • Uniform size, shape, and color • Uniform ripening arriving at destination in early stages of ripening • Ripening should be slow process with uniform color changes with the yellow color slowly deepening. • No blotching or rapid rotting

Table 13. Principal buyers, chief competitors, and market requirements. (contd)

Market opportunity	Principal buyers	Chief competitors	Market requirements
International export markets for naturally dried bananas	Tropical wholefoods Swiss and German markets linked to supermarkets and producers of 'health" cereals Fair-trade markets	Other LDC producers with production systems using low levels of inorganic inputs	• Uniform appearance with a light yellow color minimal browning • Soft, semidried texture • Organic, natural products, ethically sourced
International export markets for matooke	Expatriate Ugandans in the UK	None	• Large uniform finger size • Green color • Bunch that stays green for a longer period after harvest • Low levels of finger damage • Taste, the variety *kibuzi* is popular in UK markets
Rwandan local market for banana beer and juice	Formal producers (i.e., COVIBAR) Informal beer and juice processors	Bottled, cereal-based beers and fruit juices.	
Ugandan market for locally brewed gin *waragi*	Informal brewers selling gin to low-income males in urban areas	Other forms of low cost alcohol and bottled beers	• High alcohol content • Low cost
Tetra-packed juices using banana puree	Large-scale juice producers such as Del Monte	European and south African puree producers	• Regular dependable supply • Clean and hygienic method of supply
Tissue culture provision of disease free planning material	Commercial farmers	"Home grown" planting material	• Healthy plant appearance • Uniform plants • Rapid growth upon transplanting

Country competitive advantage

The competitive advantage for selected products is summarized in Table 14.

Table 14. Competitive advantage for selected products.

Market opportunity	Country with competitive advantage	Reasoning
		Transport costs rise as distances increase. Border taxes and delays.
Urban markets for cooking and dessert bananas	That in which the urban market is situated Fast growing centers	Exceptions are: i. Ugandan cooking banana supplies to Rwanda where Ugandan producers have a cost advantage and cultural ties exist between producers and market chain operatives. ii. Ugandan Gros Michel supplying Kenyan markets where Uganda has lower production costs for a high quality product.
International markets for fresh and organic fruit	Uganda	Largely organic production Suitable airport for fresh export close to production areas Currently active exporters
International export markets for naturally dried bananas	Uganda	Largely organic production Suitable airport for fresh export close to production area Currently active exporters

Table 14. Competitive advantage for selected products. (contd)

Market opportunity	Country with competitive advantage	Reasoning
International export markets for *matooke*	Uganda	Major end buyers are expatriate Ugandans Suitable airport for fresh export
Tetra-packed juices using banana puree	Kenya	Developed manufacturing sector providing suitable human resources Production relatively close to buyer Tetra pack patent may be running out which would provide a new opportunity to use this technology locally at lower cost
Tissue culture provision of disease free planning material	Kenya	Advantage in human resource capacity and existing facilities
Rwandan local market for banana beer and juice	Rwanda	Transport costs rise as distances increase Cost effective local supply of raw materials
Ugandan market for locally brewed gin *waragi*	Uganda	Transport costs rise as distances increase. Cost effective local supply of raw materials

Supply analysis

General picture of supply chain

The following section focuses on the similarities that exist in the market chain of study countries (Fig.5).

Farmers

The majority of producers in all countries are small scale, selling bunches of bananas either to bicycle traders or, in the case of Rwanda, to "rural assemblers". If the farm is conveniently situated next to a road, sales can be made to passing vehicles including those of brokers or wholesalers. Price negotiation is usually performed before the bunch is cut from the plant giving the producer some power in determining price. Clearly, most farmers have limited bargaining power as bunches cannot be retained for any significant period of time once they approach maturity. Ugandan traders mentioned some producers holding back supply for two to three weeks at times of rising prices, e.g., linked to Christmas and Easter. A general picture was of producers having to sell bunches to meet necessary household expenditure.

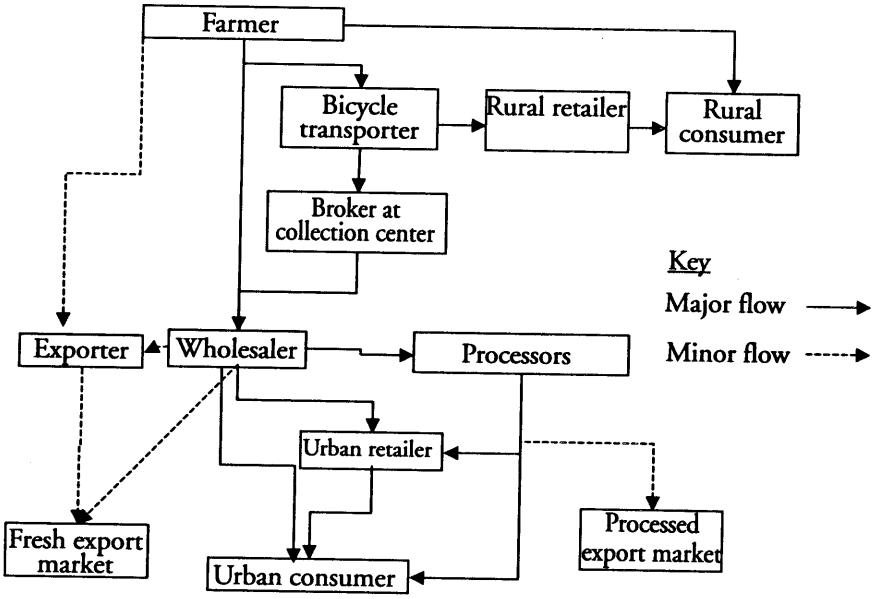


Figure 5. Generalized overview of the market supply chain.

Negotiation is based on finger and bunch size, banana type, and variety. Ugandan farmers are aware of consumer preferences for different varieties. However, Tanzanian producers, especially those more isolated, are unaware of consumer preferences. Farmers were found to receive price information from going to collection centers, through the radio, or by interaction with other traders.

Bicycle transporters

Across the region, bicycle transporters play an important role in buying bunches from dispersed and remote farmer plots and selling produce onto brokers at collection centers or traders in towns. Many bicycle transporters supply each collection center. Competition exists between these intermediaries and barriers to entry appear low.

Transporters have some control over price in negotiations with farmers especially if other traders do not visit that farm. However, at the collection center they have less power as they cannot store bananas or easily take them elsewhere. Large bunches are preferred with one bicycle able to carry up to seven bunches depending on bunch size.

Brokers

A small number of brokers usually operate at collection centers or rural markets where they or their representatives purchase sufficient bunches to fill rented trucks destined for urban centers. Brokers are also the main organizers and operators of regional trade. In Uganda, bunches are graded according to size and type. Cooking banana bunches with small fingers have the fingers removed and put in sacks. These sacks allow more small bananas to be carried on trucks.

Some brokers have repeated delivery schedules whereby regular numbers of bunches are delivered to different urban-based wholesalers at different locations. In this case, the broker will rent the lorry and organize loading. Wholesalers can contact brokers to adjust amounts using fixed lines or mobile phones or truck drivers to deliver messages.

Brokers are in regular contact with farmers who visit collection centers, bicycle transporters, truck drivers, and wholesalers. They have good price information from urban centers via interaction with other traders and the radio. Mobile phones have improved broker communication between urban markets and rural collection points.

The small number of brokers and the market information available to them give brokers some ability to influence price. This linkage point also provides an ideal opportunity for collusion and market supply control. Some potential producers mentioned this problem in informal interviews and this maybe a considerable barrier to entry for newcomers into this market. Other barriers to entry for people wanting to enter this role include the capital required to rent and fill a truck. For Uganda this is estimated at approximately US$850 for a ten-tonne truck. Tanzanian trucks are usually half this size capable of carrying 300 bunches. A disincentive for brokers is that having to carry relatively large amounts of cash makes them a target for thieves. Other disincentives include poor road conditions and corruption at checkpoints and border crossings and the need to pay petty taxation to police and market officials.

Informal collusion between brokers increases their market power allowing them to maintain their high gross and net margins. Collusion and informal cartels between brokers can also restrict new entrants wishing to transport bananas.

Wholesaler or commission agent in Rwanda

Urban-based wholesalers purchase bananas from broker lorries and sell bunches to urban retailers or directly to consumers. Wholesalers may engage in vertical integration by renting trucks to collect bananas from production areas to capture brokers margins. This occurs at times of high urban prices when wholesalers and other traders will transport bananas. These activities should be encouraged as a way to reduce broker margins, increasing prices to farmers, and reducing final consumer price.

Trucks usually arrive at urban centers in the early hours of the morning to unload and distribute bunches to retailers. Wholesalers may extend credit to retailers for a day allowing them time for sale.

A wide variation exists in the number of wholesalers who operate in urban markets. Wholesalers do not exist in some markets such as the retail market in Nairobi where transporters sell directly to retailers. In Rwanda traders pass the responsibility for selling bananas to commission agents who receive a fee rather than directly trading. They are valued for their knowledge of local market conditions when selling to retailers.

Urban retailer

Relatively large numbers of specialized banana retailers exist in Uganda. They grade bananas by type, variety, and size. Tanzanian retailers tend to sell a range of products. In Uganda large cooking banana bunches with big fingers are generally sold to wealthier people who have their own transport. Small ***matooke*** fingers are arranged in piles and sold in smaller quantities to people who use public transport. In all countries ***bogoya*** and Sukali Ndizi are sold in hands usually by specialized traders.

Matooke retailers buy from wholesalers in the morning at a price largely determined by levels of supply and demand. The final consumer price is negotiable within a fairly tight range. Consumer prices will rise through the day if demand is strong or fall if few buyers are present in the market. Storage of ***matooke*** is rare in Uganda with markets usually clearing stocks by the end of the trading day. Tanzania and Rwanda report some storage and eventual wastage. Storage of dessert varieties is common in all countries with sale of overripe fruit to processors (pancake makers in Uganda and for fruit salads in Kenya).

Market retailers were found to have their own associations in Uganda whereas in other countries these organizations rarely exist. No evidence of price collusion between retailers was found, although in most markets all retailers sell the same produce at the same price in long lines of market stalls. Some retailers access credit from microfinance institutions. Barriers to entry include a local council letter of approval, market authority registration, and space in the market place.

Exporters

In Uganda regional exports to Kenya, Rwanda, Tanzania or DR Congo are performed by brokers, wholesalers, or producers/bicycle transporters living close to borders.

For European markets, it is estimated that 10 to 15 trading organizations in Uganda arrange *matooke* and *Sukali Ndizi* exports. These organizations purchase in urban or rural markets or receive deliveries by farmers or traders to their premises. Exporters vary in their levels of sorting, grading, and packaging of produce.

Three main exporting organizations exist for organic bananas. One of these exporters deals in fresh *Sukali Ndizi* and all three companies export solar dried *Sukali Ndizi* and/or *bogoya*. These bananas may be grown by the exporter or purchased from outgrowers whom the exporter registers as organic producers. These exporters grade, pack, and label produce that is flown to Europe.

Processors

Alcoholic beverages are the usual end product of banana processing. Beer production is a significant activity in Rwanda with rural brewing being dominant and processors having permanent processing sites. Beer production also occurs in Western Uganda. Distillation of banana beers into a gin called *waragi* is a significant product in Kampala. A factory-based banana wine producer is based in Arusha, Northern Tanzania. As an exception to the production of alcohol, the main processors in Kenya are crisp makers, dried fruit producers, and people buying overripe bananas to make fruit salads.

Summary of the market chain

Market chains appear to be similar in each of the countries studied. Farmers are generally price takers. Most market power is in the hands of brokers who have the best market information due to their position in the supply chain. Mobile phones have improved the flow of market information in the collection center to the urban market section of the chain. Informal collusion is suggested between Ugandan brokers. This collusion can represent a barrier to entry for potential entrants into this role. Other barriers to entry for brokers, wholesalers, and retailers are finance, letters of permission, and trading space at markets. The only examples of associations found were those for retailers in some Ugandan markets.

Gross margins for main actors in the supply chain

Gross margin amounts and percentages for cooking bananas and Gros Michel for constituent countries are shown in Tables 15 and 16. Gross margins from the country studies have been converted to US dollars at exchange rates current at the time of fieldwork.

Gross margins per bunch are largest for brokers. These people can make significant returns considering the volumes they deal in per day. Brokers in Rwanda claim that profitability is quite modest once numerous variable costs have been deducted. In addition, brokers claim net returns should be put in the context of the higher risk they face, especially in terms of uncertain market prices. However, even after variable costs, it was estimated that one lorry carrying three hundred bunches can achieve daily returns of between US$120

Table 15. Gross margins for cooking bananas[2].

	Cooking banana							
	Kenya		Rwanda		Tanzania		Uganda	
	US$/ bunch	%	US$/ bunch	%	US$/ bunch	%	US$/ bunch	%
Farmer (selling price)	1.92		0.43		0.32		0.42	
Bicycle transporter	n/a		0.14	24	0.32	50	0.42	50
Broker/trader	0.96	33	1.24	69	3.51	78	0.83	50
Wholesaler	0.45	13	n/a	n/a	n/a	n/a	0.42	20
Urban retailer	1.15	24	0.38	16	1.60	33	0.42	17

Source: Survey data
Note: % is of selling price

Table 16. Gross margins for Gros Michel.

	Gros Michel					
	Kenya		Tanzania		Uganda	
	US$/ bunch	%	US$/ bunch	%	US$/ bunch	%
Farmer (selling price)	Purchased in Uganda	1.28		1.81		
Bicycle transporter	Purchased in Uganda	n/a		0.42	19	
Broker/trader	3.21	56	4.04	76	1.11	33
Wholesaler	Trader sells direct to retailer		n/a		0.56	14
Urban retailer	1.28	18	n/a		1.94	33

Source: Survey data
Note: % is of selling price

(Rwanda) and US$600 (Tanzania) per load. Market price uncertainty is also reduced where brokers use mobile phones, i.e., in countries such as Uganda where mobile phones are widely used. Brokers can be responsible for more than one lorry further increasing their profit potential. The exceptionally high returns to brokers shown in Tanzania partly reflect brokers added involvement in a wholesale role and the greater distances involved in Tanzanian transportation. These margins are considered to be comparatively excessive with further exploration suggested to discover more fully the reasons for such large returns.

Wholesalers typically sell between 40 and 80 bunches and a retailer between 5 and 10 bunches per day. Earnings for these actors are therefore significantly above average wages in the study countries, typically US$1 per day.

[2]Caveat = This is a first attempt to interpret national studies in a regional document. While overall the figures provide a reasonable insight, the readers should allow a level of error in the individual figures for Tanzanian broker margins and the Kenyan farmer selling price. These two figures may need to be revisited.

The Kenyan farm selling price is significantly higher than other counters. It is suggested that this reflects a local market point of sale rather than a farm gate price.

Margins are generally higher for Gros Michel due to the increased risk of wastage through damage in transport or fruit deterioration. Brokers transporting Gros Michel from Uganda to Kenya also make healthy margins.

Results from the analysis suggest that brokers in all countries can make attractive daily net profit margins depending on volumes traded. Finding ways to encourage more actors to enter into this role should go some way to increasing competition and eroding excessive margins. Discouraging cartel type collusion between existing brokers and ensuring credit agencies can operate in these markets to provide necessary working capital are ways of lowering barriers to new entrants. Improving infrastructure and security reduce disincentives and potential costs and risk premiums to brokers. Improving these factors will help towards improving prices to farmers and reducing costs to consumers. Encouraging farmers (or their family members) to perform the initial transport role, as happens in Kenya, would help producers capture additional margins and give them improved market information.

Major findings

Overview of market situation

	Kenya	Rwanda	Tanzania	Uganda
Annual supply growth	1.3 %	–	0.30 %	1.06 %
Annual urban demand growth	5.47%	4.03%	6.00%	5.12%
Real banana prices	Falling	Falling	Constant	Constant
Overview	Supply growth greater than demand, but lower than population growth. Suggests that consumers are seeking other higher income elasticity staples.	Supply growth greater than demand growth.	Some areas of overproduction (i.e., Kagera). General overall supply growth currently equal to demand growth.	Supply growth currently equal to demand growth.
	Some evidence of import substitution for cooking bananas.	Steady consumption shift to cities.	Current demand shift to cities with strong potential for continuation of this trend into the long term.	Significant short- to medium-term consumption growth in cities especially Kampala.
	Relatively small urban banana markets. Attractive quality dessert banana markets in Nairobi and Mombassa. Potential not favorable for long-term growth in urban consumption of cooking bananas, but increasing opportunities for dessert banana markets.			

Note: Supply based on estimated annual production growth rates.
Demand based on population and urbanization growth rates.

Major markets identified with countries having competitive advantage to supply those markets

Market	Country with competitive advantage
Urban markets for cooking and dessert bananas	All countries with large urban market Ugandan cooking bananas to Rwanda and Ugandan Gros Michel to Kenya
International markets for fresh and organic fruit	Uganda
International export markets for naturally dried bananas	Uganda
International export markets for matooke	Uganda
Tetra-packed juices using banana puree	Kenya
Tissue culture provision of disease free planning material	Kenya
Rwandan local market for banana beer and juice	Rwanda
Natural fiber handicrafts for regional tourist market and potential niche export market	Rwanda
Ugandan market for locally brewed gin *waragi*	Uganda

Investment opportunities for research by market

Domestic markets

The priority areas for research and development to address regionally strategic research and development options in the banana sector include innovation in technology, marketing, and policy recommendations. These include:

- Develop more sustainable production systems in countries where banana is a dietary staple and significantly contributes to food security.
- Increase efficiency of the banana marketing chain from rural production areas to urban consumption zones.
- Review levels of collusion amongst brokers and urban wholesalers with a view to identifying ways to attract more entrants into the market.
- Assist farmers in diversifying product range made from banana, vis-à-vis the larger number of banana products marketed in south and southeast Asia.

Sustainable banana production systems, soil fertility, and pests and diseases

Cooking bananas are an important food security crop in Rwanda, Uganda, northern and western Tanzania, and southwestern Kenya. Despite some indications that production growth is declining relative to population growth, the positive figures for annual growth still suggest significant increases in future demand. Addressing soil fertility and pest and disease issues are therefore important aspects to ensure sustainable, long-term production. Interventions are as follows.

Agronomy/soil fertility

- Establish what changes in soil fertility status are being caused by banana production and what production location shifts are continuing to occur, relative to improvements in roads.
- Establish why farmers do not manage soils in a sustainable manner through recognized practices of mulching, manuring, crop rotation, and improved livestock integration with design of appropriate responses.

Who National, regional, and international research, and extension providers

How

i. Further consultation with research and relevant stakeholders to access available soil fertility data.

Depending on the quality of existing data:

ii. Establishment of sites to measure changes in soil fertility levels caused by matooke production.

iii. Participatory research with farmers to better understand their choice of soil management techniques with subsequent recommendations for maintaining soil fertility levels.

iv. Review of international production methods for small-scale farmers in key banana growing areas such as Australia and the Caribbean.

Improving market efficiency through market information

Due to the perishable nature of bananas, all actors in the market chain would benefit from greater information flow in terms of where the product is currently available, prices, and who would like to buy at what volume. Modern mobile phone technology with SMS features is an increasingly available information platform that should be used to convey these information requirements.

Who FoodNet, FM radio partners in market information provision, and trade associations.

How Inclusion of domestic price information using existing channels such as in newspaper and radio coverage. Exploration to develop an information brokering trading platform through the SMS portal linked to an online database for traders and producers.

Increased bargaining and enterprise capacity of farmers

In order for farmers to be in a position to play a more effective role in gaining a higher percentage of the final market price, they need to increase the economies of scale in terms of production areas but also in terms of volumes of trade. Farmers should use local collective marketing groups to aggregate bunches more effectively, and also gain better market signals in regard to quality issues.

Who NAADS and market-oriented NGOs.

How Provide training to producers and bicycle traders in volumes of sale, market linkage, and grades.

Farmer production response to annual price spikes

Development of a farmer production response to predictable annual price variation is a way to increase farm incomes, improve consistency in annual market volumes, and reduce consumer price peaks.

Who NAADS, relevant international (IITA/INIBAP), regional (BARNESA), and national research programs (NARO for Uganda and individual country equivalents), country extension services, farmers, and relevant NGOs.

How Participatory research with producers, research, and extension into controlling the timing of sucker development and the timing of fruiting is suggested to enable farmers to produce for periods of high demand.

Potential study areas include timing of planting new gardens, timing desuckering to control new growth, and use of appropriate irrigation systems to control water stress that stimulates fruiting. Research should include a farmer-based, cost–benefit analysis to ensure interventions increase farmer profitability. Potential for tissue culture provision of planting material should be included in cost–benefit analysis.

Pests and diseases

Weevils

Continued support to extension and delivery of information to encourage cultural control including:

- Use of clean healthy planting material (i.e., consider tissue culture).
- Paring of corms at planting.
- Destruction of postharvest residues.
- Trapping of adult weevils.
- Good crop husbandry such as weeding, desuckering, pruning, manuring, and mulching to produce vigorous plants.

Nematodes

Continued support of extension and delivery of information to encourage cultural control including:

- Crop rotation.
- Use of clean planting material (removal of roots and outer layer of the corm).
- Soil amendments through weeding and manuring.
- Continued research into and promotion of resistant cultivars.

Black sigatoka

- Continued development of resistant cultivars.
- Support to extension services encouraging good crop husbandry that is seen to lead to a more vigorous plant better able to outgrow attack.

  Who National, regional, and international research, and extension providers.

  How Continuation and enhancement of existing initiatives with greater agribusiness focus.

Addressing dessert bananas susceptibility to Fusarium Wilt

Threat of *Fusarium* wilt attack is a significant disincentive to investment in Gros Michel and *Sukali Ndizi.*

Required interventions to remove this disincentive include:

- Development of host plant resistance.
- Improved cultural practices include the use of pathogen-free planting material with the further development and widespread implementation of appropriate management strategies.

Who relevant international (IITA/INIBAP), regional (BARNESA), and national research programs (NARO for Uganda and individual country equivalents).

How continuation and enhancement of existing activities.

Dessert banana variety development (Gros Michel replacement)

Market potential exists for a dessert variety with a taste similar to Gros Michel but without Gros Michel's susceptibility to pests and disease. Continued varietal development is suggested to improve upon existing varieties such as Cavendish. Due to the intractable nature of bananas in breeding options, this challenge would probably be best addressed

through transformation techniques. Alternative and lower cost options include introduction of FHIA varieties and mass dissemination via tissue culture.

Who KU Leuven, international private sector GM companies, (IITA/INIBAP), regional (BARNESA), and national research programs (NARO for Uganda and individual country equivalents).

How Project development to re-introduce a *Fusarium* race IV resistant Gros Michel to compete with Cavendish.

Tissue culture provision of disease free planning material build on Kenyan experience

Tissue culture in Kenya is successful with Jomo Kenyatta University currently selling disease-free banana seedlings for US$0.80. Demand is said to exceed supply especially in the wet season when planting is done. Information should be provided to regional commercial growers covering costs and benefits of these seedlings. If sufficient demand evolves development of more local supplies should be considered.

Who Jomo Kenyatta University, regional extension and information providers, NGOs, and private sector agricultural input distributors.

How Seedling producers need to be linked with potential customers. To do this extension providers, relevant NGOs, and the private sector organizations involved in supplying farmers should have information that can be provided to potential buyers. Buyers must also be able to contact seedling producers or distributors, something that may need facilitation. Sufficient supplies will need to be insured as production at Jomo Kenyatta University is currently limited.

Regional markets

Provision of regional market price information

Brokers and traders involved in regional banana marketing require regional price information to allow them to better tailor supplies to regional market opportunities. Other market chain participants will also be in a better bargaining position if they are aware of regional prices.

Who FoodNet and regional partners in market information provision.

How Inclusion of regional price information using existing channels such as newspaper and radio coverage. Exploration of a text message service to traders is suggested.

Product diversification–increasing the number and quality of products made from banana in eastern Africa

Who BARNESA in collaboration with Rockefeller and other commercially oriented NGOs.

How Identifying new market opportunities for fresh, processed, and handicraft products in the tourist and export markets. Areas or products of interest include juice products, crisps, snack foods, dried fruits, freeze-dried fruits, soaps, fiber products, and paper. The strategy is to supply national and regional tourist markets as a testing bed for export options.

Establishing a risk investment fund for commercialization development

Who BARNESA in collaboration with Rockefeller and other commercially oriented NGOs.

How Link business partners with research within a risk fund arrangement to exploit identified markets.

International markets

Improving the appearance of naturally dried banana through improved drying techniques and plant breeding for appearance characteristics

Who International and national research with private sector exporters and importers/food retailers in end markets.

How Banana research programs based in producing countries need to engage with private sector organizations and NGOs involved in dried fruit export/import to explore the various ways of improving the appearance of dried bananas. It is suggested this involves importers who will know end-consumer requirements. Meetings should seek to establishment best options to take forward, i.e., identification of joint experiments.

Improving the appearance of product packaging to compete in snack and sweet market outlets

Who International and national research with private sector exporters/importers/food retailers in end markets.

How Again banana research programs need to take the initiative in contacting private sector organizations/NGOs and initiating joint research with potential market pilot schemes or trials in alternative packaging.

Control of Sukali Ndizi fruit ripening after harvest by exploring postharvest packaging and temperature control/replacing this variety with an exotic

Who International and national research with private sector exporters.

How Follow up needs to be performed by country banana research programs to contact private sector organizations involved in fresh banana exports. Meetings should explore possibilities for joint research.

Improving and scaling up fruit handling throughout the supply chain by capacity building approaches with fruit handlers—especially for fresh export markets

Who International and national research with extension providers and private sector exporters.

How Initial identification of current participants in the export market chain by extension providers and private sector exporters. Focusing of training requirements with participants followed by relevant delivery by an appropriate training provider.

Bibilography

Banana production manual: A guide to successful banana production in Uganda. NARO, ADC-IDEA Project. 2000

Central Intelligence Agency World Fact book. 2002 http://www.cia.gov/cia/publications/factbook/geos/et.html

Craenen, K., R. Ortiz, E.B. Karamura, and D.R. Vuylsteke. 2000. Proceedings of the First International Conference on Banana and Plantain for Africa. International Society for Horticultural Science. 2000, Kampala, Uganda.

Clay, Daniel C. 1996. Fighting an uphill battle: population pressure and declining land productivity in Rwanda. MSU International Development Working Paper No. 58, Department of Economics. USA.

Dijkstra, T. 2001. Export diversification in Uganda: developments in non-traditional agricultural exports. African Studies Center. Working Paper 47.

Embrechts, J., J.A. Bananuka, Y. Couvreur, F. Bagamba, and D. Lallemand. 1996. Banana sub-sector review. Service Contract NoSC/26/96 Final Report, Republic of Uganda/ European Union.

Friends of the Earth International. What's wrong with the World Trade System. January 2001.

Gilberto, M. 1995. A primer on marketing channels and margins. *In* Prices products and people: analysing agricultural markets in developing countries, edited by G.J. Scott. Lynne Rienner Publishers, Inc., USA.

Agriculture in Uganda Volume II Crops. 2001. Edited by J.K. Mukiibi, Fountain Publishers/CTA/NARO.

Gold, C.S. and B. Gemmill. 1991. Biological and integrated control of highland banana and plantain pests and disease. Proceedings of a Research Coordination Meeting. International Institute of Tropical Agriculture (IITA), Nigeria.

Gold, C.S., E.B. Karamura, A. Kiggundu, F. Bagamba, and A.M.K. Abera. 1999. Monograph on geographic shifts in highland cooking banana (*Musa*, group AAA-EA) production in Uganda. African Crop Science Journal 7(3).

Gold, C.S., A. Kiggundu, A.M.K. Abera, and D. Karamura. 2002. Selection criteria of *Musa* cultivars through a farmer participatory appraisal survey in Uganda. Experimental Agriculture 38.

Gold, C.S., A. Kiggundu, A.M.K. Abera, and D. Karamura. 2002. Diversity, distribution and farmer preference of *Musa* cultivars in Uganda. Experimental Agriculture 38.

Holtzman, J.S. et al.1995 Using rapid appraisal to examine course grain processing and utilisation in Mali. *In* Prices products and people: analysing agricultural markets in developing countries, edited by G.J. Scott. Lynne Rienner Publishers, Inc.,USA.

IDA and IMF. 2000. Preliminary document on the enhanced initiative for heavily indebted poor countries—Rwanda.

ISAAA, F.M. Wambugu, and R.M. Kiome. 2001. The benefits of biotechnology for small-scale banana producers in Kenya. International Service for the Acquisition of Agri-biotechnology Applications (ISAAA), Ithaca, New York, USA.

ISNAR, 1997. Newsletter No. 32.

Kangire, A., E.B. Karamura, C.S. Gold, and M.A. Rutherford. 1996. Fusarium wilt of banana in Uganda, with special emphasis on wilt-like symptoms observed on East African highland cooking cultivars. *In* Proceedings of the First international conference on banana and plantain for Africa, edited by K. Craenen, R. Ortiz, E.B. Karamura, and D. Vuylsteke. First International Conference on Banana and Plantain for Africa, Kampala, Uganda. International Society for Horticultural Science, Leuven, Belgium.

Kangire, A. and M. Rutherford. 2001. Wilt-like disorders of Bananas in Uganda. *Musa* Disease Fact sheet No 10. INIBAP, France.

KARI, 1996. Annual Report. Kenya Agricultural Research Institute.

KARI, 1999. Annual Report. Kenya Agricultural Research Institute.

KARI, 2000. Annual Report. Kenya Agricultural Research Institute.

Kelly, V., E. Mpyisi, E. Shingiro, and J.B. Nyarwaya. 2001. Agricultural intensification in Rwanda: an elusive goal. Fertilizer use and conservation investments. FSRP/DSA Policy Brief. MINAGRI and USAID, Kigali, Rwanda.

Limbu F.L. 2002. Agricultural technology, economic viability and poverty alleviation in Tanzania. Dar es Salaam University Press Limited, Dar es Salaam, Tanzania.

Makerere University Banana-Based Cropping Systems Research Project. No Ref 91056. 1994. Final Report Phase II.

Mbwana A.S.S., S.R.B. Mgenzi, B. de steenhuijsen Piters, and F.P. Baijukya, 1997. Banana recommendations and research needs in Kagera Region. Field Note No. 70. Lake Zone Agricultural Research and Training Institute. ARI Maruku, Bukoba, Tanzania.

Mgenzi S.R.B, B. de Steenhuijen Piters, and P.A. Rwezaura. 1997. Banana seasonality in Karagwe District: the problem of perception . ARI Maruku/KCDP report.

MINECOFI/DS. 2001. Rwanda in figures.

MINECOFIN/DS. 2001. Rwanda development indicators.

MINECOFIN/DS. 2002. National poverty reduction program: a profile of poverty in Rwanda.

MoALD&M. 1993. Annual Report. Ministry of Agriculture, Livestock Development & Marketing. District Animal Production Department, Meru, Kenya.

MoALD&M. 2000. Annual Report. Ministry of Agriculture, Livestock Development & Marketing. District Annual Report, Kisii, Kenya.

MoALD&M. 2001. Annual Report Kenya. Ministry of Agriculture, Livestock Development & Marketing.

Mugisha, J. 1994. Evaluation of the cooking banana marketing structure in Uganda. Thesis for Masters Degree of Science in Agricultural Economics, Makerere University, Kenya.

Onyango M. 2000. Constraints and opportunities of tissue culture. Paper presented at the Regional Banana Workshop, February 2000, Thika, Kenya.

Robbins, P. and R.S.B. Ferris. 2002. The impact of globalization on the agricultural sectors of East and Central African Countries. FoodNet IITA.

Rutherford, M.A. and A. Kangire. 1998. Prospects for the management of Fusarium wilt of banana (Panama disease) in Africa. *In* Mobilizing IPM for sustainable banana production in Africa: Proceedings of a workshop on Banana IPM, edited by E.A. Frison, C.S. Gold, E.B. Karamura, and R.A. Sikora. Workshop on Banana IPM, Nelspruit (ZAF), 1998 INIBAP, Montpellier (France) 1999.

Trotter, B.W. 1992. Applying price analysis to marketing systems: methods and examples from the Indonesian rice market. Marketing Series Volume 3, NRI, Chatham, UK.

Walker P.T., M. Hebbleswaithe, and J. Bridge. 1984. Project for banana pest control and improvement in Tanzania. EEC report for Government of Tanzania. Produced by TDRI London.

Working Document. 1994. Diagnostic survey on key constraints of banana production in Uganda. Preliminary data on socio-economics, soils and agronomy, pest, diseases and plant growth, germplasm, post harvest. Ugandan National Banana Research Programme, IITA and NRI.

World Bank. 2002.Country Profile 2002. http://www.worldbank.orgdatadataquery.html

Zake, J.Y.K., C. Nkwiine, S.M. Sessanga, V. Kasenge, and D.P. Bwamiki. 2000. Soil research for sustainable banana production in the heavy soils of Uganda. Faculty of Agriculture, Makerere University, Uganda.

Annex 1. Survey checklist.

Topic	Subtopics	Questions/comments
Personal information	Name Address physical Telephone	NB: For better established firms exchange of business cards saves time. For small traders market place and name is enough. Note: if a trader has a mobile phone it might be useful to get the number for future follow up.
Type of business	Value addition Physical functions Experience	1. How does the respondent add value along the marketing chain? Does he change the form of the product (processor) or does he move the product (traveling trader) or does he store (wholesaler) or is he retailer or consumer? NB: there might be overlap as firms try to maximize profit thorough vertical integration
Demand (For consumer substitute consumption for sell in your probe)	Quantity Type of buyer Seasonality Variety Consumer preferences Price data	1. How much do you normally sell, e.g., per day, per week, per month? 2. Who do you sell to? 3. Are there changes in volume sold over time? 4. Are there different varieties? 5. If so, which ones and what is their respective demand? 6. What is the price you sell at by variety (get unit measure)? 7. Are there changes in price over time (short-term and long-term changes)? 8. If so, what are the reasons? 9. Do you find problems selling your products? Which ones?

Annex 1. Survey checklist (contd).

Topic	Subtopics	Questions/comments
Supply	Source by area Source by type of person Price Quality	1. Which are your supply areas (geographical)? 2. From whom do you buy? 3. From where do you buy (meeting point)? 4. At what price do you buy by variety? 5. Does the price change over time? If so, why and how? 6. Do you have problems getting the products? If so, which ones? 7. What is the quality of the supplies?
Quality	Perishability Postharvest issues	1. What is the quality of products along the chain? 2. What is the shelf-life of the products?
Storage (Relevant to wholesaler) NB: For others it's not intentional but still get the impact of not selling quickly	Quantity Time Storage problems	3. How much do you usually store? 4. For how long do you usually store? 5. Do you have storage problems? 6. Do you experience storage losses?
Transaction costs	Forms Proportions	1. What are your transaction costs? 2. What are their proportions?
Grading/sorting	Grading incentive	1. Do you grade or sort? 2. Does a better grade fetch higher price?
Market information	Sources Spatial arbitrage	1. Do you get market information, e.g., on price? 2. If so, from whom and how? 3. What is the relation of prices over different locations at a given time?
Price formation	Market power	1. How is the price determined? 2. Who determines the price? 3. If price firm/individual is a price taker find out why.
Institutional and legal framework	Associations	1. Do you have an association? 2. Are there any market regulation? If so, which ones and how do they affect your business?

Annex 1. Survey checklist (contd).

Topic	Subtopics	Questions/comments
Market structure	Competition	1. No. of sellers 2. Is there competition? 3. Is there price competition? 4. If no, is there nonprice competition,, e.g., interlocking markets?
Credit availability	Sources Types	1. Are there credit institutions? 2. Do you use them? If not, why? 3. What are their rates?

Annex 2. Population and urbanization growth rates.

	Kenya	Rwanda	Tanzania	Uganda
Due to population increase	2.10%	2.30%	2.20%	2.60%
Due to urbanization	3.30%	1.69%	3.72%	2.46%

Total populations (millions)	Kenya	Rwanda	Tanzania	Uganda
Population 2001	30.7	8.7	34.5	22.8
Population 2002	31.3447	8.9001	35.259	23.3928
Population 2003	32.0029	9.1048	36.0347	24.001
Population 2004	32.675	9.31421	36.8275	24.625
Population 2005	33.3612	9.52844	37.6377	25.2653
Population 2006	34.0618	9.74759	38.4657	25.9222
Population 2007	34.7771	9.97179	39.3119	26.5962
Population 2008	35.5074	10.2011	40.1768	27.2877
Population 2009	36.253	10.4358	41.0607	27.9971
Population 2010	37.0143	10.6758	41.964	28.7251

Total urban populations (millions)	Kenya	Rwanda	Tanzania	Uganda
Population 2001	10.5301	0.5481	11.454	3.306
Population 2002	11.106	0.57018	12.1415	3.4754
Population 2003	11.7134	0.59315	12.8702	3.65348
Population 2004	12.3541	0.61705	13.6426	3.84068
Population 2005	13.0298	0.64191	14.4614	4.03747
Population 2006	13.7424	0.66777	15.3294	4.24435
Population 2007	14.494	0.69468	16.2494	4.46183
Population 2008	15.2867	0.72266	17.2247	4.69045
Population 2009	16.1228	0.75178	18.2585	4.93079
Population 2010	17.0046	0.78207	19.3543	5.18344

	Kenya	Rwanda	Tanzania	Uganda
Giving % average annual increase in urban population	5.47%	4.03%	6.00%	5.12%

About FOODNET

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

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

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

FOODNET project partners are ASARECA networks, national programs, Universities, International Agricultural Research Centers, NGOs, CBOs, farmers, processors, manufacturers, and other agricultural sector stakeholders within the ASARECA region.

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

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

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

Project objectives are to:

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

About IITA

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

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