

THE FRESH FRUIT AND VEGETABLE MARKETS OF EAST AFRICA

**AN ASSESSMENT OF REGIONAL VALUE CHAIN ACTORS,
ACTIVITIES AND CONSTRAINTS IN KENYA, TANZANIA AND
UGANDA**



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Revised

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List of Acronyms

ACTESA	Alliance for Commodity Trade in Eastern and Southern Africa
AIV	African indigenous vegetables
ARNS	African Regional Nutrition Strategy
AVRDC	The World Vegetable Center
DHS	Demographic and Health Survey
CAADP	Comprehensive African Agricultural Development
CFSVA	Comprehensive Food Security and Vulnerability Analysis
COMESA	Common Market for Eastern and Southern Africa
COMPETE	Competitiveness and Trade Expansion Program
EA	East Africa
EAC	East African Community
EAGC	Eastern Africa Grain Council
EU	European Union
FAFS	Framework for African Food Security
FCS	Food Consumption Score
FPEAK	Fresh Produce Exporters Association of Kenya
FFV	Fresh fruits and vegetables
FTF	Feed the Future
HDCA	Horticulture Crops Development Authority
IFPRI	International Food Policy Research Institute
JMC	Joint Market Committee
KARI	Kenya Agriculture Research Institute
KEPHIS	Kenya Plant Health Inspectorate Service
KHA	Kenya Horticulture Authority
KHCDA	Kenya Horticulture Development Agency
KHCP	Kenya Horticulture Competitiveness Project
KRA	Kenya Revenue Authority
KWTA	Kongowea Wholesale Traders Association
MDG	Millennium Development Goals
MRL	Minimum Residue Limits
MSU	Michigan State University
MTA	Market Trader Association
NGO	Non-governmental organization
NCC	Nairobi City Council
OFSP	Orange fleshed sweet potatoes
RDA	Recommended Daily Allowance
SPS	Sanitary and Phytosanitary
TAPP	Tanzania Agriculture Productivity Program
TRA	Tanzania Revenue Authority
UBOS	Uganda Bureau of Statistics
USDA	United States Department of Agriculture
VAD	Vitamin A Deficiency
WEAI	Women's Empowerment in Agriculture Index
WHO	World Health Organization

Glossary of Terms

Aggregator: An aggregator is an intermediary/ trader (see below) who assembles produce in rural production areas and prepares them for transport and marketing in wholesale markets. Aggregators are often responsible for sorting, grading and transport of goods to wholesale outlets. Aggregators sometimes transport produce themselves or they hire transporters.

Broker: A broker is an actor in FFV value chains that does not own the product in any point in the chain. Brokers connect buyers and sellers and can negotiate price on behalf of either party. They operate on the farm level connecting producers and traders and on market levels connecting wholesalers to intermediaries to retailers, etc. Broker commissions vary.

Cess: A fee or tax paid in Kenya when crossing district boundaries within the country. The origin of this fee dates back to colonial times to keep local produce in the district of origin and discourage trade.

Dietary Diversity: A qualitative measure of food consumption, dietary diversity measures the number of unique foods consumed over a given period of time. Dietary diversity provides information on household food security. It reflects household access to a variety of foods and is a proxy of micronutrient adequacy of the diet of individuals.

Food Consumption Score: A key indicator in measuring food security is by Food Consumption Scores (FCS), which combines: i) dietary diversity (the number of individual foods consumed over the past week is collected); ii) food frequency (the number of days in the past week that a specific food item has been consumed is collected); and iii) the nutritional importance of the food groups (which are weighted to reflect this). Previous studies have shown dietary diversity to be correlated with nutrient adequacy, kilocalorie intake, children's and women's anthropometry and socio-economic status. As such, the FCS is an effective proxy indicator of food access and nutrition intake.

Intermediaries: An intermediary buys from farmers, brokers or from other intermediaries and takes ownership of the product at the time they receive it. They sell to other intermediaries, institutional consumers, and large suppliers at the retail level.

Retailer: Retailers sell directly to an individual, household or institutional customer. A variety of actors along the FFV supply chain engage in retail sale. Farmers and traders can sell informally along the roadside or in markets and kiosks or formally in markets, green grocers and supermarkets.

Traders: All actors working at the trade level along the value chain, including intermediaries, wholesalers, and brokers.

Wholesalers: In this study, a wholesaler is an intermediary who operates only at the wholesale market. He buys from farmers or intermediaries and often hires uses brokers for trading.

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Executive Summary

USAID is interested in better understanding the fresh fruits and vegetables (FFV) production and marketing systems in the EA region to determine if trade-related interventions could enhance FFV consumption in the region. The assumption being that increased access to regional markets could make FFV more available and affordable to a wider range of consumers. The East Africa Trade Hub (EATH) was tasked to conduct research on the FFV sector and to advise USAID East Africa on possible interventions that could be supported under their Feed the Future (FtF) program that aims to improve food security and nutrition.

For this report, EATH conducted field surveys in 51 aggregation and wholesale distribution markets in Kenya, Tanzania, and Uganda. The objective was to gather input from key downstream FFV value chain players to support desk research and secondary data analysis and explore opportunities for intervention. EATH relied heavily on desktop review of secondary data gathered from existing FFV studies and reports. The assessment focused on five key commodities: tomatoes, pineapples, oranges, bananas and onions.

The study confirmed that the vast majority of all FFV production in East Africa is consumed domestically, either on-farm or through domestic markets. Intra-regional trade represents a small percentage of total trade in FFV and a fraction of total production. While the range and geographical spread of FFVs across the region is wide, knowledge of demand and supply opportunities is lacking, and storage and logistics are disorganized. Cross-border trade varies by commodity and is largely attributable to a commodity's fragility and shelf-life.

Moreover, only a very small percentage of FFV farmers are taking advantage of regional markets. Direct linkages between local production and regional supply chains are limited to a few high-value FFVs such as oranges and onions that can provide sufficient returns. In general, cross-border trade is the result of proximity of production areas to borders where traders can easily access regional markets and take advantage of seasonal price differentials. There is little evidence to suggest that regional trade is playing a significant role in supplying traditional marketing systems, stabilizing prices, or contributing to increased consumption of FFV.

Most households, both urban and rural, rely on traditional open-air markets for obtaining FFV. The domestic market value for all FFV has been estimated to be 4-5 times greater than the value of FFV sales to international export markets. The traditional domestic marketing system continues to dominate in all FFV value chains. Retail outlets (non-supermarket) served by these markets account for over 90% of total FFV market share.

The performance of these traditional wholesale markets greatly affects the costs, prices, and distribution of benefits throughout the production and marketing system. Our research revealed that the bulk of the costs in the FFV trade occur in the wholesale and distribution segment of the value chain. Wholesale marketplaces are also where significant inefficiencies in the value chain are concentrated. Traders and brokers tend to be opportunistic, with only a short-term perspective and collusion is common. Coordination is low and market actors prefer to operate individually and business relations are largely informal. Market management, most often employed by municipalities, has limited resources and little incentive to ensure basic services like sanitation, waste removal and security. As a result there has been limited investment in market maintenance and infrastructure.

The fresh produce business is considered high risk and volatile. Post-harvest losses are high, especially during transport and off-loading. Wholesalers share a disproportionate amount of

the risk and establish prices to account for these losses. Gross profit statistics often mask the real return on investment for these players. Many wholesale markets feature brokered transactions rather than transfer of ownership between first sellers and wholesalers. This brokering activity frequently creates suspicion among farmers and smaller traders.

Consumption patterns of FFV in East African households indicate strong consumer preference towards other food groups, even as household level incomes rise. Consumption of FFV on a daily basis is still low for all income classes in all three countries. Although food consumption patterns vary by country and income group, many of these traditional diets are based on cereals or starches and FFV are not priority food items. Relatively high prices mean that FFVs remain out of reach for food and nutrition insecure households—those that need them the most.

EATH was able to determine several areas of potential interventions to help overcome some of these challenges. These centered on improving data and information collection and analysis, identifying key public and private partners to lead efforts to enhance FFV trade, supporting efforts to build capacities of regional and national level FFV trade associations, improving wholesale market efficiencies through better cooperation among value chain player and developing nutritional awareness campaigns to encourage more FFV consumption.

Key Recommendations include:

1. Improve the region's capacity to collect and analyze FFV trade flow, price and market information
2. Develop interventions to address wholesale market inefficiencies
3. Improve the FFV policy and enabling environment
4. Promote consumer awareness campaigns on the nutritional benefits of eating FFV



Introduction

USAID East Africa is working to enhance food security and nutrition in the region. The increased consumption of fresh fruits and vegetables (FFV) could play an important role in achieving this objective. Fruits and vegetables are essential to an adequately varied diet. The World Health Organization (WHO) recommends the consumption of at least 400g of fruits and vegetables per day to provide essential, necessary nutrients lacking in other food groups. Fruit and vegetables contain a range of macro and micronutrients including pro-vitamin A, iron and zinc which help to prevent malnutrition. Under-consumption of fruit and vegetables is among the top ten risk factors leading to micronutrient malnutrition and is associated with the prevalence of chronic diseases.

There are many reasons for inadequate quantities of FFV in East African diets. Although food consumption patterns vary by country and income group, many of these traditional diets are based on cereals or starches and FFV are not part of everyday consumption patterns and not featured as a priority food item in household food budgets. Also, the high prices of FFV could preclude certain income groups from including FFV in their diets. Lower income households are often the very groups that need FFV the most as they are at a higher risk of food insecurity and malnutrition than wealthier households.

USAID is interested in better understanding the FFV production and marketing systems in the EA region to assess the extent to which trade-related interventions could enhance FFV consumption in the region. This study evaluated the following hypothesis:

As regional markets become increasingly integrated, FFV should become more widely available throughout the year, helping stabilize prices and making these products more affordable to consumers. Reliable access to larger regional markets should encourage farmers to diversify production for sale, potentially increasing household incomes. Year-round availability of a range of fruits and vegetables should encourage increased trade in FFV and will automatically have a direct, simple impact on reducing malnutrition.

EATH has been tasked to advise USAID East Africa on the FFV value chain and make recommendations for possible interventions in the FFV sector based on the findings of this assessment. EATH conducted two studies looking at the FFV sector that informed the findings of this report.

In late 2011, EATH carried out a rapid assessment of intra-regional trade in FFV throughout East Africa. EATH engaged a local firm, IMANI Development Ltd. to assist in this effort to gather data to gauge the quantities of intra-regional trade in selected horticultural commodities and to determine the most important trade flows and key border crossings. The team looked at pineapples, bananas, passion fruit, onions, tomatoes, and cabbages, to provide a good cross-section of fruits and vegetables. The study also identified key production areas for each commodity that supplied these value chains.

Although the data in the rapid assessment indicated that most (>90%) horticultural crops are produced and marketed through traditional domestically-sourced production and marketing systems, the study identified at least some fruits and vegetables that are traded regionally, mostly through informal channels, but some that are also traded through more formal trade routes and recorded in formal trade statistics. These included: bananas (both sweet and green), oranges, pineapples, mangoes, onions and tomatoes.

The second study described in this report was designed to provide an in-depth look at the downstream links of these FFV value chains and trace their movement from production zones, to aggregator markets, and into the various marketing channels for distribution to retailers and consumers. The study analyzed the market dynamics and systems influencing both domestic and regional trade of these and other horticultural crops available in East African markets. The study also looked at FFV consumption patterns and nutritional aspects of FFVs grown and traded in the region. During the course of the study, EATH carried out a critical review of USAID’s “enhanced trade” hypothesis to evaluate its validity based on field research and primary and secondary data analysis.

For this report, EATH relied heavily on a desk top review of secondary data gathered from existing FFV studies and reports. EATH augmented this data with current production figures and price trend analysis. To further support secondary data, EATH incorporated results from the three-country field survey (Kenya, Tanzania, and Uganda) to gain a more detailed understanding of the activities and constraints of key value chain players in principal aggregation and distribution markets in these three countries.

EATH interview with the market manager in Mwanza, Tanzania



Structure of the Report

Section 1 (“**Regional Trade in FFV**”) describes trade of tomatoes, pineapples, oranges, bananas, and onions between Kenya, Tanzania and Uganda. This section situates trade flows within the context of production volumes, seasonality, and price trends over three years. Section 2 (“**Understanding the Value Chains**”) begins by describing the dynamics of wholesale and aggregation markets, including governance and management structures, followed by more in-depth descriptions of the region’s primary wholesale market models. Case studies of select markets provide a more detailed picture of governance mechanisms and common constraints confronted by market participants. The second half of Section 2 defines various actors along FFV value chains and their roles and activities and discusses constraints revealed in survey results. Finally, the costs along selected value chains are outlined underlining weaknesses and market inefficiencies common across FFV value chains. Section 3 (“**Impact on Food Security and Nutrition**”), provides a brief overview of dietary diversity and consumption patterns in all three countries. This section discusses the possible effects of increased intra-regional trade flow of FFV on food security and nutrition outcomes in the region.

Each section concludes with recommendations based on analysis of specific opportunities and constraints. These recommendations are discussed in greater detail in Section 4 (“**Recommendations and Action Plan**”). Actionable recommendations are outlined and classified by near-term, medium-term and long-term objectives for USAID.

Regional Trade in Fresh Fruits and Vegetables

An analysis of the region's trade flows conducted by Imani for the EA Trade Hub in 2010 revealed that intra-regional trade represents a small percentage of total trade. Looking at the percent traded as a percent of national production gives a sense of the dominance of domestic trade. That share varies by commodity and is largely attributable to a commodity's fragility and shelf-life. For example, trade in tomatoes is 1.32% of total production, which would indicate that proximity to market is key for this fragile and perishable crop. Trade in onions, which are hardier and have a longer shelf-life (up to three months if dried and stored properly), is somewhat higher at 6.5% but still small compared to total production. For purposes of this analysis the difference between total production and intra-regional trade represents domestic trade. Intra-regional trade in lower value, bulkier horticulture commodities such as bananas is also low at 0.02%, which would indicate that there is sufficient local production to meet demand.

The sections below provide a more detailed assessment of five key commodities: tomatoes, pineapples, oranges, bananas and onions.

Regional Trade Flows

Tomatoes

East Africa's tomato farmers primarily produce Italian processing varieties (Rio Grande, Roma and Money Maker). These varieties are preferred because they are high yielding, disease resistant and have a longer shelf-life than other varieties. Kenya has two main production seasons – November – February and April – June with peak production in May. Tanzania's main production period is from August – December with peak production in October. Uganda has two production periods – the long, six month period is from April – September with a short season from December – January.

Figure 1 below shows the main production areas. In Kenya, Taita Taveta is the leading production area (14.3% of national production). Other important production areas are Migori, Kajiado and Kirinyaga. In Uganda, Mukono, Kayunga and Mubende districts are the leading production areas. In northern Tanzania, production is concentrated in Arusha, Kilimanjaro and Lushoto districts that serve as a source of supply to Kenya.

Figure 1: East Africa Tomato Production and Trade Flow Map

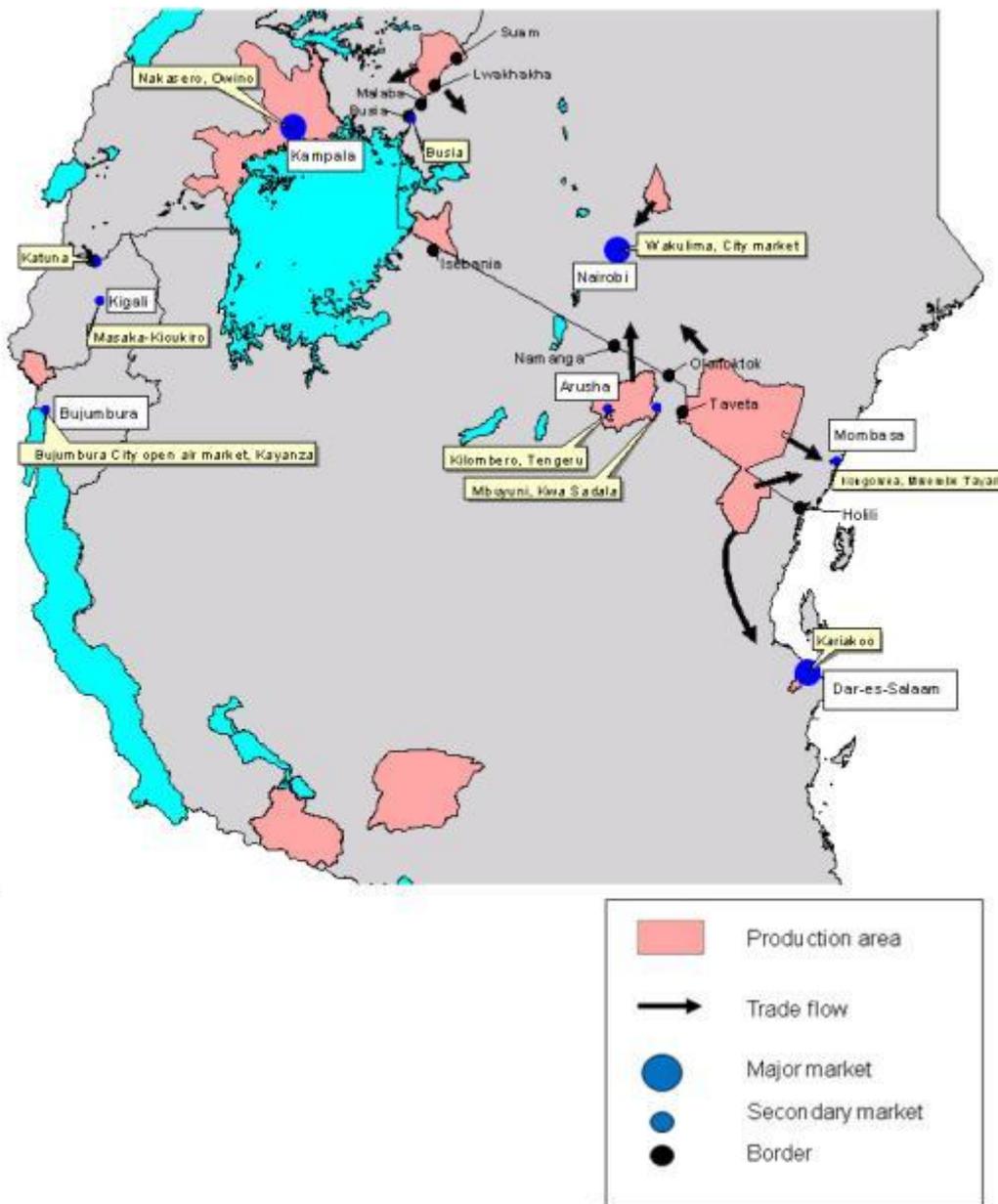


Figure 2 below provides both production and trade data for 2010. Intra-regional trade, at 1.32% of total production, is a very small piece of the total picture. It is clear that domestic trade dominates. Intra-regional trade's low share might be attributable to the fragile and perishable nature of tomatoes and the high losses (crushing and bruising) that result from over-packing and transport. Proximity to market is a key driver of trade, which is, in part (Tanzanian tomatoes are also known for their flavor and quality) one of the reasons why tomatoes from northern Tanzania are able to compete with Kenyan production from neighboring Taita Taveta.

Figure 2. 2010 Production and Trade Volume Data (MT)

2010 Production (MT)

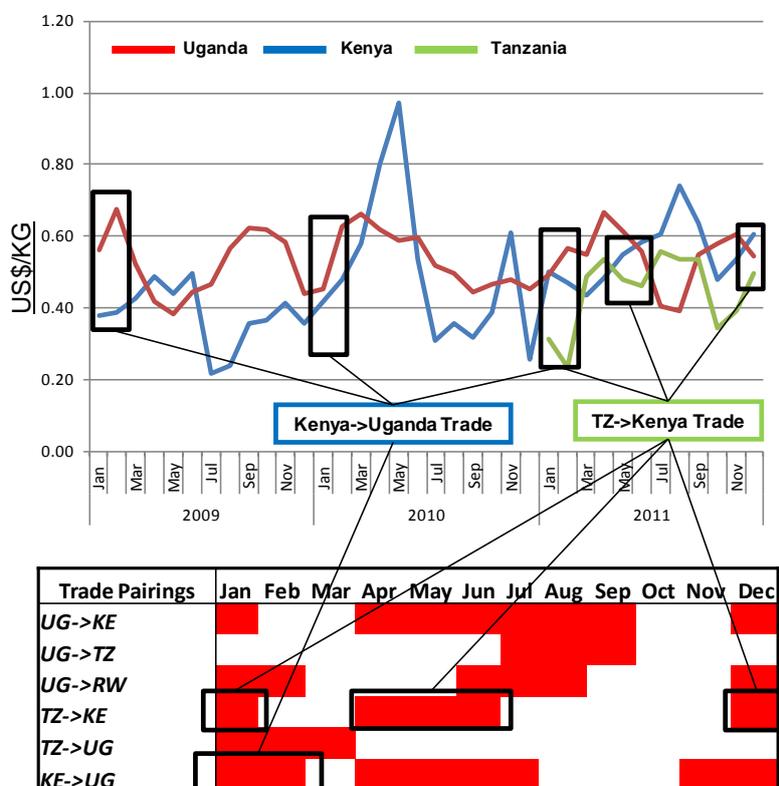
Kenya	Tanzania	Uganda	Rwanda	Total
539,151	235,000	31,000	42,800	847,951

		Destination				Total
		Kenya	Tanzania	Uganda	Rwanda	
Source	Kenya			267		267
	Tanzania	4,694				4,694
	Uganda	2,586	480		3,200	6,266
	Rwanda					0
Total		7,280	480	267	3,200	11,227
Imports/Production		1.35%	0.20%	0.86%	7.48%	1.32%

Source: Imani Horticulture Trade Study and FAOSTAT

Seasonal price differentials and production cycles drive intra-regional tomato trade flows. In Figure 3 below it is clear that trade early in the year from Kenya to Uganda is tied to increased price differentials. This is during one of Kenya's main production periods and coincides with the end of Uganda's short season, which runs from December – January. For the three-year period, the differentials generally peaked during February (in 2011, prices in Kenya continued to drop into March and April). While we only have Tanzania data for 2011, it appears that trade into Kenya follows a seasonal pattern and is tied closely to increased differentials that occurred in January/February, April – June, and December.

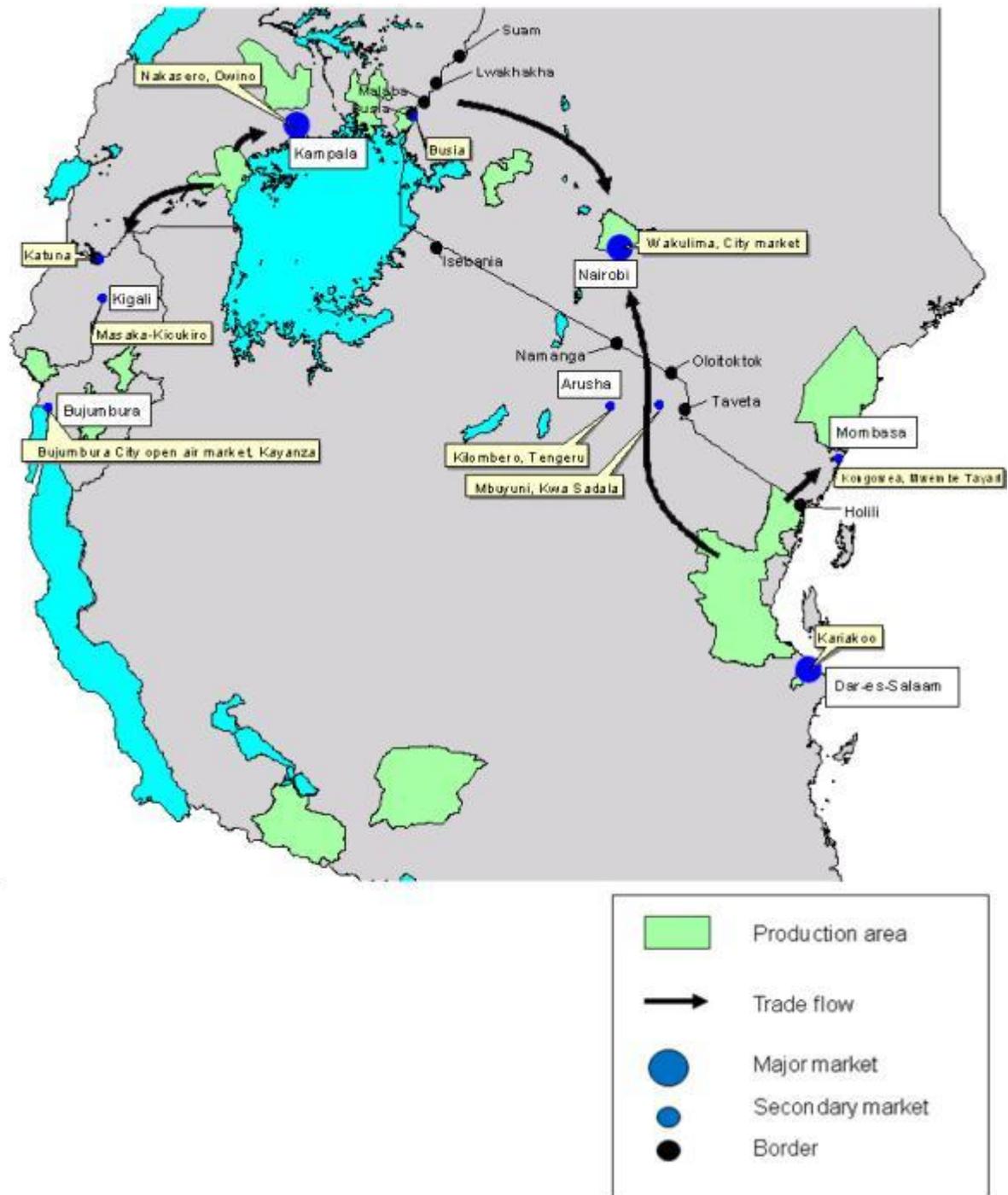
Figure 3: 2009-2011 Average Wholesale Tomato Prices



Pineapples

As Figure 5 below indicates, Kenya is the leading producer of pineapples in East Africa; however, much of that is commercial production for processing and export by Del Monte. The FAOSTAT production data for Uganda significantly understate Uganda's actual production. If Uganda's real production data were included the 2% of production that intra-regional trade accounts for would be significantly lower and even more insignificant. As with the other commodities in the study domestic trade dominates. 67% of Kenya's production is concentrated in Kiambu County in the Central Region where Del Monte's plantation is located.

Figure 4: East Africa Pineapple Production and Trade Flow Map



In terms of regional trade, Uganda is the leader. The Smooth Cayenne variety produced there is the consumer benchmark. Due to their flavor and size (the Smooth Cayenne is larger than the commercially-grown Super Sweet) and year-round availability, Ugandan pineapples often command a 20% premium in the region's wholesale markets. Uganda's leading production areas are Kayunga and Mukono Districts in the east and Mpigi District in central. Smallholder production from these areas supplies Kenya, South Sudan and Rwanda. Smaller volumes of Tanzanian production from Tanga and the Coast Region supply both Nairobi and Mombasa markets. Pineapples are typically loaded loose in large (16MT vehicles) for regional trade. The weight of pineapples on top result in mechanical damage and about 5% of consignments are sold as grade two or discarded.

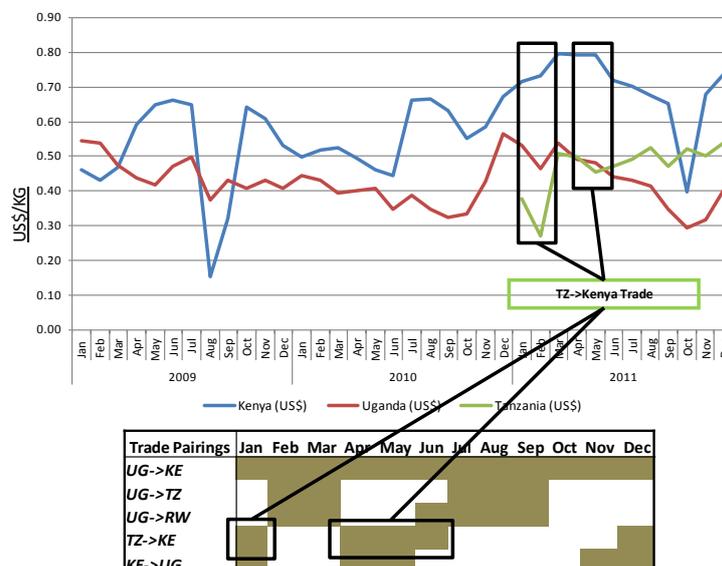
Figure 5: 2010 Pineapple Production and Trade Volume Data (MT)

		Kenya	Tanzania	Uganda	Rwanda	Total
2010 Production (MT)		272,231	87,500	1,750	16,500	377,981
		Destination				
		Kenya	Tanzania	Uganda	Rwanda	Total
Source	Kenya					0
	Tanzania	1,365				1,365
	Uganda	5,119			1,080	6,199
	Rwanda					0
Total		6,484	0	0	1,080	7,564
Imports/Production		2.38%			6.55%	2.00%

Source: Imani Horticulture Trade Study and FAOSTAT

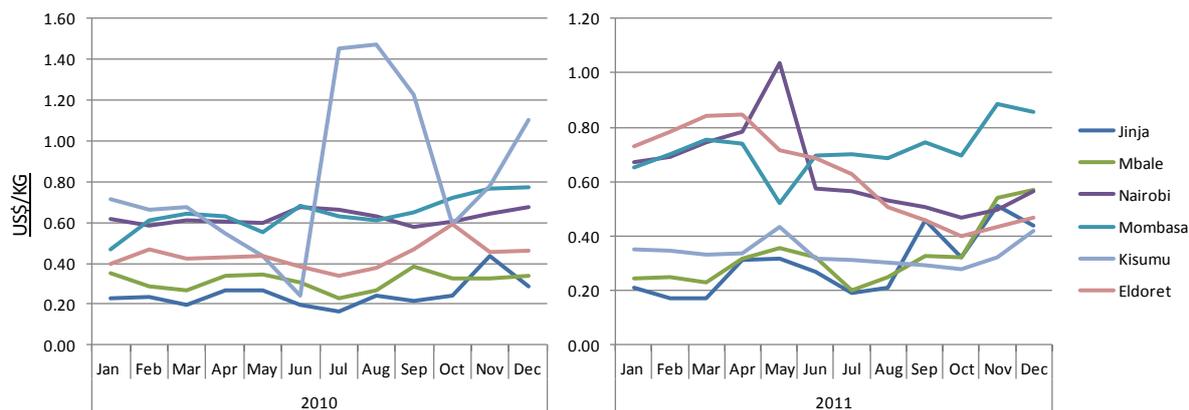
An analysis of wholesale pineapple prices (**Figure 6**) for the period 2009-2011 revealed that the average annual wholesale price in Kenya for the period 2009-2011 was 78% higher than the average price in Uganda. Given the consistent average price differential between Uganda and Kenya, it is clear that Kenya represents a significant, year-round opportunity for Ugandan pineapple traders. While we only have Tanzania price data for 2011, **Figure 6** seems to indicate that Tanzanian traders take advantage of seasonal differential spikes to supply Kenya's markets with pineapples, primarily from Tanga.

Figure 6: 2009-2011 Average Wholesale Pineapple Prices



Comparing wholesale prices from Uganda’s main eastern markets of Jinja and Mbale to prices in four key Kenyan markets (below) reveals an even greater differential than the overall national average. The three year average differential between these key production areas and Kenya’s markets is close to 90%. These huge differentials also justify trade in pineapples from Uganda’s central production zones where volumes are greater.

Figure 7: 2010/2011 Select Market Wholesale Pineapple Prices



Oranges

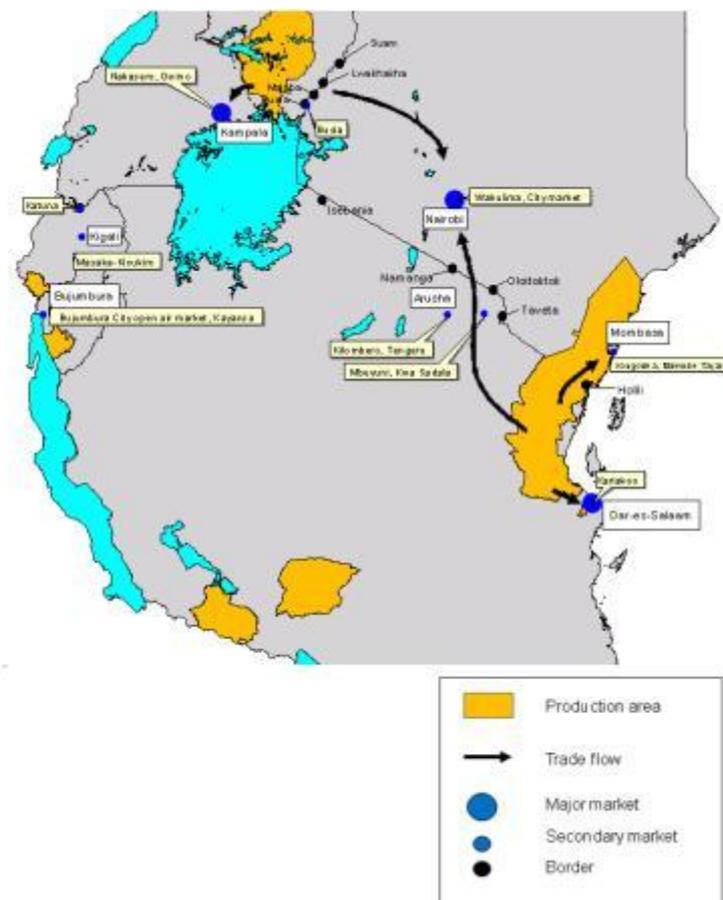
East Africa's major orange production areas are Tanga on Tanzania's Northeast coast, Kilifi and Kwale districts surrounding Mombasa on Kenya's coast and Soroti and Mubende districts in Eastern and mid-western Uganda. Tanzania is known for its quality production of Delta Valencia and Washington navel varieties and its year-round production. These varieties, which were introduced by donor projects in select areas, are now in full production and spread out over a wide growing area. While orange production in Kenya has increased significantly over the past several years, demand still outstrips supply. As a result, Kenya still relies heavily on imports from Tanzania. With Kenya's production concentrated on the coast and imports primarily from Tanga, the distance to Western Kenya's key markets far, relative to Uganda's main eastern production areas.

Oranges' thick skin means that they are easier to ship and can withstand the poor packing conditions that persist in the region – typically oranges are loaded loose into trucks. Their durability makes them less risky than other more fragile horticulture crops and therefore more appealing to traders.

A typical transporter illustrating the 'loose' transport of oranges



Figure 8: East Africa Orange Production and Trade Flow Map



The majority of trade in oranges in 2010 was from Tanzania to Kenya as indicated in Figure 9 below. Tanzania is the region's leading exporter of oranges with oranges from Tanga supplying Kenya's main urban centers and Mwanza and Morogoro supplying Uganda and Kenya. Uganda's main production area along the Nile between the source and Lake Kyoga and its smaller production center in Mubende district supply small volumes to Kenya, Tanzania and Rwanda.

Figure 9: 2010 Orange Trade Volume Data (MT)

2010 Production (MT)		Kenya	Tanzania	Uganda	Rwanda	
		N/A	N/A	N/A	N/A	
		Destination				
		Kenya	Tanzania	Uganda	Rwanda	Total
Source	Kenya			295		295
	Tanzania	13,621				13,621
	Uganda	468	918		448	1,834
	Rwanda					0
Total		14,088	918	295	448	15,749

Source: Imani Horticulture Trade Study and FAOSTAT

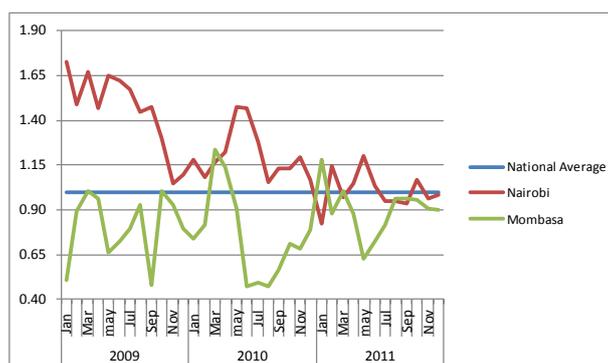
As Figure 10 below shows, Tanzania's orange producers provide a year-round source of supply for Kenya.

Figure 10: Regional Orange Trade Calendar

Trade Pairings	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UG->KE												
UG->TZ												
UG->RW												
TZ->KE												
TZ->UG												

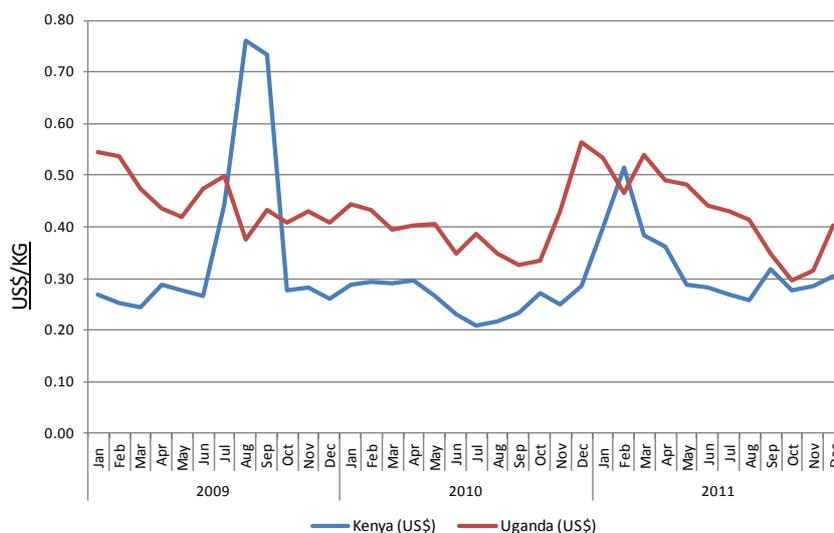
As the steady decline in the Nairobi wholesale prices over the past three years relative to the national average highlighted in Figure 12 seem to indicate, this reliable supply base, combined with Kenya's own domestic production, which has increased by 30% in the past three years, and supplemented by small volumes from Uganda is increasingly satisfying Kenya's demand and improving affordability. Nairobi wholesale prices declined 7.5% per year during the period.

Figure 11: 2009-2011 Nairobi and Mombasa Relative Wholesale Orange Prices



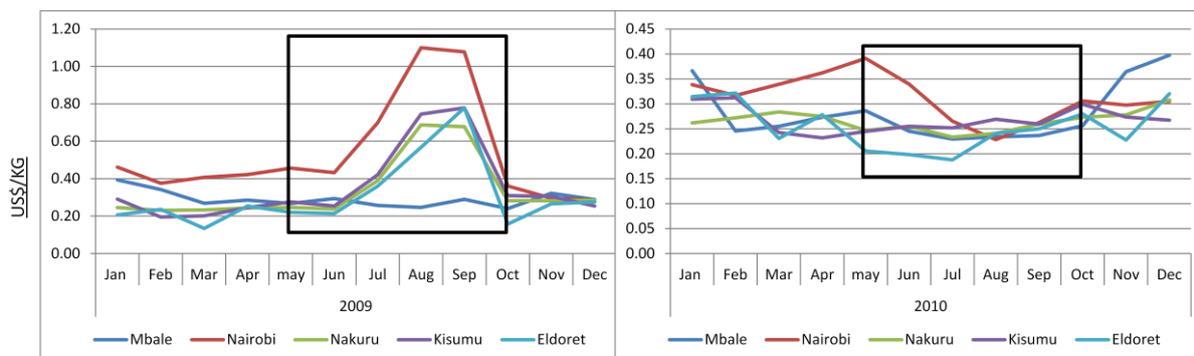
Given the consistent and significant average price difference between Kenya and Uganda during the period 2009-2011 (Tanzania data for oranges was not available) contained in Figure 12, one could assume that Uganda would be a significant opportunity for Kenya's producers and traders. However, the limited trade volumes from Kenya to Uganda seem to tell a different story. Disaggregating national market data from both sides of the border provided a clearer picture about the nature of the orange trade between the two countries and the important role domestic markets play in the FFV trade.

Figure 12: 2009-2011 Average Wholesale Orange Prices



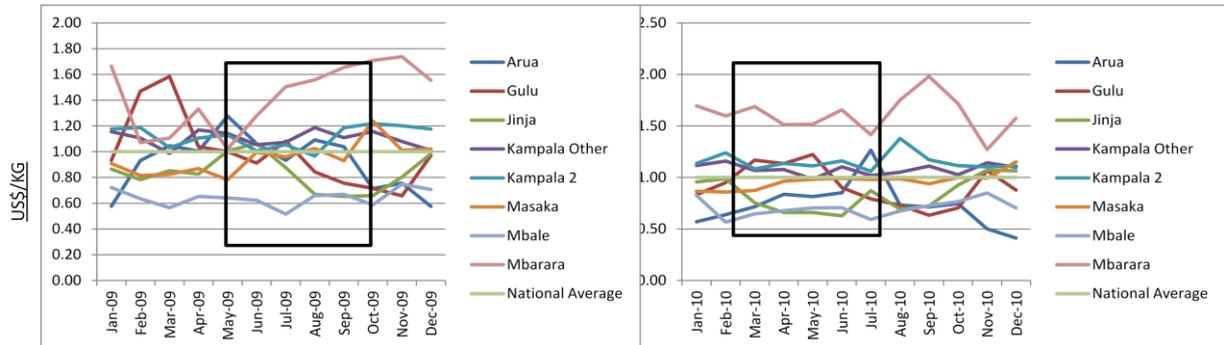
Uganda's main orange production area is relatively close to the border with Kenya and its key western markets. Figure 13 below shows the average wholesale prices for Uganda's Mbale market in the east of the country and Kenya's three largest Eastern Markets – Kisumu, Eldoret, Nakuru – and Nairobi. While the average prices in Mbale during the main trading period (May – October – see Figure 10) were significantly below those in Kenya's markets, the volume of trade from Uganda to Kenya was not very large.

Figure 13: 2009/2010 Select Market Wholesale Orange Prices



Further analysis revealed that despite the opportunities in Kenya, Uganda wholesale prices for the two-year period were on average 39% higher than Kenya wholesale prices. The higher prices in Uganda and the ease of domestic trade meant that most of Uganda's production went to meet domestic demand. Interestingly, prices in Western Kenya's leading market – Mbarara (the pink line in Figure 14 below) were consistently higher than all other markets. This is likely due to Mbarara's proximity to Rwanda and DRC and its role as an export base for those markets where demand is increasing.

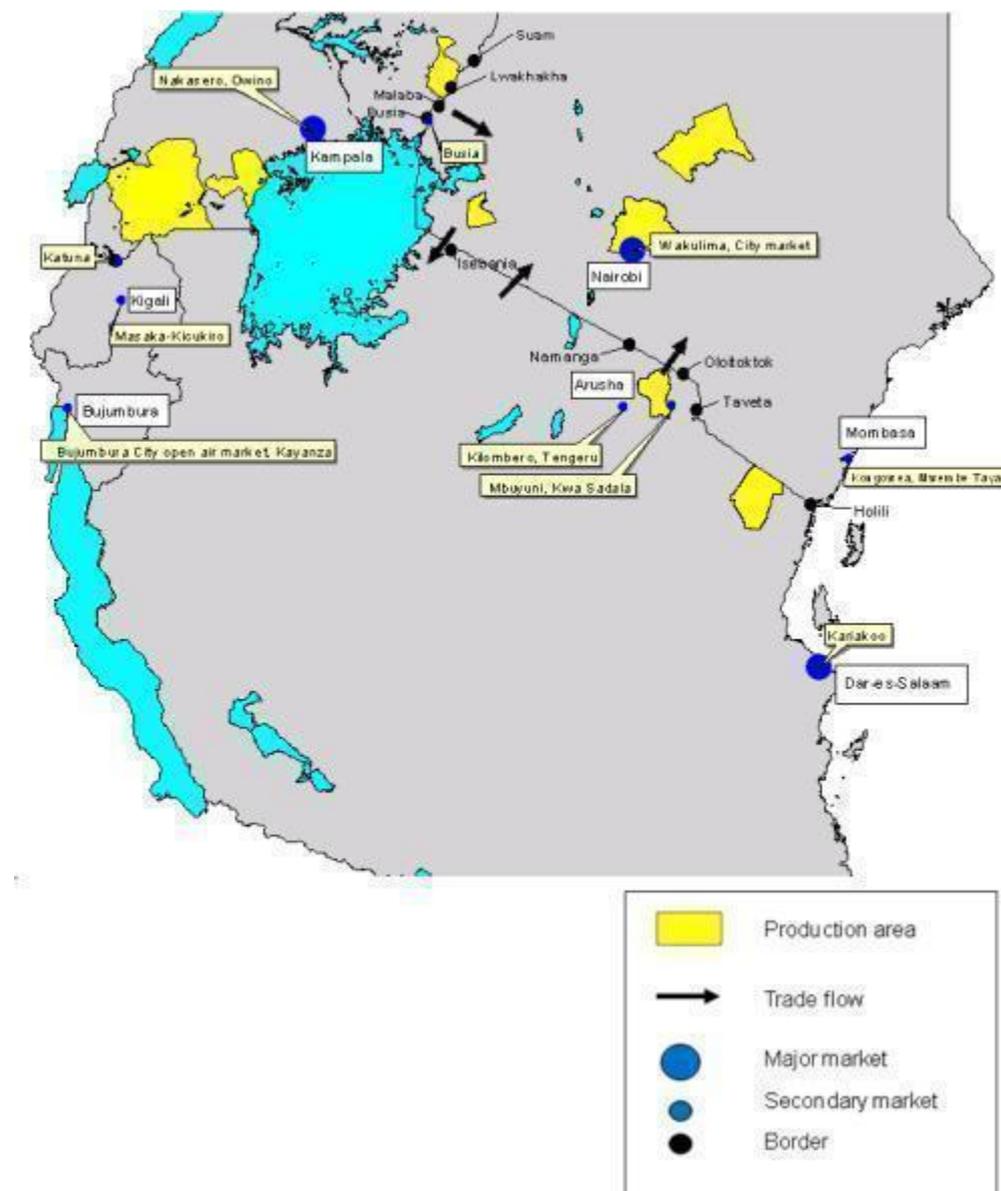
Figure 14: Relative Uganda Wholesale Orange Prices



Bananas

Uganda is the region's leading banana producer and consumer. 2010 regional production data (see Figure 16) show that at 10 million metric tons, Uganda represents 56% of total regional production. As Figure 15 below shows, Uganda's main production areas are in the southwest, with a smaller pocket of production around Mt. Elgon in the east. In Kenya, bananas represent 38% of all fruits grown. Production areas range from Kisii (primarily cooking banana) on the shores of Lake Victoria in the west to Meru (the leading production area) in the Central Region. Kiambu and Muranga are also significant production areas. In Tanzania, production is concentrated in the Lake region and the southern highlands; however pockets of production on the border with Kenya are important for intra-regional trade.

Figure 15: East Africa Banana Production and Trade Flow Map



Based on the 2010 regional trade volume data from Figure 16 below, bananas from Uganda account for 89% of all regional trade, with 50% going to Kenya, 29% to Rwanda and 22% to Tanzania. At 0.08% total trade, volume as a share of total production is insignificant and

would indicate that, apart from some opportunistic trade, bananas are primarily a domestically traded commodity.

Figure 16: 2010 Banana Production and Trade Volume Data (MT)

2010 Production (MT)		Kenya	Tanzania	Uganda	Rwanda	Total
		1,583,140	3,584,700	10,150,000	2,749,180	18,067,020

		Destination				Total
		Kenya	Tanzania	Uganda	Rwanda	
Source	Kenya					0
	Tanzania	1,492				1,492
	Uganda	5,902	2,699		3,469	12,070
	Rwanda					0
Total		7,394	2,699	0	3,469	13,562
Imports/Production		0.47%	0.08%	0.00%	0.13%	0.08%

Source: Imani Horticulture Trade Study and FAOSTAT

From the data in Figure 17 below, Uganda’s national average wholesale prices are consistently below that of Kenya. For the period 2009-2011, Uganda’s average annual wholesale price was 20% below Kenya’s average price. Consequently, Ugandan producers and traders are able to take advantage of the significant price differentials that coincide with the peak production period from May to October to supply Kenya’s markets throughout the year.

Figure 17: 2009-2011 Average Wholesale Cooking Banana Prices

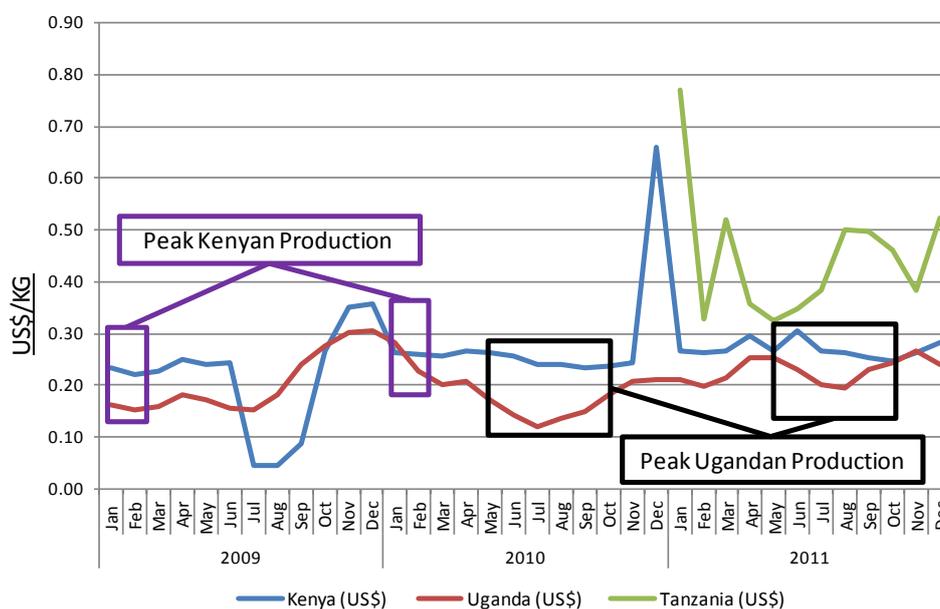
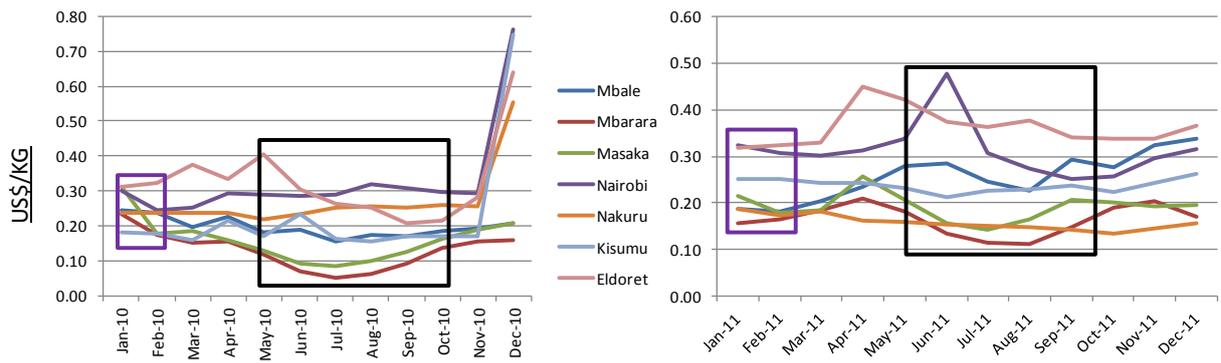


Figure 18 below shows wholesale market prices from the markets in Uganda’s key production areas from 2010 and 2011 along with the prices from Kenya’s major markets (excluding Mombasa). Early in the year, when Kenya’s Lake Victoria area is in production (purple boxes), the prices in Kisumu market are comparable (slightly below in 2010 and slightly above in 2011) to those in Uganda. Trade flows from Uganda fall off during this period but pick back up around May as Uganda’s major production areas begin harvesting (black boxes) and the differentials between Uganda and Kenya prices are at their highest.

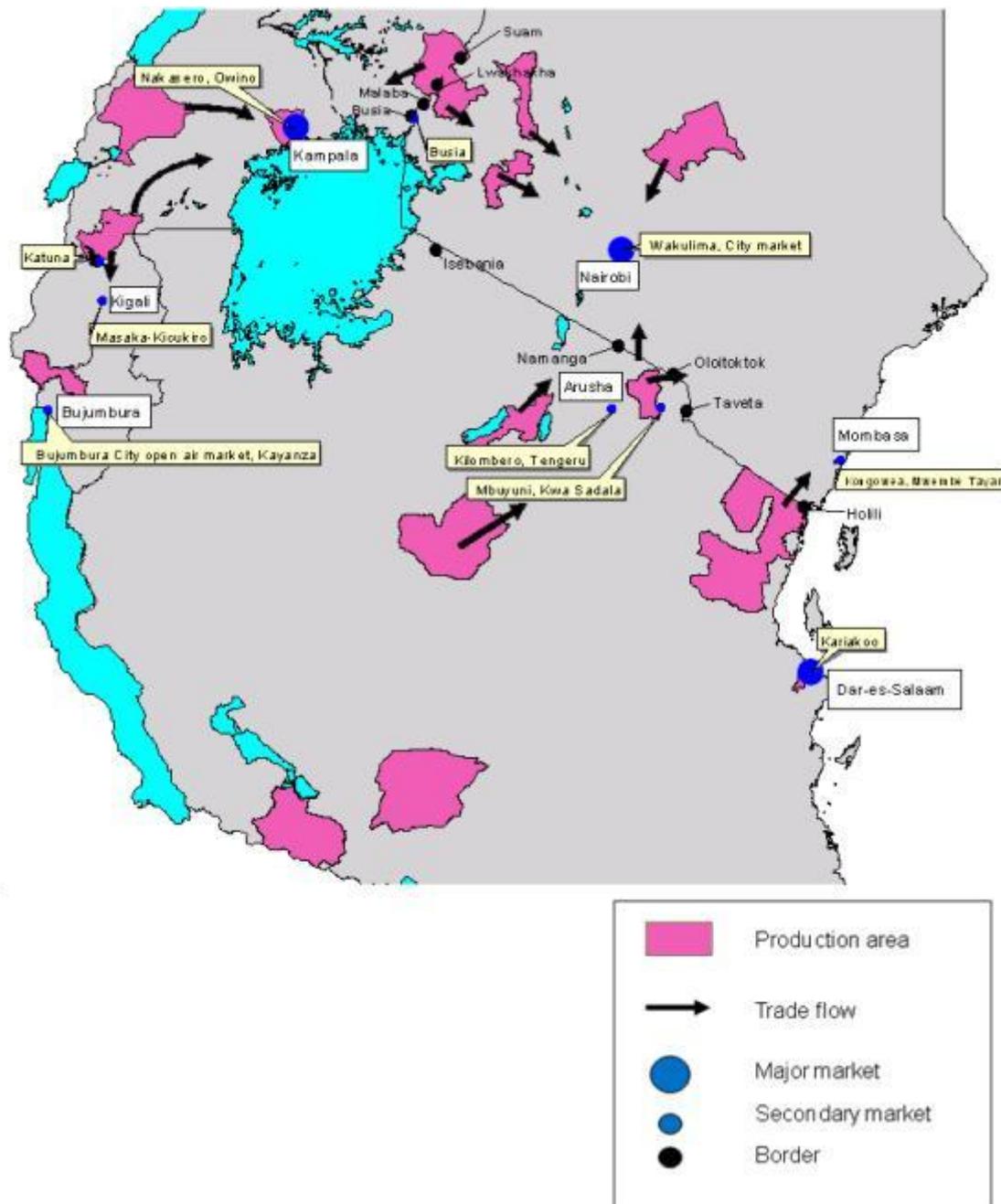
Figure 18: 2010/2011 Select Markets Wholesale Cooking Banana Prices



Onions

Trade in red onions is high relative to other staple horticulture products – roughly 7% of total production (tomato trade represents roughly 1% of production), but is still dwarfed by domestic trade. Onions trade well because they travel well – they are durable and have a long shelf-life. If onions are properly dried, packed and stored they can last up to three months which makes them more attractive to traders who are financing their movement. Onions from Northern Tanzania's key production areas are considered among the best in the region and supplement Kenya production which is concentrated in Bungoma district (30% of total) in the west and Meru district (20% of total) in central. Uganda's eastern production area also supplies Kenya throughout the year, while its southwestern production areas supply Rwanda.

Figure 19: East Africa Onion Production and Trade Flow Map



Despite having increased production by 17%/year from 2009-2011 (source: horticulture validated report 2011), Kenya demand still exceeds domestic supply. In 2010, the shortfall, only considering imports from then EAC, was about 16% (see Figure 20). While Kenya relies primarily on supply from Tanzania, Ethiopia, which was not considered during COMPETE’s cross-border trade study, is also an important supplier. Were Ethiopian imports factored in, the shortfall would be much larger.

Onions are commonly packed in oversized, extended bags



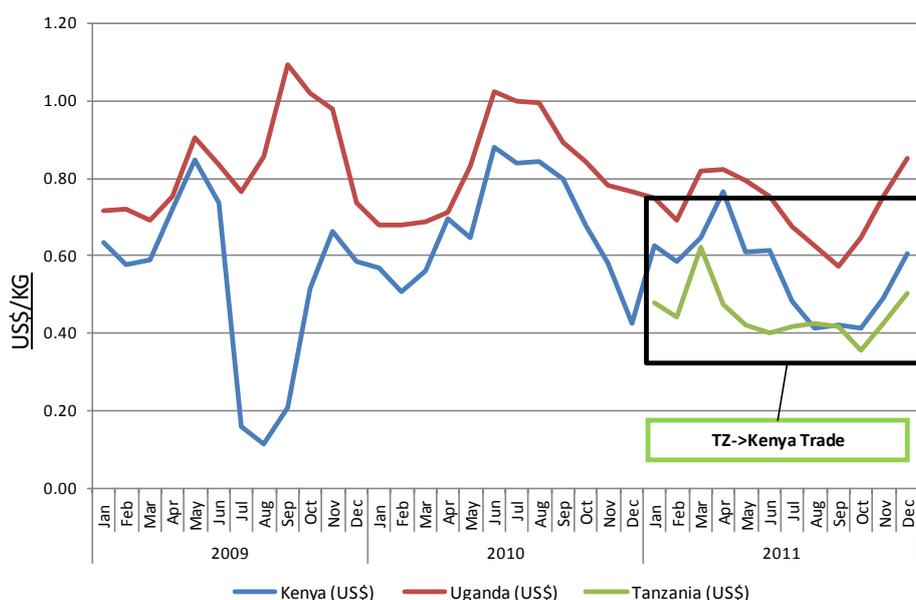
Figure 20: 2010 Onion Production and Trade Volume Data (MT)

		<u>Kenya</u>	<u>Tanzania</u>	<u>Uganda</u>	<u>Rwanda</u>	<u>Total</u>
2010 Production (MT)		89,000	53,000	195,000	10,100	347,100
		Destination				
		Kenya	Tanzania	Uganda	Rwanda	Total
Source	Kenya			2,351		2,351
	Tanzania	14,274		395		14,669
	Uganda	2,234			3,366	5,600
	Rwanda					0
Total		16,509	0	2,746	3,366	22,621
Imports/Production		18.55%	0.00%	1.41%	33.33%	6.52%

Source: Imani Horticulture Trade Study and FAOSTAT

As **Figure 21** below shows, Tanzania’s average wholesale prices are well below that of Kenya. Tanzania’s low cost of production (source: Konig) and the proximity of key production zones to Mombasa and Nairobi enables its onions to compete with Kenya’s domestic production.

Figure 21: 2009-2011 Average Wholesale Onion Prices



As Figure 22 below shows, Tanzania is a year-round supply source for Kenya. Additionally, Uganda’s leading production area is a steady source of supply for Kenya’s western markets, albeit not on the scale of Tanzania.

Figure 22: Regional Onion Trade Flow Calendar

Trade Pairings	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UG->KE	█	█	█	█	█	█	█	█	█	█	█	█
UG->TZ	█	█	█	█	█	█	█	█	█	█	█	█
UG->RW	█	█	█	█	█	█	█	█	█	█	█	█
TZ->KE	█	█	█	█	█	█	█	█	█	█	█	█
KE->UG	█	█	█	█	█	█	█	█	█	█	█	█

Looking at the trade flow patterns and volumes across five key FFV commodities revealed several things:

1. Intra-regional trade is extremely small relative to domestic trade.
2. Pockets of production that are close to borders are able to access regional markets and take advantage of seasonal price differential spikes.
3. Consumer preference for commodities from specific origins – notably Ugandan pineapples and Tanzanian onions is a driver of regional trade.
4. Data and information gaps might be keeping intra-regional trade artificially low.

Recommendations

Given seasonal spikes in price differentials between countries and between markets on different sides of the region’s borders, opportunities exist for producers and traders to take advantage of regional supply/demand imbalances and/or deliver high quality product that meets the needs of the region’s more discerning customers. To achieve this, horticulture stakeholders across the region will need to improve the availability, reliability and credibility of market (price) information. Some of the key interventions¹ could include:

1. Enhance region’s capacity to analyze price and market information.
2. Harmonize data collection methodologies.
3. Develop regional FFV market information systems.

¹ A detailed explanation of the recommendations and action steps identified in each section are shown “Recommendations and Action Plan” section at the end of the document

Understanding the Value Chains

While the range and geographical spread of FFVs across the East African region is wide, year-round availability is sporadic, knowledge of demand and supply opportunities is lacking, and storage and logistics are not well organized. The FFV business is considered high risk and volatile. Post harvest losses are high and many rural communities are missing out on the opportunity to consume fresh produce. As discussed in the previous section, existing trade is highly seasonal, most crops are extremely perishable with relatively short shelf-life and prices are volatile.

EATH conducted an assessment of the major value chain actors in selected FFV value chains to supplement secondary data collected through desk research. The focus was on providing near-term, actionable recommendations that can improve efficiency along FFV value chains. Below is a discussion of key findings revealed through field research.

In June-August 2012, the field team conducted official interviews with 195 industry stakeholders representing five different segments of the value chain: *Wholesalers, Retailers, Transporters, Associations, and Market Managers* across Kenya, Tanzania and Uganda. Figure 23 below provides descriptive statistics of the sample and country, disaggregating by both sex and youth status.

Figure 23: Demographic Breakdown of Survey Respondents

Country/ respondent	Wholesaler	Retailer	Transporter	Market Manager	Association	Total
Kenya	29	11	3	4	4	51
Women	9 (31%)	2 (18%)	0 (0%)	0 (0%)	0 (0%)	11 (22%)
Youth	0 (0%)	0 (0%)	2 (67%)	0 (0%)	0(0%)	2 (4%)
Tanzania	22	14	9	12	10	67
Women	3 (14%)	3 (21%)	0 (0%)	1 (8%)	1 (10%)	8 (12%)
Youth	4 (18%)	4 (29%)	1 (11%)	1 (8%)	1 (10%)	11 (16%)
Uganda	29	21	10	12	3	77
Women	1 (3%)	17 (81%)	0 (0%)	0 (0%)	0 (0%)	17 (23%)
Youth	29 (94%)	21 (100%)	10 (100%)	12 (100%)	3 (100%)	75 (97%)
Total	82	46	22	28	17	195
Women	12 (15%)	22 (48%)	0 (0%)	1 (4%)	1 (6%)	37 (19%)
Youth	33 (40%)	25 (54%)	13 (59%)	13 (46%)	4 (24%)	88 (45%)

Wholesale and Aggregation Market Dynamics

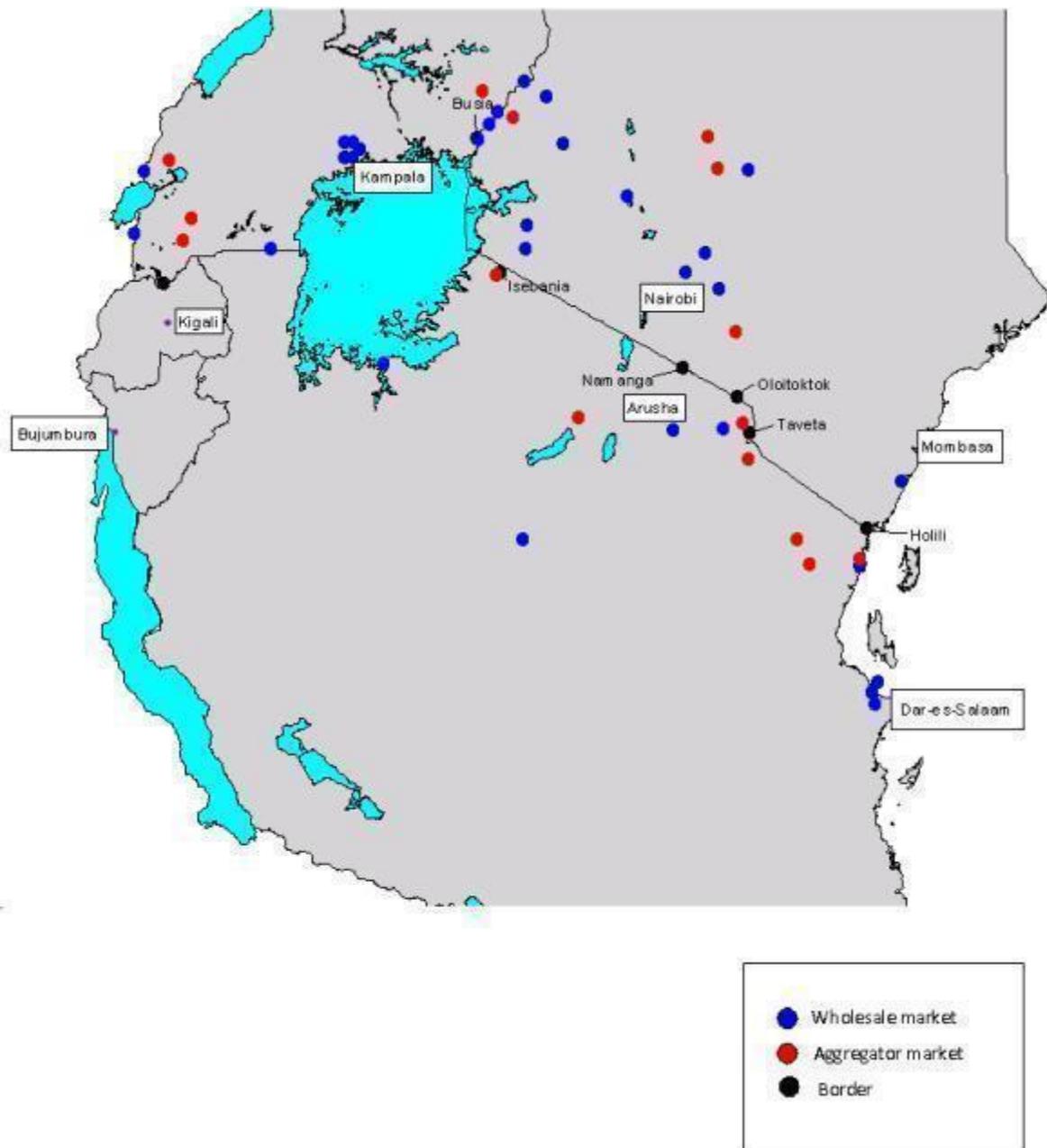
Open-air wholesale markets are the most important marketing channel for FFV in the region. Most urban households source fresh fruits and vegetables from these markets for their convenience, prices and variety of produce available. Although modern wholesale and retail sectors are growing in the region, the so-called traditional marketing sector, made up of these open-air markets dominate the retail FFV market. Combined with an array of informal retail vendors outside of market places, and small shops, traditional wholesale and retail markets carry out more than 90 percent of domestically marketed fresh produce in nearly all countries.

COMPETE interview with the market manager in Mwanza, Tanzania



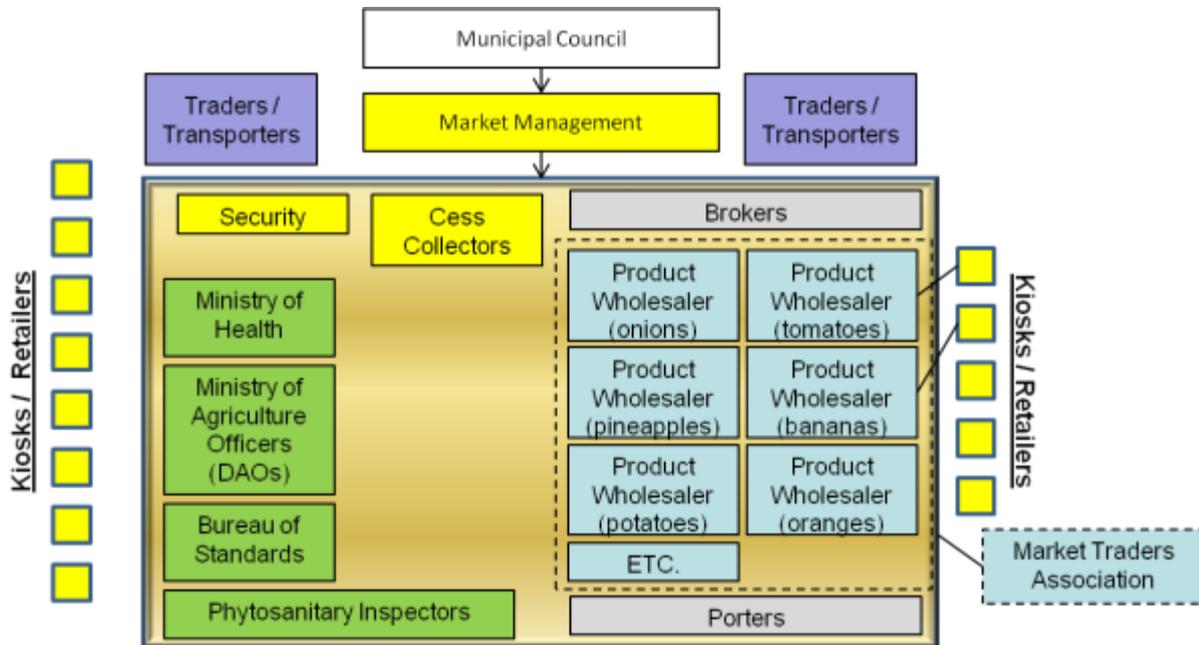
The EA Trade Hub conducted interviews in 51 markets across the three countries: 10 wholesale and 4 aggregator in Kenya, 13 wholesale and 7 aggregator in Uganda, and 10 wholesale and 7 aggregator in Tanzania (see Annex 4 for a complete list of markets surveyed). Survey data is meant to provide a snapshot of how FFVs are traded along the value chain, and to clarify how the stakeholders operate in the industry, in what products they specialize, and the ‘rules of the game’ in wholesale and aggregation markets. Finally, the survey aimed to understand challenges faced by market participants and assess the constraints that hinder trade. Wholesale and aggregation market coverage of the survey is displayed in Figure 24 below.

Figure 24: Wholesale and Aggregation Markets in Uganda, Kenya and Tanzania



The majority of formal wholesale and retail markets in East Africa are owned and managed by municipal authorities, with oversight from ministries of local government. Figure 25 represents a typical wholesale market structure in East Africa.

Figure 25: Wholesale Market Structure



Market Governance and Organization Overview

Wholesale markets often specialize in different produce. For instance, Temeke Stereo Market in Dar es Salaam specializes in fruits such as oranges, watermelons, and mangoes, whereas the nearby Mabibo (Urafiki) Market sees large volumes of Irish potatoes, bananas, and tomatoes. Market employees include security personnel, attendants and a market manager. Security personnel ensure that traders and wholesalers pay the stipulated taxes and also manage general order in daily trading. Market managers or superintendants, employed by the municipality, oversee all market operations. Relationships between the traders using the markets and these public sector authorities are often strained.

Under the market manager is a team of attendants who are responsible for collecting taxes or fees from vehicles as they enter the market. Charges are generally collected per vehicle rather than by volume which perpetuates the practice of overloading trucks. Survey results supported earlier research done by Tschirley and Ayieko (2009), revealing that fee structures are often not well defined, fee collection is a source of conflict, and use of the funds is not transparent. For example, double taxation—when a vehicle is taxed and the produce taxed again as it is unloaded into the marketplace—is a way for attendants to pocket extra money and is commonplace in wholesale markets. No fees are applied to outgoing goods.

Taxes are paid in cash and receipts are usually provided. At the end of each day attendants submit cash intake to the market manager which is then remitted to the municipal council. The municipal council is responsible for budgeting resources toward operating expenses including salaries, electricity, maintenance, and occasionally improvements in infrastructure. Attendants do not report total cash intake and pocket varying amounts of cash for themselves

which significantly limits the capacity of the municipal council to provide essential services. Refuse collection, for example, is often outsourced to the private sector and paid for by the council, provided they have the budget. Cash inflow is rarely sufficient to cover operating expenses with little to no investment of the funds into market improvements or even basic upkeep such as waste management. As a result, many markets have become physically overwhelmed and managerially dysfunctional. Market managers in all markets surveyed reported poor infrastructure, poor sanitation/ hygiene, waste management and insecurity as the most important constraints they face. Wholesale traders encounter the same constraints. From a consumer perspective, open-air markets have become known for lower quality products, unhygienic conditions and poor sanitation.

Further, local legislation on standards, packaging, and hygiene measures exists but is almost never reinforced by municipal councils because they lack incentives and the resources to do so. District Agricultural Offices have made some effort to improve standards in markets by assigning inspectors to major markets and addressing strategies for enforcing legislation with municipal authorities. Such efforts, however, have yielded limited success.

Packing regulations are rarely enforced and over packing is common



The urban wholesale FFV market is disjointed and decentralized. According to Tschirley and Ayieko (2009), physical capacity has not kept up with rapid urban population growth, resulting in unplanned and often chaotic decentralization of trade; wholesaling has often spread into existing retail markets without any new physical investment, while retailing has expanded into streets and informal market places. For example, in Nairobi, Kenya, the four principle retail markets, Gikomba, Korogocho, Kibera and Kangemi, have begun to absorb excess wholesale FFV from Wakulima, the city's principal wholesale market. Much of the produce sold in retail markets is purchased by retailers from the wholesale area of the same market. Many urban wholesalers purchase goods at one wholesale market and simply move the produce to the wholesale area of smaller retail markets early in the morning. Tschirley and Ayieko's (2009) survey indicates that important volumes of FFV are involved in this "second tier" of wholesaling. As a result, traffic congestion and lack of sanitation have become major economic and public health concerns, and conflict with city authorities, residents, and other businesses has escalated.

Market Trader Associations

Market Trader Associations (MTAs) wield a great deal of influence in wholesale markets such as the example discussed below in Owino Market in Uganda. At least one MTA operates in every major FFV wholesale market in the region and their membership represents each of the major products traded in the market. Most permanent traders in wholesale markets are members of an MTA. They lobby to keep market fees reasonable and advocate for improved services and infrastructure from the market authorities. MTAs are run by a committee that appoints a chairman although meetings are often sporadic and convened only to resolve serious issues or conflicts. Among the association leaders surveyed during the

study, the most commonly cited challenges were: limited business skills, low member participation (including late payment of membership fees) and inadequate funding.

MTAs are important for improving transparency in wholesale markets. For example, in August of 2012, the Kongowea Wholesale Traders Association (KWTA) in Mombasa organized protests, hired a lawyer and sued the City Council of Mombasa for increasing cess tax by over 100 percent without consulting traders (Otieno, 2012). Traders argued that the tax spike greatly reduced the capacity for traders to make any profit from sales of fresh produce. Cess rates for a 1.5 tonne pickup of watermelons increased from Ksh1,650 to Ksh3,500. Taxes for a 5-tonne “Canter” of produce increased to Ksh4000 from the previous rate of Ksh2300. Rate increases were even more drastic for larger volumes—fees for a 10 tonne truck more than doubled, from Ksh4000 to Ksh10, 000. The High Court in Mombasa ruled that the rates should be reviewed and the case attracted the attention of the area MP and the Mombasa Deputy Mayor who reinforced that traders should be properly consulted on such issues. The KWTA was therefore successful in influencing policy in the interest of traders.

From the surveys and interviews conducted in Kenya, Uganda, and Tanzania, select markets were chosen in each country as case studies to depict common challenges faced by market participants.

Wakulima Market, Nairobi, Kenya

Wakulima Market was built in the late 1960s as a city wholesale market and supplies fresh fruits and vegetables to most of Nairobi's 3.5 million residents. Wakulima handles an estimated 56% of the value and 67% of the volume of FFV flowing into the city's wholesale markets, dominating the flow of carrots, onions, Irish potatoes, oranges, mangoes and watermelon (Tschirley and Ayieko, 2008). It also includes a retail market. Fresh produce arrives daily from Tanzania, Uganda, and occasionally Ethiopia, and is traded onwards to supply the national and wider regional market.

A retailer in Wakulima Market, Nairobi



Wakulima operates from 4.00am to 1.00pm daily, and is owned and managed by the Nairobi City Council (NCC). Civil servants are responsible for collecting two types of market fees on a daily basis, but do not perform quality assurance or standard control of produce being sold. Traders and retailers pay for market entry and their stall and intermediaries (wholesalers) pay per unit of commodities traded on the market. Over the years the market has suffered neglect as there has been no physical expansion or infrastructure upgrades since it was built.

The market is located in the city center forcing transporters to battle Nairobi traffic to deliver commodities. Fresh produce is usually transported at night from production areas in Kenya and the region, and arrives at the market early in the early hours of the morning. Produce is usually offloaded in the dark, in designated parking zones in the market, or nearby streets, and carried in by porters to wholesalers. In many cases the produce is sold before being offloaded from the truck, and the truck moves on to retail markets.

Koenig (2008) estimated that 3000 wholesalers and retailers do business in Wakulima on a daily basis which is far beyond the market's capacity. Increased congestion over the years has lead to overflow of wholesale trade into the city's larger retail markets: Gikomba,

Korogocho, Kibera and Kangemi. These markets have little to no infrastructure or facilities. Much of the wholesale trade taking place in these markets is illegal and without a license from the NCC (Koenig, 2008). For example, wholesale traders at Gikomba Market can only trade between 4am and 8am. After 8am, the market is used exclusively for retail activities.

Kongowea Wholesale Market, Mombasa, Kenya

Kongowea is one of the largest wholesale markets in East and Central Africa where an estimated 15,000 people buy and sell FFV, dried fish, poultry and other foodstuffs each day. According to one study (Onduru, 2008), the market receives between 70 and 120 truckloads of agriculture produce each day during its busiest months (July-September; January-February). The market opens at 5am and closes at 2pm for cleaning and garbage removal. Kongowea is a municipal market with a similar governance structure to Wakulima. Built with German funding, the market has a perimeter fence, considerable covering and storage facilities for cereals and other non-perishable commodities. It is managed by the Municipal Council of Mombasa under the Ministry of Local Government. Market fees are collected from trucks outside the gate before goods and produce are allowed on the premises. Wholesale trade of FFV occurs in both covered and uncovered sections of the market. Although, the market is meant to be exclusively for wholesale trade, some retailers and hawkers trade on the premise, which has led to confrontation between wholesale traders and the market management (Onduru, 2008).

The municipal council is responsible for sanitation and hygiene in the market. Municipal staff is charged with garbage removal and cleaning daily, although traders are expected to maintain a certain level of cleanliness. Municipal council staff has had difficulty managing the volume of garbage generated daily and sanitation and hygiene remain persistent problems. In 2005, traders organized a mass protest against the Council and its failure to ensure garbage removal services and maintain acceptable levels of sanitation in the market's toilets. The protests had some impact as the Council has taken steps to improve hygiene, although it remains a major constraint to traders and market staff (Onduru, 2008). Traders we interviewed in Kongowea cited the lack of proper storage and poor sanitation as the most important constraints they face.

Kilombero Wholesale Market, Arusha, Tanzania

FFV as well as grains and rice are traded in the Kilombero market. The market was a publically owned open-air market until 2007 when the SACCOS Trader Association took over management of the market and invested in the market's infrastructure. Today, the Arusha Municipality Council maintains ownership of the land only. The Trader Association, created in 1999 regulates market access and collects fees depending on how much each trader sells. The municipality is responsible for cleaning and upkeep and security. Traders have formed sub-groups according to crop and elect representatives for each crop division. These groups meet regularly to discuss important issues and challenges. (Koenig, 2008) According to Koenig, (2008) the major problems traders face in Kilombero are insecurity and space. At the time of the study, the market did not have security lights and the market for onions was congested and overcrowded.

Kilombero is one of the most important markets for onions in Northern Tanzania with volumes traded between 120 and 220 MT/day during high season (between 24 and 67.5 MT/day during the low season). Most of the onions come from Karatu district and are sold to Tanzanian and Kenyan traders. An estimated 80 to 100 MT/month are transported to Kenya for sale (Koenig, 2008).

Other markets managed by MTAs include Mgandini, Lushoto, (Tanga region), Ukombozi (Singida). Finally, the largest market in Dar es Salaam, Mabibo Market, is entirely managed and owned by the MTA; even the market's infrastructure was financed and built by the association. It is one of the better organized FFV wholesale markets in the region. Although it appears that markets run by MTAs are more efficiently managed, it was unclear from stakeholder interviews what, if any, downsides exist to this model. A more in-depth assessment of MTA market governance would be useful in comparing various governance structures.

Owino Market, Kampala, Uganda

The largest wholesale market in Uganda and one of the largest markets in East Africa, Owino was built in the 1970's for a few hundred vendors and had over 5000 vendors and 30,000 employees by the early 1990s. Today, buyers, traders and transporters compete for space, the majority of walkways are uncovered and sewage and rain water run through open drains. Informal evening markets began to expand in the streets surrounding Owino, creating competition to the traders who operated formally within the market and during its operating hours. Market officials commonly charge illegal fees and bribes for allowing these evening markets to operate.

Traders and vendors pay considerable fees in order to do business in Owino. Vendors in the market often rent space from stall owners who own several spaces. Vendors pay rental fees, contract with transporters and security firms, pay fees to market authorities and the Market Vendor's Association (MVA). The MVA plays a large role in market organization and governance in Owino and is the largest stakeholder organization in Owino (Freedman, 2000). The association is comprised of dozens of committees formed by type of merchandise and market zoning and general oversight. Larger committees meet to discuss waste disposal, market fees, administrative practices, security, market plans and transport. Smaller committees meet to hear a wide range of disputes, resolving some of them and transferring others to higher-level committees. High-level, central committees address issues like market redevelopment plans, security and corruption linked to the evening market.

Nakasero market, Kampala, Uganda

After Owino, it is the second largest FFV wholesale market in Uganda, and also a regional market, since mangoes come in from Kenya, onions from Tanzania, and product is transported up to Juba from here. It was built in 1934 by the colonial administration as Kampala's main produce market, and the infrastructure has not been updated for the last 59 years, despite the huge increase in trade going through it.

Aggregation Markets

Aggregation markets serve as collection points for farmers and brokers to bring produce for onward transport to sale in larger urban markets, as well as local retail trade. Wholesale markets are supplied by local production zones in addition to aggregation markets. Aggregation markets are rural produce collection points located near major highways, junctions and central road networks. They are generally located in uncovered, open spaces with plenty of space for grading, sorting and re-packing. Some are close to major cross-border trading routes. For example, in Emali, Kenya, Tanzanian trucks bring onions to a

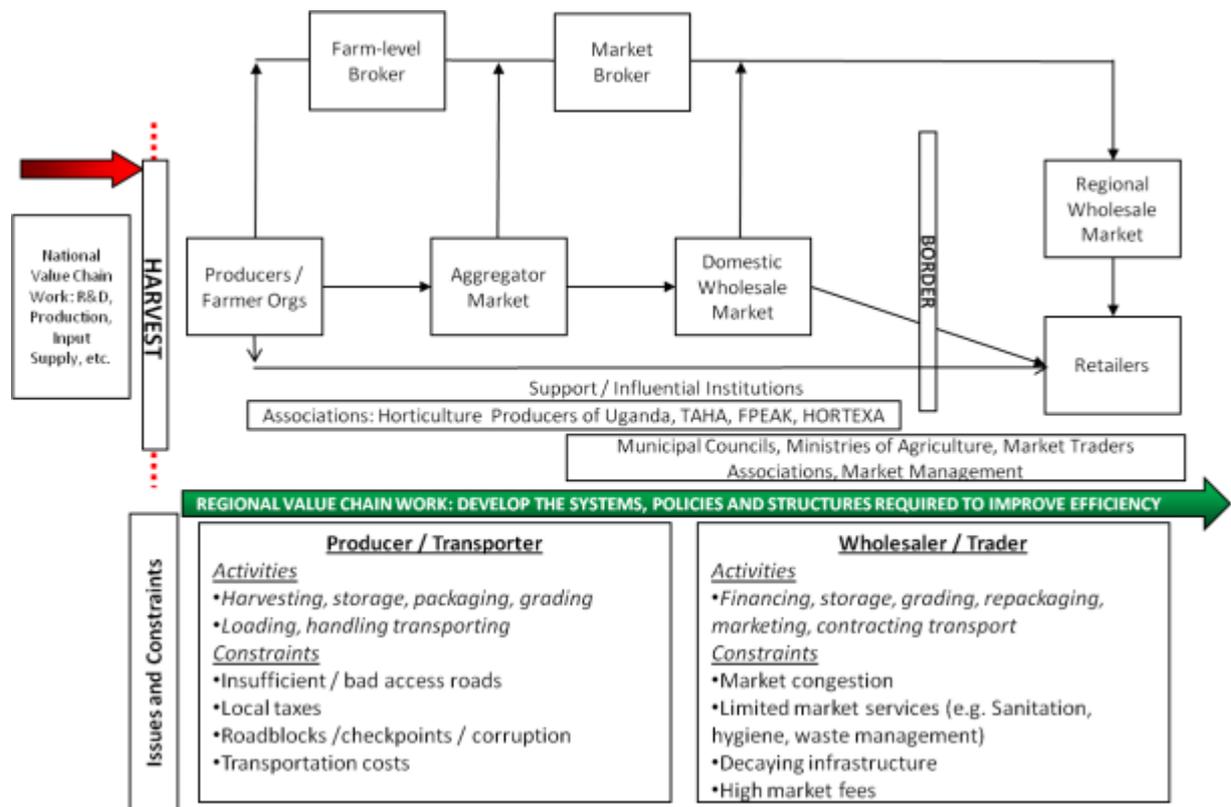
central point on the Mombasa highway. From there, product moves east to the large Kongowea market in Mombasa, or northwest to Wakulima market in Nairobi. According to Tschirley and Ayieko (2008), nearly 80 percent of all produce in Kenya moving off the farm is assembled by assemblers/ intermediaries in rural areas who then transport the produce to urban wholesale markets.

In general, aggregation in rural areas is rather dispersed with most of the produce flowing through informal assembly markets. Some aggregation markets are under the jurisdiction of municipal councils and others are the result of ad hoc rural assembly points. Most trading at aggregation markets is informal; brokers phone their counterparts in wholesale markets early in the morning to determine and set price structures. Some intermediary/ wholesalers visit farms directly, aggregating produce by the truckload for forward shipment to wholesale markets. The volume of produce that bypasses aggregation markets can be considerable. In Kenya, an estimated one-fifth of all produce coming off farms flows directly to retail traders in the capital city (Tschirley and Ayieko, 2008).

Value Chain Actors, Activities and Constraints

Below is a map of the FFV value chain actors, activities and constraints. Relationships between actors are informal, based on family ties and friendships and a very low level of coordination exists between actors within and across different segments of the value chain. Relations between value chain actors are usually spot-market. For the purpose of this study, we use definitions and terminology borrowed from Koenig et al. (2008) combined with data collected from markets surveyed. Male traders dominate the more profitable wholesale segment of the horticulture value chain compared to farming and retailing which consist mainly of women and youth.

Figure 26: Regional Horticulture Value Chain Actors, Activities and Constraints



Producers

FFVs are generally produced by small- and medium-scale farmers who grow one or two crops as primary cash crops. Farmers generally sell to the first buyer who comes along or the buyer with the best price. Producers often depend on traders for transport to the markets and selling price is thus dictated by traders (intermediaries) and not farmers (Koenig, 2008). Producers generally have limited access to price information and therefore little bargaining power with buyers. A lack of on-farm storage facilities also forces farmers to sell produce immediately. Finally, farmers have little to no knowledge regarding consumer preferences, or quality grading standards. What producers cannot sell to buyers at farm gate is usually consumed at the household level or sold in small quantities in local markets. In some cases, this can cause considerable losses for farmers who are poorly connected to buyers and markets. Women generally take the lead in growing vegetables and focus on crops for household consumption, selling any excess. Men cultivate cash crops primarily for sale which leads to a disproportionate portion of agricultural income going to men.

Traders

Different types of traders are involved in various segments along the value chain. Traders include: intermediary traders (at aggregation points), brokers and wholesale traders. Produce often passes through several traders before reaching the consumer, but can also be traded directly off the farm to a retailer. A retailer is not a trader, but sells produce to consumers. This study observed that over half the traders in markets were youth and over 70 percent of those engaged in cross-border trade (formal and informal) are under 30. The FFV sector thus provides employment opportunities that are open to youth.

Survey results found that in general, formal business offices for traders are not common and low levels of membership (30 percent of all respondents) in associations implies a relatively low level of cooperation and coordination, although this number was highest at 50 percent in Tanzania. The relative longevity of businesses observed and the low proportion of formal office space suggests that operations and relationships are largely informal, and that low levels of investment are common, which may explain why the sector is appealing to youth.

An **intermediary** generally purchases produce from one or more farmers, grades and re-packages it and then sells in bulk to wholesalers who trade goods in a wholesale market. An intermediary may also buy goods from a broker or another intermediary at aggregation markets or smaller wholesale markets and can sell produce to large suppliers or institutional consumers although sales to other wholesalers are most common.

A **wholesaler** is a trader who operates and sells goods exclusively in an established wholesale market. The wholesaler buys goods from intermediaries, often via a broker, and sells to either another wholesaler or a retailer. Wholesalers generally specialize by product category, set opening prices and control price changes throughout the day. Wholesaler traders in markets keep constant contact with intermediaries in order to control supply of produce, requesting more if demand is high or avoiding large surpluses. Because of the of cash constraints and the lack of storage space, especially cold storage, wholesalers try to sell all FFV stocks by the end of each day causing volatility of market prices.

The lack of storage, notably cold storage was the most frequently cited constraint across countries and value chain actors. A relatively small number (16%) of traders interviewed have storage onsite or near the market, and are able to hold inventory of produce. Traders that do have storage facilities are able to set market prices and take advantage of higher prices when incoming supplies dwindle. The majority of traders bring produce to the market by truck before sunrise and expect to sell out in a single day. Those that do not sell out often keep their product overnight in the truck or on the ground at the market and pay another day's fees for the market space and the truck in order to clear their inventory. Wholesale prices generally drop in the course of a trading day.

Market entry can be difficult for wholesalers because business relationships are so informal. Interviews with key informants indicate that to successfully enter into the market, a wholesaler must purchase goods at a loss until he builds trust with intermediaries and/or brokers along the supply chain. Thus, a trader must have the capacity to invest a considerable amount of capital upfront to successfully enter the market as he will likely suffer losses for several weeks before he will successfully find produce at realistic, market prices.

A **broker** is different than an intermediary or wholesaler in that he does not own the product at any point in the value chain (Koenig et al. 2008). A broker's role rather is to link buyers to sellers and negotiate prices on behalf of either party. Brokers are paid a commission by either or both parties in the transaction. Brokers at farm-level connect producers with intermediaries and at market level connect intermediaries with wholesalers. The vast majority of FFV are marketed and sold through brokers, also referred to as 'middlemen.' They have therefore a large influence in price setting. Collusion is common, if not standard, among brokers. Many brokers deal in just one commodity leading to the formation of cartels.

Transporters

Few traders own their own trucks, which are usually rented from transporters, and range in size from five to 18 metric tons (Fuso Canters, Fighters, or Ten-wheelers). Traders in Kenya and Tanzania did not express preferences for specific transporters, perhaps due to high competition in the marketplace, while in Uganda most traders reported seeking out transporters with whom they had contracted previously, or which provided credit or laborers to assist with offloading. Few respondents reported combining shipments with other traders, reaffirming the low level of cooperation among traders for anything but price information. The main constraints expressed by transporters interviewed were: the excessive number of police checkpoints and road blocks along trade routes, extortion from police and inadequate parking space and congestion in wholesale markets.

Trader loading produce to a canter truck from a tractor



Retailers

Retailers purchase goods from wholesalers or other retailers and sell to consumers. Many retailers operate in the same wholesale markets from which they source FFV. Others transport produce to kiosks or other retail markets. The majority of FFV retailers in East Africa are women. In Nairobi, for example, 74 percent of businesses in open-air markets and 72 percent of kiosks are female-owned according to Tschirley and Ayieko (2009). Our survey results support these figures; our findings indicate that 70 to 80 percent of those working in markets surveyed were women.

According to our survey, the most significant constraints faced by retailers included: lack of storage / cold storage in marketplaces, poor market infrastructure, and seasonality of supply, perishability and wholesale price fluctuation / volatility.

Cooperation

Cooperation between all actors along the value chain is low. Most operate individually without the support of farmer or business organizations or contractual agreements (Koenig, 2008). Farmers groups are uncommon in the countries of study and survey results show that membership in traders associations is low. The little cooperation that does occur is based on friendship or family relations and information on prices, buyers, and markets is exchanged in this way. Agreements and informal contracts between market participants are characterized and even dependent upon, very high levels of trust (Koenig, 2008). For example, a wholesaler may agree with a broker on a price for a commodity in the morning and will receive volumes of the commodity without immediate payment. The wholesaler then sells his supplies to one or more retailers. Retailers often pay the wholesaler progressively throughout the day as they sell goods to consumers. Wholesalers generally set buying prices with retailers but retailers are in a strong bargaining position when



Women play a key role in the retail segment of the value chain

setting price to sell to consumers. The bargaining power of retailers, however, differs considerably between high and low seasons as supply fluctuates.

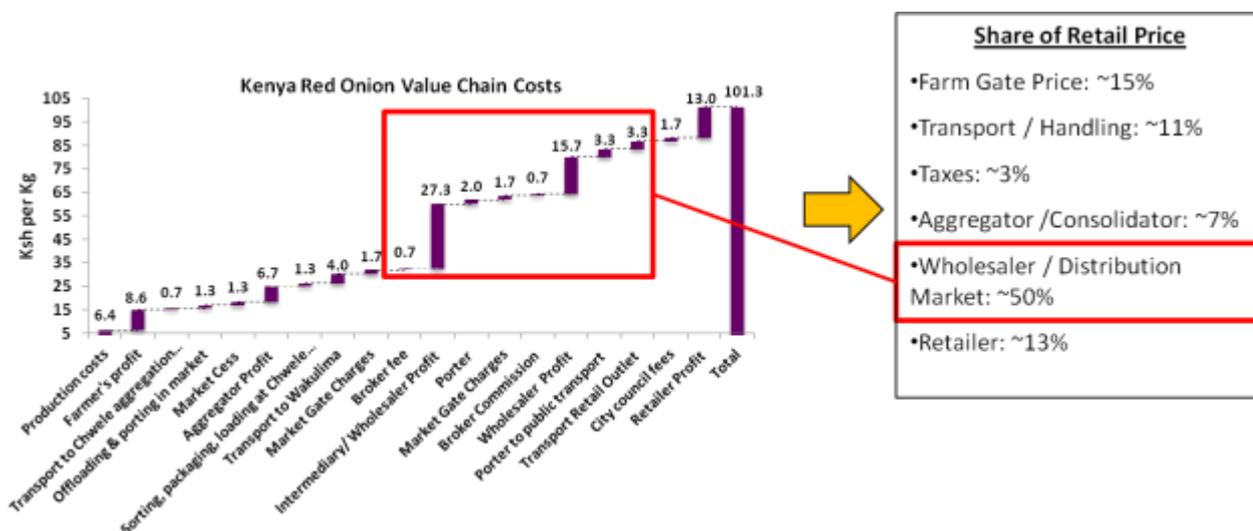
Inefficiencies in FFV Value Chains

Inefficiencies along East Africa’s FFV value chains create roles for intermediaries that drive up costs and push FFVs out of the reach of those that would benefit most from increased consumption. As indicated in Figures 2-5 below, a large proportion of cost is added at primary wholesale and distribution markets—the main point of entry for regionally-traded FFV.



The costs, prices and profits along the red onion, pineapple, tomato and orange value chains below are intended to provide a snapshot of FFV value chains in the region. Cost and price figures were collected during field study between July and August 2012. As mentioned previously, costs and therefore prices fluctuate substantially depending on seasonality, climate, and other factors. Further, actors and their roles along FFV value chains often overlap. A transporter may also be a broker or wholesaler and a wholesaler sometimes engages in retail trade. This underlines the informality of the sector. Therefore, costs and margins indicated here do not reflect average prices across seasons and countries.

Figure 27: Kenya Red Onion Value Chain Costs



Most onions in Kenyan markets between June and November are mostly from Tanzania. Costs and prices indicated in Figure 27 above were collected in July 2012 and thus reflect the low season in Kenya when farmers produce very little because of high supply from Tanzania from April to August (Koenig, 2008). During this season, post-harvest losses can range between 10 and 80 percent (median 15 percent), mostly because farmers are unable to sell their product in time. Koenig notes that most traders prefer Tanzanian onions during these

months because they have the same price point but are better quality. On the contrary, farmers lose very little (3 percent) during the second season (from October to March) when supply from Tanzania is low.

Onion farmers do not generally go to aggregation markets to sell their produce. Because transport and packaging is too expensive, they rely on brokers to identify buyers to purchase at farm gate. Intermediaries purchase onions and arrange for transport to aggregation markets. Farm gate price fluctuate substantially between high and low seasons. Kenyan farmers make little or even negative profit during the low season (April-August) because of high volumes and competition from Tanzania during these months. Conversely, prices during peak season can reach more than four times as high than in first season (Koenig, 2008).

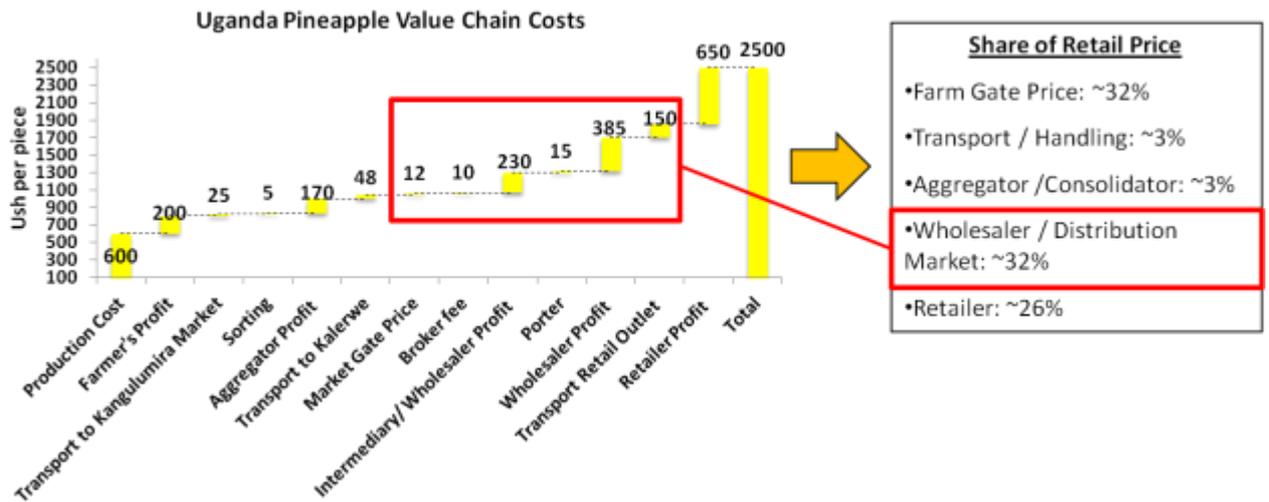
Onions are sorted into three grades. Grade 1, the best grade consists of medium-sized onions. Big onions or twins are considered Grade 2, and the rest Grade 3 (Koenig, 2008). In some cases, brokers sort and grade onions, and in others intermediaries purchase ungraded bags at an average price for different grades and sort the onions themselves (Koenig, 2008).

Aggregators have the lowest profit margins, with profits even slightly lower than those of the farmer. This is partly because aggregators incur most of the sorting, grading and packaging, as well as transport costs before onions reach the wholesale market.

The red onion value chain in Kenya involves a number of actors and transactions before goods reach the end market which drives up costs for consumers. As **Figure 27** shows, costs related to wholesale trade including broker fees and wholesaler profits account for roughly half of the retail market price. Wholesaler traders have the highest gross margins in this value chain, followed by retailers. Onions are packaged and sold in 100kg bags although they usually contain up to 145kg. They are sorted and packaged into smaller nets which officially hold 14kg but usually contain 16-20kg. Because bags are never weighed, traders routinely use heavier bags when it is profitable to do so. Because onions are easier to store than other FFV, traders can make higher profit margins. Wholesale traders can keep onions in the market for up to two weeks with no shelter when it is not raining (Koenig, 2008).

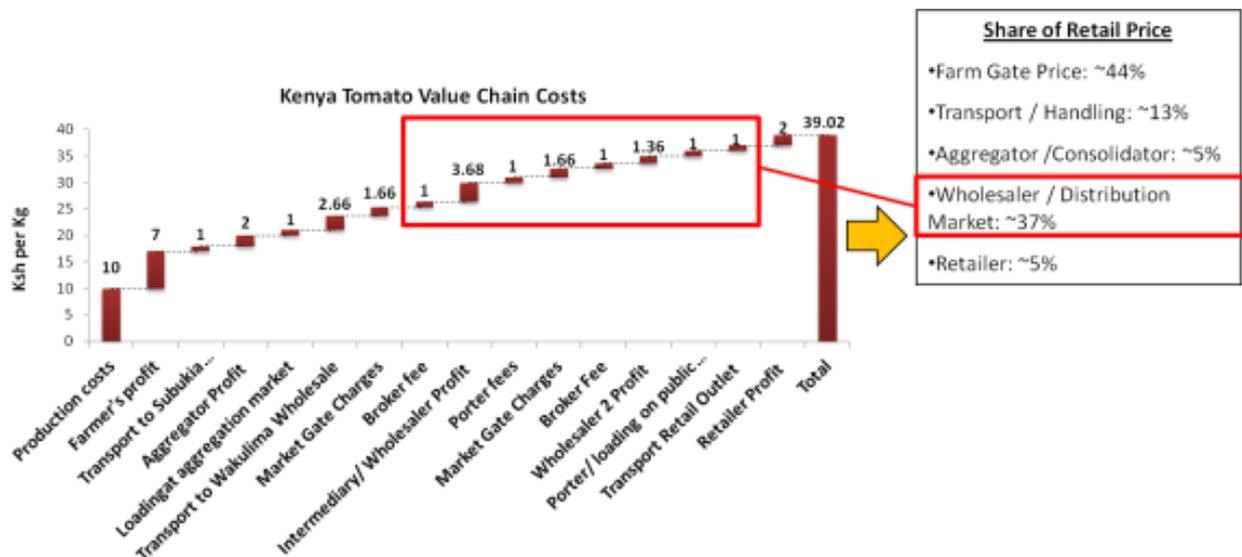
An estimated 100 onion retailers operate in Wakulima and just as many reportedly in Gikomba retail market. Retailers sell between 1,400-1,800kg per month depending on the season. Costs, and therefore prices, do not fluctuate very much from season to season although profits are slightly higher during season one (Koenig, 2008).

Figure 28: Uganda Pineapple Value Chain Costs



The Ugandan pineapple value chain is shorter with fewer actors and transactions than Kenyan FFV value chains we studied. Costs associated with wholesale and distribution, although lower than in Kenya, still account for nearly one-third of the total retail price. In this value chain, the retailer has the highest profit margins. The farmer earns relatively high profits compared to intermediaries along the value chain; the aggregator earns the least profit. Transport and handling is comparably low for pineapples as they are less fragile than other FFV. Pineapples also have a longer shelf-life than other FFV and do not require packaging.

Figure 29: Kenya Tomato Value Chain Costs



The retail price of tomatoes fluctuates greatly between high and low seasons (Koenig, 2008). Supply-side variables including seasonality and disease influence prices more than demand, which remains relatively constant year-round. Price information for the Kenya tomato value chain was collected in August 2012 during the low season.

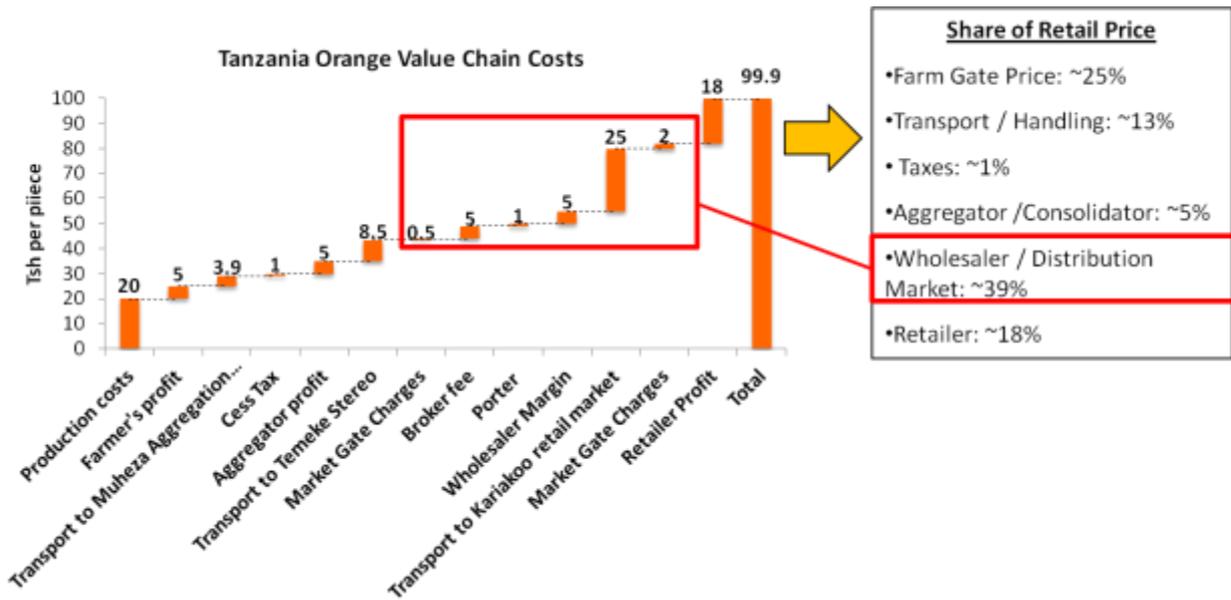
Tomato production is labor and water intensive which drives up production costs. Tomatoes are also particularly vulnerable to pests and disease and require more pesticides than other FFV. Initial sorting and packaging is done at farm level to prepare goods for sale at aggregation markets. Traders who purchase tomatoes directly from the farm prefer to pack themselves. A study of tomatoes grown in Mwea Division, Kenya, conducted by Koenig (2008) revealed that tomatoes are graded into four to six different grades according to size and presence of skin blemishes. A grade 1 tomato will be the largest and without skin blemishes (Koenig, 2008). Generally, only grades one and two tomatoes are packaged and marketed for wholesale. Lower grades are generally consumed by the household or sold in local markets. Although tomatoes generally travel shorter distances than other FFV, transport and handling costs remain high due to their fragility, high perishability and extremely short shelf-life.

As shown in Figure 29 above, the number of transactions within the wholesale and distribution segment of the value chain drives up the retail price of tomatoes in Kenya. For example, tomatoes are handled by two separate wholesale traders, and thus, two brokers before they reach the retailer. As a result, traders achieve much lower margins compared to the other value chains discussed. However, during the high season, wholesalers achieve higher profits compared to other value chain actors because they are responsible for price setting and can obtain a higher profit per kilogram. Moreover, there are fewer wholesalers, and thus less competition, in markets than retailers.

The retailer makes a marginal profit of five percent of the retail price. However, it is important to consider that profit distribution for tomatoes varies greatly between high and low seasons. Farmers in the tomato value chain generally make a very high profit in the low season—often the highest profit of all the actors in the value chain—and a negative profit in high season.² The same is true for tomato growers in Tanzania. Retailers make an even lower profit, sometimes no profit at all in high supply seasons as they have little bargaining power with wholesalers who set prices. Moreover, consumers are unwilling to pay high prices when supply is high (Koenig, 2008).

² According to Koenig (2008), this applies only to farmers with access to irrigation technology and therefore the capacity to cultivate during dry seasons when market supplies are low.

Figure 30: Tanzania Orange Value Chain Costs



Data for costs along the Tanzania orange value chain was collected during July 2012 at the height of the peak season when supplies are high.

Orange farmers sell oranges directly off the tree. Farmers rarely ever harvest, package and transport oranges themselves, but rather, identify buyers before harvest. A buyer then comes to the farm to pick, count and load the oranges for transport to aggregation markets (Haiyan, 2008). Intermediaries thus incur labor costs for picking and packaging in addition to the farm gate price.

Like the FFVs discussed above, the majority of costs in the Tanzania orange value chain are concentrated within the wholesale/distribution segment of the value chain representing nearly 40% of the retail price. However, wholesaler profits are comparably low with an equal profit distribution between the farmer, aggregator, broker and wholesaler. As wholesale traders are responsible for price setting, the comparatively low profit margin in Figure 31 above reflects the oversupply of oranges in wholesale markets during the peak season. In the Tanzania orange value chain, the retailer makes the highest profit share at 18 percent of the retail price. Retailers generally sell oranges at roughly double the cost price as is the case in above.

Figure 31: Average Costs along Selected FFV Value Chains

FFV Value Chain Cost Category	Range Share of Retail Price
Farm Gate Price	15-44 %
Transport/ Handling	3-13%
Taxes	1-3%
Aggregator/ Consolidator	3-7%
Wholesaler/ Distribution Market	32-50%
Retailer	5-26%

Overall, costs at the wholesale and distribution levels of the value chain account for the largest share of the retail price for FFV. As shown in Figure 31 above, costs associated with wholesale and distribution segment of the value chain range from 32 to 50% of the retail price. Market inefficiencies that contribute to these costs include lack of storage in wholesale markets which leads to product loss, overcrowding and congestion in market places, and price volatility. Further, a lack of coordination between actors as well as inefficiencies in institutional structures forces more actors than necessary to be involved in marketing activities and enables actors to cheat or otherwise engage in collusion and other rent-seeking activities.

Recommendations

The bulk of the costs associated with the FFV trade are concentrated within wholesale markets. Market management and governance is weak and essential services like sanitation, waste management, basic maintenance and storage are not provided even though market fees are presumably paid for such purposes. As civil servants employed by the municipality, market managers have little incentive to improve the delivery of service to wholesale market actors or advocate on their behalf because they are themselves constrained by insufficient resources. Although addressing larger, structural constraints like police extortion and poor road infrastructure remain outside the scope of horticulture-focused interventions, activities targeted toward soft infrastructure in wholesale marketplaces have high impact potential.

1. A potential near-term intervention would be to improve communication and coordination among key wholesale market actors like municipal councils, traders, market managers and trade organizations, by establishing Joint Market Committees (JMCs). Through JMCs, stakeholders can begin to address and rectify key constraints and challenges and promote collaboration. USAID can begin by identifying regional wholesale markets with the potential and willingness to launch a JMC and piloting the concept in one or two wholesale markets.
2. Promote the outsourcing of select non-essential services to reduce costs and improve service delivery.
3. Develop public-private partnerships (PPPs) and/or privatization of wholesale market management.

Divergent and inconsistent national and regional trade policy and standards issues constrain intra-regional trade of most commodities. The FFV sector is still highly unregulated and consequently very informal. Little is done to ensure regulations are enforced at municipal markets. Our research revealed that local market traders associations want improved standards and better (and enforced) regulations. There are several areas where the regional mission could address these constraints:

1. Promote the roll out of the simplified certificate of origin (SCO) at key FFV borders and increase awareness among traders.
2. Work with the industry to develop better packaging and handling standards for FFV.
3. Develop regional grades and standards for FFV.

Impact on Food Security and Nutrition

Household food security exists when “all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996). Food security involves access, availability and utilization of food. Food consumption characteristics and dietary diversity are two commonly used measures used to assess food security. For the purpose of this study, research using these measures was consulted to assess how intra-regional trade flow might affect food security and nutrition outcomes in the region, specifically by increasing availability and affordability.

A varied diet provides different nutrients necessary to the body for growth and maintaining health. Although the prevalence of acute malnutrition remains relatively low in Kenya, Tanzania, and Uganda, they nevertheless remain food deficit countries with persistent food insecurity and global chronic malnutrition. Food insecurity and malnutrition are largely socio-economic problems and remain a major concern to policy makers and development partners. Poor access to and availability of nutrient-rich foods are often the result of unstable livelihoods and seasonality of income and prices.

Current Consumption Patterns of FFV

Although diets in East Africa are generally staple food heavy, demand for high-value horticulture products and particularly FFV has increased as a result of the growing middle class. Income elasticity of demand for FFV in the region is generally high, contrary to demand for grain products, which is income-inelastic (Koenig, 2008). Staples share in total food budgets are thus expected to decline as incomes rise resulting in increased dietary diversity.

FFV are essential to children's nutrition



However, current FFV consumption patterns of middle and upper income groups suggest that demand for FFV remains relatively low compared to other food groups in the food basket.

Not just low incomes but also limited awareness of the importance of nutrition are the two main constraints to dietary diversification. Thus, should regional trade increase enough to stabilize FFV prices, it is unclear whether or not more stable prices alone will lead to increased consumption of produce or other food groups. Moreover, prices would need to decrease considerably to affect lower income households which generally have the lowest dietary diversity and the highest risk of food and nutrition insecurity.

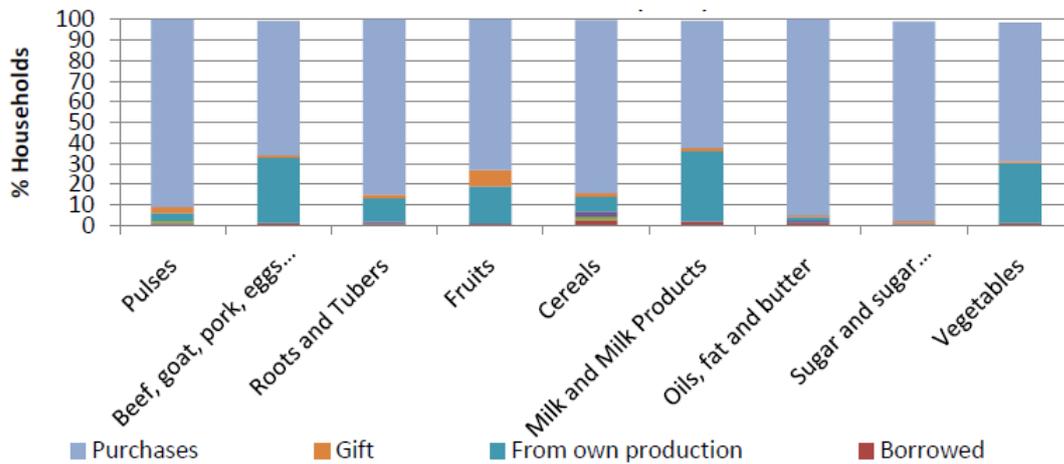
Kenya

Approximately 10% of Kenyans are said to be food insecure and up to 30% of the food insecure live in urban and peri-urban centers according to a study on consumption and expenditures on food commodities in urban households in Nairobi done by Kamau, Olwande and Githuku (2011). Poor dietary diversity is a key driver of food insecurity in urban Kenya, home to nearly 35 percent of the country's population.

Cereals are the most important element of households' food basket. A 2012 WFP market and household survey of seven districts in Kenya indicated that Kenyans consume vegetables an average of five days per week and fruits an average of just one day per week. The survey

found that although many Kenyans outside of urban centers source some food from household production, the major source of all foods is from purchases as shown in Figure 32 below. Own production was the second most important source of food particularly for milk products and vegetables. Urban households in Kenya purchase nearly all food items and are thus highly dependent on markets for supply of FFV.

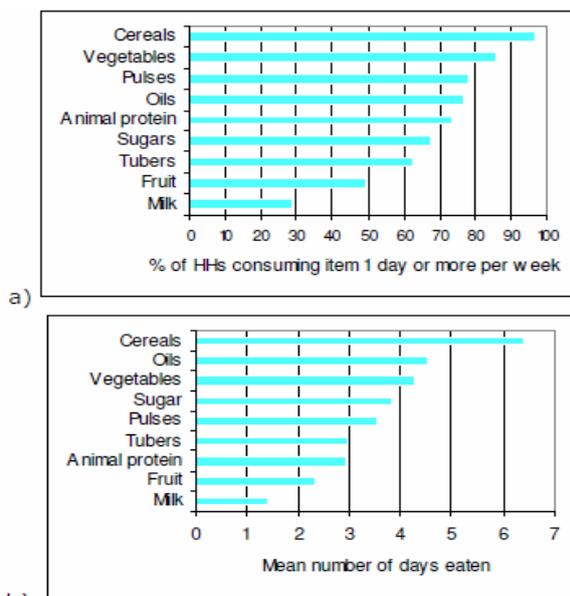
Figure 32: Main Food Sources for Kenyan Households (%HH)



Source: WFP 2011

Kamau et al. (2011) found that the proportion of food budget spent on fruits and vegetables in urban households varies little between income quintiles. Although the food budget increases as income increases, the proportion of expenditure on FFV remains fairly consistent. For example, households in the lowest income group spent the greatest proportion of their food budget on staples (32%) while the wealthiest households spent the largest proportion of their food budget on meat and eggs (23%). Proportion of food budgets spent on FFV varied little

Figure 33: Food Item Consumption: Tanzania



a) Percentage of households consuming item at least one day a week; b) Mean number of days item consumed
(Source: CFSVA Tanzania 2010)

between income quintiles ranging between 21% and 23% for the lowest and highest income groups, respectively. These figures suggest that while dietary diversity seems to increase with income, preferences toward food groups other than FFV seem to account for increased expenditure on food.

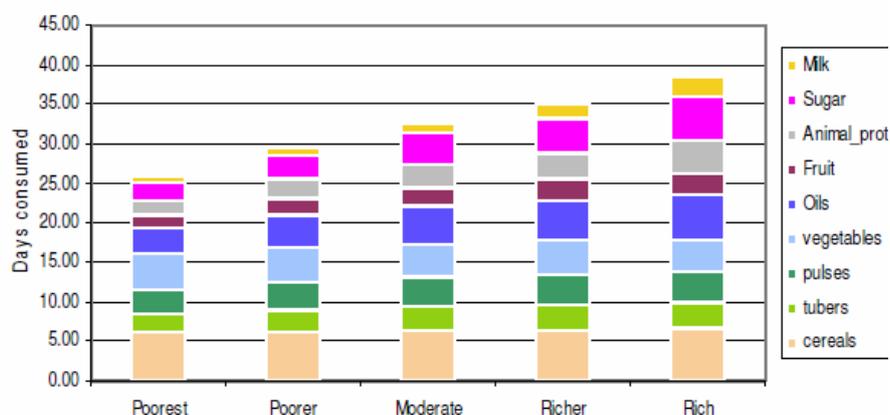
Tanzania

According to the 2009-10 Tanzania Comprehensive Food Security and Vulnerability Analysis (CFSVA), diets in mainland Tanzania are mainly cereal-based, consumed at least one day per week by 97% of households. Vegetables are eaten roughly four days per week. Fruits are consumed less frequently, only about two days per week as shown in Figure 33.

Consumption of fruit varies somewhat with income and very little for vegetables. The CFSVA findings indicate more diversified diets as wealth increases but pulses, oils and sugars appear to be the first food items to

increase as wealth increases. As households become even wealthier, both milk and animal protein consumption show the largest increases. As Figure 34 below indicates, fruit consumption does increase slightly with wealth, but vegetable consumption does not seem to differ substantially by wealth, nor does cereal consumption.

Figure 34: Mean Days Food Item Consumed by Wealth Quintile: Tanzania



Source: CFSVA Tanzania, 2009-10

Overall, markets are the primary source of food items consumed in mainland Tanzania. Households across livelihood profiles, income groups and regions purchase at least 60% of their food from markets as opposed to home production. However, in terms of individual food items, fruits and vegetables are accessed equally between own production and purchase.³

Uganda

Over 20% of the Ugandan population is food insecure or moderately food insecure according to the Uganda CFSVA (2009). The majority of Ugandan households depend on local markets for some or sometimes all of food items consumed, depending on the time of year. On average, food is the largest household expenditure accounting for 54 percent of the total. The main food sources in Uganda are purchases accounting for 55 % of all food items followed by own production (33% of all food items).

Ugandans typically only spend about 8 % of their food budget on fruits and vegetables compared to the other high-value food group, milk, meats and eggs which accounts for 20% of total food expenditure. These figures reflect the importance of meats, eggs and milk to the Ugandan diet in contrast to fruits and vegetables. In general, Ugandans eat vegetables an average of three days per week and fruits an average of two days per week. There is little variation in FFV consumption across income groups. Households in the lowest income bracket consumed vegetables an average of three days per week and fruits 1 day per week. Those in the highest income group also ate vegetables just three days per week and fruit an average of two days (CFSVA, 2009).

Average quantities of FFV consumed across all three countries and proportion of food budget spent on fruits and vegetables suggest that FFVs are not an important component of the food basket (see Figure 35). Average volumes of fresh produce consumption in all three countries reveal a relatively low consumption of FFV compared to other food groups regardless of

³ The CFSVA survey notes that this heavy reliance on purchase rather than production is somewhat surprising and could be partly explained by the fact that the data generated was collected during a lean period (Nov-Jan) when food stocks are generally in decline. That said, reliance on food purchases has declined somewhat since 2005/2006. (Tanzania CFSVA 2009/2010)

income and wealth. Households across income groups in all three countries indicate preferences toward meat and dairy over FFV as expenditures on meat and dairy increase more with wealth than do expenditures on fruits and vegetables.

Figure 35: Diet Consumption and Food Sources Kenya, Tanzania, Uganda

	Expenditure		Consumption		Food Source	
	% of total household expenditure on food	% of food budget spent on FFV	Avg. consumption of fruit per week	Avg. consumption of vegetables per week	Purchased (Markets)	Own production
Kenya	48%	4%	1-3	3-5	60-70%	1%
Tanzania	54%	6%	3	4	60%	35%
Uganda	54%	8 %	2	3	55%	33%

Source: CFSVA Kenya, Tanzania, Uganda and WFP 2012

Closing the Micro-nutrient Deficiency Gap

Fruits and vegetables are essential to an adequately varied diet. The World Health Organization (WHO) recommends the consumption of at least 400g of fruits and vegetables per day to provide essential, necessary nutrients lacking in other food groups. Fruit and vegetables contain a range of macro and micronutrients including pro-vitamin A, iron and zinc which help to prevent malnutrition. Good nutrition, as we know, is essential for cognitive development in infants and economic and social potential of adults.

Under-consumption of fruit and vegetables is among the top ten risk factors leading to micronutrient malnutrition and is associated with the prevalence of chronic diseases. Deficiencies in vitamin A, iron, zinc, and iodine are the four main micronutrient deficiencies affecting human health in Africa (Keating, 2010). Fruits and vegetables provide substantial amounts of two of these micronutrients, vitamin A and iron. They are also essential sources of calcium, fiber, folate, magnesium, potassium, sodium, and vitamin C.

The United States Department of Agriculture (USDA) recommends that adult men and women consume at least 2.5 to 3 cups of vegetables and 1.5 to 2 cups of fruit per day. As mentioned above, although diets in Uganda, Tanzania and Kenya generally provide enough macronutrients (energy), they do not meet these guidelines and are micronutrient deficient. As discussed above, low incomes and affordability of FFV is not the only constraint to nutrition security. A lack of awareness of nutrition and the importance of micronutrient-rich foods like FFV play a key role in inadequate dietary diversity in East Africa. Our survey results support this assertion. Most retailers interviewed responded that very few consumers were motivated by nutrition when purchasing FFV and reported a very limited awareness

Increased intra-regional trade of FFVs will undoubtedly have a positive effect on food security in East Africa, although the extent of the impact is questionable. As Figure 36 and Figure 37 reveal, the most widely traded FFV in the region is not necessarily the best sources of essential micronutrients. For example, the commodities selected for this study have relatively low levels of iron and Vitamin A, two main deficiencies that contribute to malnutrition in the region, compared to other fruit and vegetable varieties and/or other food sources. African Indigenous Vegetables (AIVs), which are mainly traded domestically, contain much higher levels of Vitamin A and iron than do more regionally traded FFV. Moreover, very high volumes of these FFV need to be consumed to satisfy the recommended

daily allowance of essential micronutrients; quantities which remain far out of reach from the households that need them the most.

Figure 36: Micro-nutrient Content of Select FFV (per 100g)⁴

	Iron (mg)	Zinc (mg)	Pro-vitamin A (mcg)	Vitamin C (mg)	Calcium (mg)	Fiber (g)	Folate (Folic Acid) (mcg)	Magnesium (mg)	Potassium (mg)	Beta Carotene (mcg)
RDA*	18	8	700	75	1,200	25	400	320	4,700	1800
Mango	.16	.09	54	36.4	11	1.6	43	10	168	290
Onion	.21	.17	0	7.4	23	1.7	19	10	146	1
Tomato	.27	.17	42	13.7	10	1.2	15	11	237	449
Pineapple	.29	.12	3	48	13	1.4	18	12	109	35
Orange	.10	.07	11	53	40	2.4	30	10	181	71
Banana	.26	.15	3	8.7	5	2.6	20	27	358	26

*Recommended Daily Allowance (RDA) based on suggested values for women aged 19-50 yrs

Source: National Library of Medicine and National Library of Health; www.nlm.nih.gov

Figure 37: FFV High in Micronutrients

Micronutrient	Source
Iron	Spinach, collard greens
Calcium	Collard greens, turnip greens, spinach greens
Magnesium	Spinach, beet greens, okra
Vitamin A (beta-carotene)	Watermelon, tomato, sweet potato, spinach, mango, grapefruit, collard greens, chili pepper, carrot, cabbage, dark green leafy vegetables
Vitamin C	Tomatoes, pineapples, oranges, onions, cauliflower, cabbage, sweet potato papaya

Link between Trade and Nutrition

Availability

Socio-economic position affects food access and nutritional status of urban households more so than rural households because the main source of food is through purchase. Rural households source at least some FFV from home production while home production is low in urban areas. For example, only 16% of urban households in Nairobi practice urban agriculture for home consumption (CFSVA, 2010). Thus, urban households are highly dependent on markets and vulnerable to price variations, often purchasing between 97 and 100 percent of their food from markets.

Availability of FFV in regional and domestic markets, however, does not seem to be an important factor in regional food insecurity. Markets are supplied with FFV year-round and our findings show no evidence of unmet demand for FFV. Moreover, the FFVs with the greatest potential to increase nutrition security are those traded domestically. African Indigenous Vegetables (AIVs), like Amaranthus, Spider Plant and African Eggplant are particularly rich in micronutrients and vitamins. AIVs generally have a higher nutrient profile than European introduced vegetables like cabbage and potatoes (See Annex 2 for full nutrient

⁴ Figures for Vitamin A and beta-carotene vary as they are often expressed together.

profiles). Increased trade of AIVs and heightened awareness of their potential to alleviate chronic malnutrition could have a lasting impact on regional food security.

Affordability

Consumption patterns discussed above in all three countries suggest that stabilizing retail FFV prices will not necessarily lead to increased consumption of FFV but rather, increased expenditure on other food groups like meat and dairy. Moreover, the FFVs that are currently traded regionally are not those which are most likely to impact the nutritional status of households at risk of malnutrition.

Households that are food and nutrition insecure (or considered at-risk) have an already limited capacity to purchase low-cost staple foods. Such households are often unable to source enough food for three meals per day. Even if FFV prices were to decrease as a result of increased regional trade, FFV will likely remain largely out of reach for these households.

Moreover, although the diversification in the food basket (decline in staple consumption) is expected from an increase in per capita incomes, FFV consumption will not necessarily increase with purchasing power. It is even less likely that the marginal decrease in prices of a very limited number of FFV as a result of intra-regional trade will have any significant impact on food and nutrition security in the region. A greater understanding of consumer preferences, choices and decision making regarding food purchases (or food production) is necessary.

Recommendations

Dietary diversity, through increased consumption of fresh fruits and vegetables, is important to improving micronutrient intake and thus, alleviating malnutrition. However, consumption of fruits and vegetables in East Africa is considerably low compared to other food groups both in terms of volume and value. Because FFV consumption does not differ substantially across income groups, it can be inferred that affordability is not the only factor in under-consumption of FFV, but also, awareness of the nutritional importance of FFV. Making FFV more affordable is unlikely to impact food and nutrition security in the region without increased awareness of their nutritional value. USAID could invest in the following activities to increase the role and benefits of FFV trade in regional food security and nutrition:

1. Assess information/ research gaps surrounding food security and nutrition education levels in the region. Conduct in-depth Knowledge Attitude and Practice (KAP) survey. Conduct more research on food consumption patterns, dietary preferences, and decision-making patterns surrounding food item purchase.
2. Launch comprehensive educational and awareness campaign on FFV and their nutrient quality at national and regional levels. National campaigns should be localized and targeted toward nutrient-dense FFVs that grow well in various agro-ecological zones. A regional level campaign could focus on FFV more generally. Increased awareness of FFV will not only improve nutrition in the region by encouraging behavior change, but increase demand for FFV.⁵

⁵ Nutrition awareness and marketing campaigns have been successful in the past. For example, the International Potato Center launched a branding campaign of the Orange Fleshed Sweet Potato (OFSP) in Mozambique. The OFSP was marketed as a high-value, desirable product (Keatinge et al. 2010).

Recommendations and Action Plan

The value chain and market inefficiencies documented in this report inhibit cross border trade in FFV despite favorable seasonal price differentials and consumer demand for regional products. While many of the challenges in the horticulture sector are bilateral in nature, there are a number of constraints that drive up prices of regionally-traded commodities that could be addressed regionally by USAID East Africa.

Below is a set of recommendations for how to tackle some of these challenges incrementally. Potential interventions are broken down into near, medium, and long-term activities.

Recommendation 1: Improve the region's capacity to collect and analyze FFV trade flow, price and market information

The study was limited in some cases by the lack of data on trade and prices at both the national and regional level. As is the case with other value chains, unreliable and inconsistent data collection methodologies, inadequate distribution/access, and limited data sets create information asymmetry within horticulture value chains and afford only a narrow view of national markets. This makes the FFV value chain non-transparent and effectively blinds value-chain participants to both national and regional market opportunities and encourages informal transactional trading systems. It also constrains regional trade and negatively impacts food security. Improving the region's capacity to collect and disseminate information on FFVs should contribute to increased trade.

Near term:

Harmonize data collection methodologies. If market information is useful, reliable, and readily available, value chain actors will use it. Developing harmonized data sets/collection methodologies and delivering consistency across the region will help drive market information use and will facilitate the development of regional links.

EATH has worked with RESAKKS, EAGC, national bureaus of statistics, MIS providers, and other partners to develop a uniform data collection methodology for traditional staple food crops and could use the same approach to convene key horticulture stakeholders to build consistency across the region. USAID could work directly with existing data providers like TAHA, UBOS, HCDA to increase frequency (goal is daily) of data collection and improve quality and dissemination. Training programs could be managed by RESSAKs and other regional partners such as the new EATH. To ensure sustainability of data collection networks, USAID and its partners need to build a network of permanent market participants who could collect data as part of their daily job. Ministry of Agriculture/Trade enumerators already collecting data is one potential source of on-the-ground resources. Another source could be wholesale market managers and Municipal Councils who have a full-time presence in key markets and could provide the data to traders as an additional service to justify the fees they charge and to increase throughput.

Medium term:

Enhance analysis of price and market information. Comparison of prices across countries is lacking as most research has been conducted at the bilateral level. Further value chain cost analyses for major crops across several countries would provide valuable insight into both sources of competitive advantage/disadvantage and constraints and would serve as a useful benchmark against which USAID and its implementing partners could design specific interventions and evaluate impact. These analyses could serve as the foundation for collaboration/coordination with bilateral partners engaged in the sector. Additionally, USAID could work with key stakeholders to aggregate data and work to build capacity within

organizations such as TAHA, HCDA, and HCA to analyze the data and package it in a way that supports decision making. USAID could also leverage horticulture data to strengthen the EAC's Regional Food Balance Sheet.

Long term:

Develop regional FFV market information systems. The regional mission could support efforts to develop a regional FFV market information platform. Building on the model that was used to expand the Eastern Africa Grain Council's Regional Agricultural Trade Intelligence Network (RATIN) and leveraging the tools developed to support that expansion, USAID could build a new system with limited investment. Upfront work to map the current national and regional MIS provider landscape, understand existing capabilities/gaps, and identify national partners should begin immediately. The next step would be to engage national MIS providers in an effort to get buy-in for a regional platform and agree on the right home/owner (potentially HCA, whose capacity has improved and which is being supported by a range of donors). The success of a regional platform will rest in its ability to deliver value to both national partners that are contributing data to the system as well as users of the data. Developing innovative partnerships with mobile network operators that support marketing efforts and expands dissemination and data use will also be critical to sustain an integrated regional network.

While HCA has made significant strides, it still needs additional capacity development support to build it into a strong regional body. Any intervention on the part of USAID East Africa should be coordinated with other donors.

Recommendation 2: Develop interventions to address wholesale market inefficiencies

As was discussed in detail above, the operational structure and performance of the region's wholesale markets has a significant impact on retail prices and the affordability of FFVs. The survey confirmed that costs borne by traders within wholesale markets are high and result from poor market management, insufficient service delivery and limited investment in infrastructure by municipal councils. Post-harvest losses during transport and off-loading are high and wholesalers, who already share a disproportionate amount of the risk within the value chain, set prices that reflect these losses. Wholesale prices also reflect the costs absorbed by wholesalers to pay for services that should be provided by market management such as sanitation, trash removal and security. Given the high level of dysfunction in most wholesale markets which drives up costs unnecessarily, there is an opportunity for USAID to design interventions that are focused on building efficiency and reducing costs within markets.

Near term:

Improve coordination among key wholesale market actors (municipal councils, traders, market managers, traders' associations, government agencies (e.g. Ministries of Agriculture, Bureaus of Standards, etc.)). Traditional wholesale markets are comprised of a large number of players who are not working efficiently together. Consequently, mistrust is high and markets function at suboptimal levels. Facilitating communication and collaboration among market actors is a necessary first step towards improving market operations. USAID could leverage the Joint Border Committee (JBC) model that EATH has employed to improve the functioning of borders and facilitate cross-border trade movement, to improve coordination in markets and facilitate problem solving. This type of intervention should help deliver efficiency gains that contribute to cost reductions and build trust among the various stakeholders that will deliver benefits to all market actors.

To implement this activity, USAID and its partners would need to identify several markets across the region that would be willing to participate in a pilot Joint Market Committee (JMC). The implementing partner, working with the pilot JMCs, would develop and refine operating protocols and systems (again drawing on the extensive work done with JBCs) and initiate an initial assessment of key challenges/constraints within each market and work with the JMCs to agree on priority actions and timelines. The lessons learned during each pilot would then be compiled into a replicable JMC roadmap that could be expanded to other markets across the region.

Medium term:

Promote the outsourcing of select non-essential services to reduce costs and improve service delivery. Most of the region's wholesale markets are managed by municipal councils who employ management teams on-the-ground in markets tasked with oversight and service delivery. The challenge has been that municipal councils are not always adept at managing markets. Competing priorities at the municipal level and strained budgets often mean that fees paid by wholesalers to market managers are not always used to cover market operations. As a result, service delivery suffers or is non-existent. Some of the services that are necessary to the proper functioning of markets such as security, sanitation and trash removal are not necessarily municipal council core competencies and could be better provided by service providers. Outsourcing non-essential services to external companies would provide municipal councils with additional revenue streams while helping to reduce their direct costs. Working through the JMCs, an outsourcing model could be developed. The presence of multiple stakeholders on JMCs could also help ensure transparency in the process and serve as a more effective oversight mechanism to ensure that contracted service providers are meeting their obligations. There are examples of markets where this has been done so preliminary work to understand what has worked and what hasn't would be critical.

Long term:

Develop public-private partnerships (PPPs) and/or privatization of wholesale market management. There are a number of cases observed during this study where PPPs are working well in the management of wholesale markets. The mission could support efforts to review legal frameworks for the establishment and management of markets that often hinder active private sector engagement and contribute to the progressive decline of public market places. There is an opportunity to look closely at these models and to tease out the best practices for sharing with a larger audience.

Recommendation 3: Improve the FFV policy and enabling environment

Divergent and inconsistent national and regional trade policy and standards issues constrain intra-regional trade of most commodities. The FFV sector is still highly unregulated and consequently very informal. Little is done to ensure regulations are enforced at municipal markets. Our research revealed that local market traders associations want improved standards and better (and enforced) regulations. There are several areas that the regional mission could address these constraints:

Near term:

Promote the roll out of the simplified certificate of origin (SCO) at key FFV borders and increase awareness among traders. In Article 14 of the EAC customs union, all FFV products fall under Rules of Origin (Rule 5). As long as they are harvested within the 5 partner states, they can be traded duty free, as long as they are accompanied by supporting documents, an EAC simplified certificate of origin if the products are valued below \$2000 or an EAC certificate of origin from the exporter, if the goods are valued over \$2000. During its

final year, EATH will be conducting cross-border trade forums at select markets across the region. While the focus will be on traditional staple foods, involving FFV traders in these forums will help drive awareness of SCO, increase transparency at borders and promote formal trade.

Medium-long term:

Work with the FFV industry to improve packaging and handling of FFV. Local legislation on standards, packaging, and hygiene measures exists but is almost never reinforced by municipal councils because they lack incentives and the resources to do so. Generally, few FFV are packaged and handled properly. Transport and handling costs for FFV remain high due to their fragility, high perishability and extremely short shelf-life. Working with regional partners in FFV, USAID could support efforts to reduce post harvest handling losses due to improper handling and packaging. The region should take advantage of existing best practices that have been identified through various research and development programs focusing on these issues.

Develop regional grades and standards for FFV. The lack of basic standards and/or the lack of awareness of existing standards for most products make transactions less transparent and afford buyers/traders the opportunity to set their own standards and secure an advantage in the producer-buyer relationship, which breeds mistrust between value-chain participants. Promoting consistency and harmonization of quality standards for FFVs should help facilitate trade and promote greater transparency across the value chain. The benefits that accrue to producers from a more transparent quality standards system should be an incentive for smallholders to invest in production and will support the push for greater regional food security. A process similar to that USAID used to develop the 22 staple foods quality standards could be used for FFVs. This would involve engaging key horticulture stakeholders and national bureaus of standards and coordination with the EAC's Technical Standards Committee. Standards should be developed in conjunction with the Swahili GAP, currently in draft form, and under the ownership of FPEAK. Swahili GAP is a regional code of conduct aimed at increasing professionalism in the industry. Promoting the consistent adoption among key value chain actors across the region will be essential and will involve the development of awareness materials for distribution to national partners.

Recommendation 4: Promote consumer awareness campaigns on the nutritional benefits of eating FFV

FFVs are not a priority food item in the East Africa food basket. Under consumption of FFVs is largely due to consumer preferences toward other food items. Our survey revealed that many consumers are unaware of the nutritional importance of FFV. Although consumers reported medicinal advantages or qualities of FFV, nutrition was not a motivator for purchase of FFV. In order for FFVs to improve food security and nutrition in the region, the benefits of FFV must be promoted to increase consumption.

Near term:

Improve understanding of food consumption patterns, dietary preferences and decision-making patterns surrounding food item purchase (or production). In order to diversify diets in East Africa and promote increased consumption of FFVs, a greater understanding of people's choices and constraints surrounding food-related decisions is necessary. The mission could further assess information and research gaps surrounding food security and nutrition education levels in the region. USAID could support national and international partners who specialize in these areas to conduct targeted studies of food choices and preferences such as

an in-depth Knowledge Attitude and Practice (KAP) Survey. The mission could also support further study of the region's agro-ecological zones and nutrient-dense FFV that grow best in varying zones. USAID could identify potential public and private sector partners for the promotion of FFV.

Medium-long term:

Launch a comprehensive education and awareness campaign on FFV at national and regional levels. Increased consumption of FFV will not only improve regional food security and nutrition but drive demand and thus trade in FFV. There is an opportunity to encourage and support PPPs in branding and marketing FFVs. USAID could support regional campaigns aimed at increasing awareness of the nutritional importance of FFV and promoting behavior change toward increased consumption of FFVs. The mission could also support national, localized campaigns that promote the production of nutrient-dense FFV according to the agro-ecological zones where they grow the best.

Step-by-Step Action Plan

Below, we present a step by step action plan designed to guide the mission on possible interventions in FFV sector. This work would require a 4-5 year effort and include dedicated long term staff to carry out much of this work. Based on our experience conducting similar work in other value chains under EATH, annual costs for covering the FFV sector could reach US \$2-4 million annually depending on the composition of the team that should include a FFV technical expert, an agricultural economist and a nutritionist.

Proposed Step-by Step Action Plan

Proposed Recommendation	Short term	Medium term	Long term
Improve the region's capacity to collect and analyze FFV trade flow, price and market information			
<i>Develop harmonized data collection criteria for FFV price and market information</i>			
Identify key partners who currently collect FFV data			
Convene a meeting of key FFV data collectors and review key focal points for providing FTF price information and identify gaps			
Build capacity of regional Partners in FFV data collection			
<i>Enhance analysis of price and market information.</i>			
Build capacity of private sector trade associations to analyze price and market information			
Conduct targeted studies			
Hold KMS workshops to share information among FFV stakeholders and bilateral missions			
Address traditional wholesale market inefficiencies			
<i>Improve communications among key wholesale market actors (municipal councils, traders, market managers, trade associations.</i>			
Hold stakeholder meetings to introduce the concept of Joint Market Committees (JMCs)			
Conduct assessments of key markets using identified criteria for evaluating market efficiency			
Work with key market players to convene JMCs			

Improve policy and enabling environment			
<i>Promote the roll out of simplified certificate of origin (SCO) at key FFV borders</i>			
Increase awareness among public and private sector traders on SCO (could be handled at JBC meetings)			
<i>Work with the FFV industry to improve packaging and handling of FFV.</i>			
Coordinate regional meeting of stakeholders to discuss packaging and handling issues			
Develop best practices in handling and packaging			
<i>Develop regional quality standards for FFV</i>			
Conduct a review of national standards in selected FFV including Swahili Gap			
Convene a regional meeting to kick off the standard harmonization process within the EAC			
Develop regional quality grades and standards for FFV			
Promote consumer awareness campaigns on the nutritional benefits of eating FFV			
<i>Conduct research on food consumption patterns, dietary preferences and decision-making patterns surrounding food item purchase (or production).</i>			
Work with key nutrition stakeholders to better understand consumption patterns.			
Support (through partnership funds) additional research			
<i>Launch a comprehensive education and awareness campaign on FFV at national and regional levels.</i>			
Identify key national level partners for carrying out campaigns			
Develop educational and awareness materials			
Support roll out campaigns at national level			

Bibliography

- Dever, D. (2007). *Small-farm access to high-value horticultural markets in Kenya* (Case Study No. 6-4 of the program: "Food Policy for Developing Countries: the role of government in the global food system). Cornell University.
- Ewbank, R., Nyang, M., Webo, C., & Roothaert, R. (2007). *Socio-economic assessment of four MATF-funded projects* (Working Paper No.8). Farm Africa.
- Farm Africa (n.d.). *Kenyan farmers reap benefits from better marketing* (Appropriate Technology, Vol 36, No 1). Retrieved from Maendeleo Agricultural Technology Fund website: <http://www.farmafrica.org.uk>
- Farm Concern International (n.d.). The agricultural input/ output value chain analysis of embu, Meru, Iaita, and Makueni. CNFA Inc., AgMark, and Farm Concern International
- Farm Concern International (2006). Brief: viable market opportunities and investigative research on market threats for urban and peri-urban farms. Farm Concern International, Urban Harvest, International Potato Center.
- Farm Concern International (n.d.). Business opportunities brief: watermelon, green grams, bulb onion, tomatoes and sunflower. CNFA Inc., AgMark, and Farm Concern International.
- Freedman, Jim (2000). *Transforming Development: Foreign Aid for a Changing World*. University of Toronto Press.
- Haiyan, Tu. (2008). *A Reconnaissance Study of the Citrus Value Chains in Tanga Region, Tanzania*. Larenstein University of Applied Science. Wageningen, The Netherlands.
- Japan International Cooperation Agency (2013). *A study report on horticulture sub-sector in Uganda* (Draft). JICA.
- Kamau, M., J. Olwande and J. Githuku. (2011). *Consumption and Expenditures on Key Food Commodities in Urban Households: the Case of Nairobi*. Tegemeo Working Paper 41. Nairobi; Tegemeo Institute, Egerton University.
- Karuga, S. (2010). *Kenya's Regional Horticulture Trade* (Draft Report). USAID/KHDP.
- Keatinge, J.D.H. et al. (2010). Relearning Old Lessons for the Future of Food—By Bread Alone No Longer: diversifying diets with fruit and vegetables. *Crop Science*, Vol. 50, March-April. www.crops.org
- Kenya Horticulture Competitiveness Project (2012). *KHCP Final Report: Horticulture Audit June 2011-March 2012*. Fintrac, Inc.
- Kenya Horticulture Competitiveness Project (n.d.). Kenya's intra Africa horticulture trade. Fintrac for USAID. Retrieved from: <http://www.growkenya.org>

- Kenya Horticulture Competitiveness Project (n.d.). Fruits and vegetables retail audit. Fintrac for USAID. Retrieved from: <http://www.growkenya.org>
- Kenya Horticulture Competitiveness Project (2011, July). Horticulture retail audit. Fintrac for USAID. Retrieved from: <http://www.growkenya.org>
- Koenig, T., Blatt, J., Brakel, K., Kloss, K., Nilges, T., & Woellert, F. (2008). *Market-driven development and poverty reduction: A value chain analysis of fresh vegetables in Kenya and Tanzania* (SLE Series). Humboldt Universitat Zu Berlin, Center for Advanced Training in Rural Development.
- Makorere, R., & Mbiha, E. (2012). *Evaluation of efficiency of orange marketing system in Tanzania: Empirical evidence from Muheza district in Tanga region*. Department of Agricultural Economics, Sokoine University of Agriculture, Tanzania.
- Mathenge, M., & Tschirley, D. (2006). *Seasonal analysis of selected fresh fruit and vegetable prices at wholesale level in key urban markets of Kenya* (Working Paper No. 22). Tegemeo Institute of Agricultural Policy and Development, Egerton University.
- Ngugi, I. K. , R. Gitau, J. Nyoro (2007). *Access to high value markets by smallholder farmers of African indigenous vegetables in Kenya*, Regoverning Markets Innovative Practice series, IIED, London.
- Nyoro, J. (2004). *Regoverning markets: securing small-scale producer participation in restructured national and regional agri-food systems. Case of supermarkets as outlet for fresh fruits and vegetables and dairy in Kenya and Uganda*. Tegemeo Institute of Agricultural Policy and Development, Egerton University.
- Onduru, Davies (2008). *Improving the Tanzania—Mombasa Cross-border Tomato Product Chain: A study of Mombasa tomato market*. ETC East Africa Ltd. For the Agricultural Economics Research Institute, Wageningen University. www.etc-international.org
- Otieno, Brian. 8 August 2012. Kenya: Kongowea Market Traders Protest Increased Levies. *All Africa* Retrieved from: www.allafrica.com
- Tanzania Horticultural Association (2012). *Position Paper: Key Policy Issues Affecting Tanzania's Horticultural Industry*. Tanzania Horticultural Association.
- Tschirley, D. (2011). *What is the scope for horticulture to drive smallholder poverty reduction in Africa? Policy Synthesis for cooperating USAID Offices and Country Missions* (No.88). Michigan State University.
- Tschirley, D., Ayieko, M., Hichaambwa, M., Goeb, J., & Loescher, W. (2010). *Modernizing africa's fresh produce supply chains without rapid supermarket takeover: towards a definition of research and investment priorities* (MSU International Development Working Paper No. 106). Michigan State University, Department of Agricultural, Food, and Resource Economics.

- Tschirley, D., Muendo, K. M., & Weber, M. T. (2004). *Improving Kenya's domestic horticultural production and marketing system: current competitiveness, forces of change and challenges for the future* (Working Paper no. 08B). Tegemeo Institute of Agricultural Policy and Development, Egerton University.
- Tschirley, D. L., Muendo, K. M., Ayieko, M., & Weber, M. T. (2004). *Improving Kenya's domestic horticulture marketing system: competitiveness, forces of change and challenges for the future* (Policy Brief No. 4). Retrieved from Tegemeo Institute for Agricultural Policy and Development website:
<http://www.tegemeo.org/publications.asp>
- Tschirley, David and M. Ayieko. 2008. *Assessment of Kenya's Domestic Horticultural Production and Marketing Systems and Lessons Learned for the Future*. Tegemeo Working Paper 32. Nairobi; Tegemeo Institute of Agriculture Policy and Development, Egerton University.
- Tu, H. (2008). *A reconnaissance study of the citrus value chains in Tanga region, Tanzania*. Larenstein University, Wageningen, The Netherlands.
- United States Agency for International Development. 2011. Horticulture Market News: February 2011. Kenya Horticulture Competitiveness Project.
- World Food Program. 2009. Comprehensive Food Security & Vulnerability Analysis Uganda. WFP VAM Food Security Analysis.
- World Food Program 2010. Comprehensive Food Security & Vulnerability Analysis Tanzania. WFP VAM Food Security Analysis.
- World Food Program 2010. Comprehensive Food Security & Vulnerability Analysis Kenya High Density Urban Areas. WFP VAM Food Security Analysis.
- World Food Programme (2012). *Unconditional cash transfer baseline survey*. World Food Programme.

Annex 1: Institutions, NGOs and other actors in the region working on horticulture

Key Regional Actors

Horticulture Council of Africa (HCA)

The Horticulture Council of Africa's vision is to connect national member associations to help them address constraints to both regional and international trade. HCA was formed several years ago, and now comprises 12 national associations, from 9 countries (EAC, Zambia, Ethiopia, Madagascar, and Ghana). Initially it was hosted by the Fresh Produce Exporters Association of Kenya (FPEAK) and did not have its own secretariat, but with help from donor funding from the Dutch Government, it has now moved to the Practical Horticulture Training Center (PTC) in Thika, Kenya with a staff of two, although the FPEAK Chief Executive, Dr Stephen Mbithi is still running HCA together with his main job as CEO of FPEAK. The reasons for its formation are compelling, especially in helping further develop the horticultural sector to maintain and gain a competitive advantage in the horticultural trade by taking on regional challenges, especially policy advocacy at the level of WTO and EU/ACP negotiations. Thus far, the organization has mostly lobbied for improved trade access into the international export markets outside the region and has had limited impact on improving the inefficiencies in regional trading.

After numerous meetings with the EAC, where it was re-stated that the biggest constraint to improving FFV trade in the region was the "lack of compliance to standards", it was agreed that HCA take the lead on implementing the much needed harmonisation of regulations relating to the FFV trade in the region. HCA approached Trademark East Africa (TMEA) for funding in helping it to prepare for this implementation, which also featured in its 5 year strategic plan (2011-2016). TMEA have been able to fund HCA for approximately \$650,000 which has allowed HCA to develop 5 tools necessary for roll-out in the 5 EAC countries. These are a) standards b) translations into relevant languages c) recognition by GlobalGAP of SwahiliGAP d) a manual on SwahiliGAP e) farmer leaflets for each standard. The next steps will involve obtaining national validation of these materials.

HCA has also been contracted to do consultancy work on regional horticultural trade by The Nile Basin Initiative (NBI), allowing it to start generating income through consultancy services. HCA have co-ordinated this study which covers the 4 countries of Kenya, Uganda, Rwanda, Burundi and employed consultants to prepare a report for which a final draft is expected shortly.

HCA has now set as its priority activity for the future, the setting up and monitoring of a system that will facilitate the trading of FFV's in the EAC region, comprising 3 steps:

- a) Mapping out production areas with clusters of farmers who are not too far from border crossings and who are willing to go through a training and export certification process.
- b) Certifying them as having complied to EA standards, showing full traceability (At the moment, FPEAK are doing a farmer certification program through KenyaGAP but this initiative needs to be replicated in the other EAC countries).

c) Entering these regional producer groups into a data base which is shared with the regulators.

The work that USAID EATH has done already in building the capacity in regional co-operation on SPS by funding COPE and the capacity building that has been done in the NPPOs would be one of the building blocks of this regional initiative.

Once it can be shown that this model works in the short to medium term, the aim of HCA is to replicate it for the other RECs, COMESA and SADC

East African Community (EAC)

Under the 4th EAC Development Strategy, from 2012-2016, productive sectors, agriculture and food security strategy features prominently, although there is no special emphasis given to horticulture, or fresh fruits and vegetables as a priority sub-sector. However there is recognition of the need to harmonise regulatory policies, sanitary and phytosanitary issues, and standards to help implement the special trade regime for cross border trade. The most recent legislation passed to formalise this became operational in January 2010 on the signing of the EAC Customs Union, prioritising the free movement of goods produced locally, under Article 6.

Alliance for Commodity Trade in Eastern and Southern Africa and Common Market for Eastern and Southern Africa (COMESA/ACTESA)

Although there are numerous agriculture programs being implemented, most of which involve removing trade barriers, and facilitating the free movement of food commodities from surplus to deficit areas in the region, there is no program specific to horticulture, or the fresh fruit and vegetable trade. ACTESA was formed back in 2008 in order to strengthen the alliance for commodity trade between member countries, in which horticulture in the form of tree crops is mentioned as a sub-sector, where assistance needs to be given to helping small-holders commercialise their production.

African Union (AU)

The African Union vision for agriculture mentions as part of its goals leading up to 2015, the need to create “dynamic markets within countries and between regions” as part of its agricultural strategy, but again there is no specific mention of horticulture, which remains a sub-sector

Other Stakeholders and Institutions

Regional Institutions	
<p>Regional Strategic Analysis and Knowledge Support System (ReSAKSS) www.resakss.org</p>	<p>Offer knowledge products to improve policymaking, track progress, and derive lessons for the implementation of CAADP and other agricultural and rural development policies. Based on the International Livestock Research Institute (ILRI) campus in Nairobi, they collect both formal and informal statistics on staple foods from the following sources: COMSTAT, Tanzania Revenue Authority (TRA), Uganda Bureau of Standards (UBOS), FEWSNET Kenya and South Africa. Data collection for horticulture commodities covers onions and tomatoes only. Mostly funded by USAID with some funding from the Gates Foundation, and from the International Food Policy Research Institute (IFPRI) via ILRI.</p>
<p>Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) www.asareca.org</p>	<p>Sub-regional non-profit with 11 member countries: Burundi, DRC, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda and South Sudan, represented by their national agriculture research for development institutes. They work on the 9 major food staples, as well as high value non-staple crops, including fruit and vegetables. Recent projects include tree crops in Tanzania and Rwanda, snow peas for export, as well as climbing beans and other bean innovations.</p>
<p>The World Vegetable Center (AVRDC) www.avrdc.org</p>	<p>With its Africa offices in Arusha, Tanzania, AVRDC works on increasing production and consumption of fresh vegetables, mainly through introducing new varieties, involving plant breeding programs from its considerable gene bank. To date 90 superior open pollinated lines of vegetables for Sub-Saharan Africa have been developed, although they work mostly on onion, tomato, pepper, cabbage, and African Indigenous Vegetables (AIV's) such as Amaranthus. AVRDC receives donor funding from USAID, DfID, and bilateral assistance from Governments such as Korea and Thailand who have significant seed production industries.</p>
National Institutes and Agencies	
<p>Kenya Agricultural Research Institute (KARI) www.kari.org</p>	<p>Works on improved production, husbandry techniques, new varieties</p>
<p>Kenya Plant Health Inspectorate Service (KEPHIS)</p>	<p>Mandated to protect Kenya's agriculture from pests and</p>

www.kephis.org	diseases that could impact the environment, economy and human health
Horticulture Crops Development Authority (HCDA) www.hcda.or.ke	HCDA has compiled the most complete set of data on horticultural statistics, “The Horticulture Validated Report 2011” which was compiled under the National Horticulture Task Force (NHTF) whose members include KEPHIS, Ministry of Agriculture information centers and KARI. The report was financed by HCDA and USAID’s Kenya Horticulture Competitiveness Project (KHCP).
National Agricultural Research Organization, Uganda (NARO) http://www.naro.go.ug/	Works on improved production, husbandry techniques, new varieties
FIT Uganda Ltd. www.fituganda.com	Business development consulting company that provides capacity building and facilitation support to small and medium enterprises (SMEs)
Uganda Export Promotion Board (UEPB)	Currently setting up 3 Market Linkage Centers to collect localized information on specific products at production hubs in Seree (citrus), Kasese (chillies), and Luwero (pineapples)
Ministry of Agriculture, Tanzania	Works on improved production, husbandry techniques, new varieties and has 7 zonal research institutes
International NGOs	
Farm Concern International	They started working in Kenya using the Commercial Village Concept (CVC) to assist small farmers with production, post-harvest handling, aggregation and marketing of both staples, and horticultural products. Recently they have targeted horticulture specifically with the Domestic Horticulture Markets (DoHoMa) program, which entered its second year of implementation in September 2011 and has continued to increase the production and incomes for the small holder farmers in Kenya, Tanzania, Rwanda and Malawi. The mobilized traders are 3,265 and those linked to the commercial villages are 1,368 who source their commodities from the smallholder farmers participating in the project
TechnoServe, Project Nurture http://www.technoserve.org/project/project-nurture	Project Nurture is a four-year regional project being implemented in Kenya and Uganda together with FCI. Funded by the Bill and Melinda Gates Foundation, it purposes to transform smallholder farmers in Kenya and Uganda into reliable suppliers of mango and passion fruit to industrial and local consumer markets. The program sensitizes smallholders and extension officers on the economic potential of domestic as opposed to export markets by showcasing successful

	<p>small-scale fruit producers. It also organizes small-scale farmers into producers' associations and assists each association to identify a centralized produce collection point in order to facilitate access to local processors.</p> <p>Upon its completion, revenues of the 54,000 small-scale fruit producers in Kenya and Uganda are projected to increase from the current \$12.5million to \$25 million</p>
<p>Farm Africa www.farmafrica.org</p>	<p>Works on mango, passion fruit, pineapple production in the region, mainly Kenya, Uganda, Tanzania, Ethiopia. In Kenya, they work in particular in Kitui in Eastern Province, which is more densely populated with mangoes than anywhere else. Passion fruit work is centred in Kwale in Coast Province where 3000 women farmers are receiving assistance in improved orchard management, and there is also work going on with improved pineapple production. Funding comes through various foundations and charity donations, some channelled through Africa Harvest's Maendeleo Agricultural Enterprise Fund to which small farmers can apply for grants.</p>
<p>CABI www.cabi.org</p>	<p>Working in Kenya and Tanzania to improve yields and reduce post-harvest losses. One of the relevant projects is to improve access to good AIV seed for small farmers, using funding from ASARECA. Since AIV's are a significant contributor to food security and nutrition for East African smallholder farmers, they are helping create viable and sustainable seed production enterprises at the local level, particularly with crops such as Amaranthus, African Nightshade, Crotalaria, Spider Plant, Jute Mallow, and African eggplant.</p>
National Donor Funded Projects	
<p>Kenya Horticultural Competitiveness Program (KHCP) http://www.growkenya.org/</p>	<p>Implemented by Fintrac Inc. working on helping 200,000 small- scale farmers improve their productivity, value addition, working along the value chain in line with the objectives of the FtF Initiative. KHCP works on specific products such as sweet potatoes, passion fruit, onions, cabbages. The project is implemented in cooperation with Kenyan private and public sector partners through grants aimed at engaging marginalized groups such as women and youth and improving competitiveness and livelihoods throughout Kenya.</p> <p>The program aims to increase incomes for 200,000 small farmers and strengthen their businesses network by improving and creating local, regional and global</p>

	<p>market opportunities. This project will help Kenyans feed themselves by building a countrywide horticulture distribution network that provides a year-round supply of high-quality, nutritious products grown by Kenyan farmers.</p> <p>Part of the FtF initiative, KHCP believes that this kind of environment will increase rural incomes, create jobs, and improve food security.</p>
<p>Tanzania Agricultural Productivity Program (TAPP) http://www.tanzania-agric.org/</p>	<p>Based in Arusha and implemented by Fintrac Inc., TAPP is a 5 year program that started in 2009, funded by USAID Tanzania. The project aims to help improve smallholder incomes, through improved productivity, improved nutrition, and better access to markets, and a large part of their product portfolio is made up of horticultural products. Their six target zones are Arusha, Kilimanjaro, Lushoto, Morogoro, Coastal strip, and Zanzibar.</p>
<p>Kenya Agricultural Value Chain Enterprises (KAVES) Project</p>	<p>Awarded early 2013, and is now in start-up, KAVES includes horticulture along with other staple food value chains. It is a bilateral program focused on the 2 FtF priority geographic regions, HR1 (High Rainfall 1), in the west of Kenya, and SA2 (Semi Arid 2), in the east of Kenya. The work involves continuing existing agronomy support to smallholders on improving yields, post-harvest handling, and market linkages, for a range of crops particularly those with high nutritional profiles such as the green leafy vegetables and orange fleshed sweet potatoes.</p>
Regional and National Trade Associations	
<p>Horticultural Council of Africa (HCA) http://www.fpeak.org/hca.html</p>	<p>An umbrella organisation for 13 national horticultural trade associations in Africa. Members of HCA are drawn from the major horticulture exporting countries of the Eastern, Central and Southern Africa (ECSA) region. They include Kenya, Uganda, Zambia, Tanzania, Zimbabwe, South Africa, Burundi, Rwanda, and Ethiopia. Their mission is to promote growth of horticultural sector in the East, Central and Southern Africa Region through information sharing, collaborative research/technology, environmental stability and collective bargaining.</p>
<p>Fresh Produce Exporters Association of Kenya (FPEAK) www.fpeak.org</p>	<p>Representing mainly fresh produce exporters, but also has in its membership domestic horticulture companies.</p>

<p>Horticulture Exporters Association, Uganda (HORTEXA) http://www.agro-info.net/?website_id=7317</p>	<p>Has depended largely on donor funding for many years, as well as the relatively newly-formed Horticulture Promotion Organisation of Uganda (HPOU) in 2005, with 30 members. They are assisting HORTEXA with the National Working Group on codes of practice, as well as the Quality, Infrastructure and Standards Project (QUISP) funded by SIDA together with the Ministry of Trade, Industry and Co-operatives.</p>
<p>Tanzania Horticulture Association (TAHA) www.tanzaniahorticulture.com</p>	<p>Based in Arusha, TAHA represents both domestic and export companies, with some funding from TAPP. A main reference point for collection of horticultural data in Tanzania, from both national wholesale markets, and export data from border crossings.</p>
<p>National NGOs</p>	
<p>Africa Harvest</p>	<p>Africa Harvest is a Kenyan NGO that works with the National Banana Association, on programs targeted toward the expanded use of tissue culture to help farmers become less exposed to crop diseases. Some of their funding comes from Rockefeller Foundation.</p>

Annex 2: Constraints ranked by value chain actors

Most Common Constraints Among All Value Chain Actors

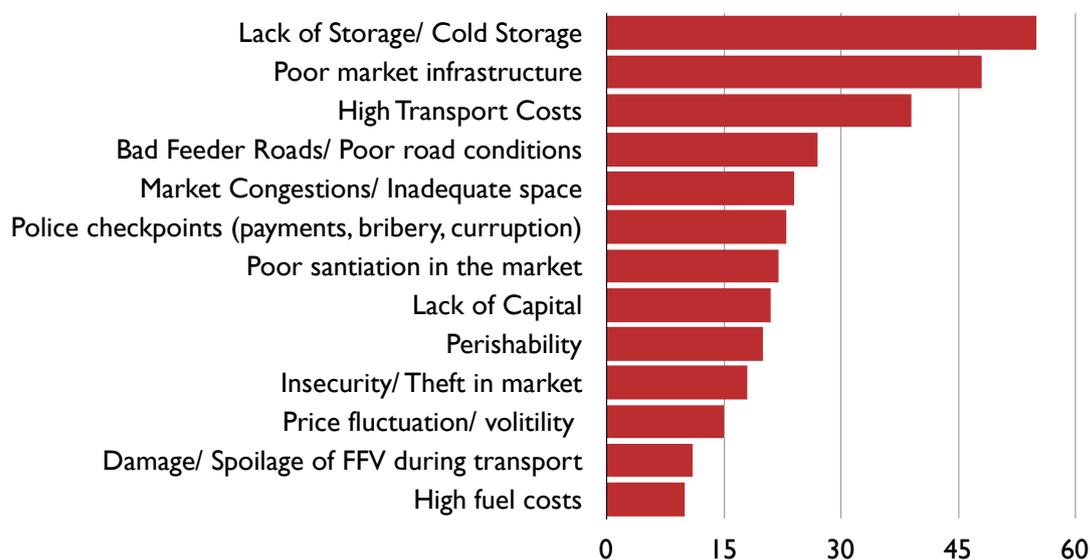


Figure 38: Top Constraints Wholesalers/ Traders Across 3 Countries

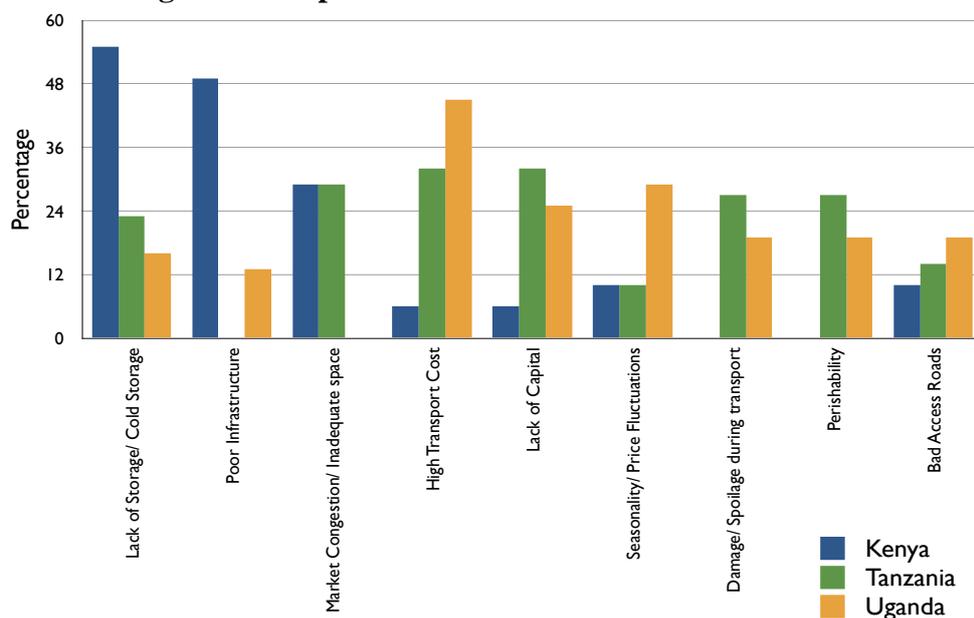


Figure 39: Constraints Matrix by Actor and Country

Constraints	Kenya	Uganda	Tanzania
Market Buyers			
Lack of storage/ cold storage	43%	19%	29%
Poor market infrastructure	29%	24%	14%
Transport costs	21%	38%	21%
Availability of produce/ Seasonality of supply		29%	
Perishability		14%	36%
Price fluctuation/ volatility		4%	29%
Wholesalers/ Traders			
Lack storage/ cold storage	55%	16%	23%
Poor market infrastructure	49%	13%	
Market congestion/ inadequate space	29%		29%
Transport costs	6%	45%	32%
Seasonality-price fluctuations	10%	29%	10%
Insufficient capital	6%	25%	32%
Product damage/ loss		19%	27%
Perishability		19%	27%
Bad Access Roads	10%	19%	14%
Transporters			
High fuel prices/ price fluctuations	67%	50%	22%
Extortion from police	67%	10%	22%
Congestion in market/ inadequate space	67%	10%	
Bad feeder roads/ poor road conditions	67%	50%	56%
Traffic police/ too many police checkpoints		40%	100%
Insecurity on the road		20%	22%
Market Managers			
Theft in the market	75%		
Poor infrastructure	75%	58%	50%
Poor sanitation/ hygiene	50%	33%	33%
Waste management	50%	25%	33%
Association			
Inadequate funding	50%	33%	33%
Limited business skills			22%
Low participation from members		33%	22%
Late payments of membership fees		33%	22%

Annex 3: Nutrient Profiles of Selected AIVs and other Vegetables

Figure 40: Nutrient Profiles of Selected Indigenous African Vegetables

Nutrient Content per 100g Fresh Weight					
	Protein (%)	Calcium (mg)	Iron (mg)	β -carotene (mg)	Vitamin C (mg)
African Nightshade (Manavu or Osuga)	4.6	442	12	8.8	131
Amaranth (Mchicha or Terere)	4.0	480	10	10.7	135
Spiderplant (Saga or Saget)	5.1	262	19	8.7	144
Cowpea Leaves (Kunde)	4.7	152	39	5.7	87
Pumpkin Leaves (Seveve or Malenge)	4.6	442	7.7	6.4	187
Jute Mallow (Mrenda)	4.5	360	7.7	6.4	187

Figure 41: Nutrient Profiles of Selected Fresh Produce Products

Food Product	Protein	Calcium	Magnesium	Iron	Zn	Vit A	β carotene	Vit C
	g	mg	mg	Mg	mg	IU	mcg	mg
Kale	3.3	13.5	34	1.7	0.44			120
Cabbage	1.7	52	8	0.7	0.03		385	49
Carrots	0.7	34	9	0.4	0.02		5330	4
Tomatoes	0.7	0.7	7	0.5	0.00		640	17
Spinach	2.8	170	54	2.1	0.07		3535	26
Avocado (1 medium size)	4.02	24	58	1.11	1.29	293		
Banana (Ripe/Sweet)	1.29	6	32	0.31	0.18	76		
Passion (1 cup)	5.9	28	68	3.78	0.24	3002		70.8
Orange (one medium)	1.23	52	13	0.13	0.09	295		
Onion	1.1	23	10	0.02	0.17	2.1		7.4
Irish Potato	2.0	12	23	0.78	0.29	0		19.7

Annex 3: Notes on Methodology

Rational

USAID seeks to understand the opportunities to increase regional trade in select horticulture crops to balance out seasonal variations in supply from one area to another, increase the availability, and reduce the average price of nutritious foods throughout the whole year. It is hypothesized that increased availability and lower prices of fruits and vegetables will significantly improve the quality of diets in the region, while improved production and post-harvest practices will improve product quality and lead to increased competitiveness and trade. Growth in this area will also provide incentives for smallholder farmers to diversify production, improving household livelihoods.

Previous work in this area used statistics gleaned from phytosanitary inspection offices, such as Kenya Plant Health Inspectorate Service (KEPHIS), or customs data from central offices and border crossings. However, formal statistics do not accurately represent the FFV sector because trade is largely informal. Thus, addressing the constraints to regional trade in FFV requires a better understanding how both formal and informal trade operates, the location of major markets, and the major market actors.

Objective of the Study

The objective of this study was to assess the major trade flows for horticulture products in East Africa to understand the dynamics of regional trade in FFV, highlight weaknesses in the value chain, and propose interventions that could be developed to address food security and nutritional deficiencies through increased intra-regional trade. This study builds on the 2011 regional horticulture study completed by EATH, as well as other horticultural reports from bilateral projects and Missions in the region. It considers horticultural crops that are traded in significant quantities, which were identified in the preceding EATH study which may present significant and previously unidentified potential in terms of growth, competitiveness, and nutritional impact. Many of the more nutritious crops, like African Indigenous Vegetables (AIVs) and orange fleshed sweet potatoes are highly perishable and significant structural changes may need to occur before these products can be traded competitively across borders.

General Approach

In-depth desk research was conducted on the regional FFV sector and various FFV value chains in Uganda, Kenya and Tanzania. We also used empirical methods to support secondary data collection. The assessment team conducted interviews with market participants and key stakeholders and experts. Based on primary and secondary data collection and analysis, EATH made conclusions and recommendations to USAID.

The research team included a national consultant in Kenya, Uganda and Tanzania and a Kenya-based nutrition expert. The team conducted desk research of the horticulture trade and nutrition prior to the initiation of fieldwork. Fieldwork was supervised by the EATH Staple Foods Specialist, and desk research, overall coordination, design, data analysis, synthesis, and writing was completed by a DC-based value chain consultant who traveled to the region for consultation and oversight. Consultants in each country conducted surveys in targeted regions, using questionnaires tailored for various stakeholders.

Site Selection

The countries in this study were selected based on their central location in the region, their strong production capacity for horticultural products, the existence of known and vibrant trade routes, and the existence of a customs union which promotes increased trade between the countries. Kenya is a global leader in horticulture exports, yet is a net importer of fresh fruits and vegetables. Uganda and Tanzania are both net exporters of horticulture and major trading partners with Kenya. Given the climate and growing conditions, all three countries have great potential for growth as demand in the region expands.

Regions, districts, wholesale and retail markets, aggregation points, and border points were selected based on a number of factors. Given the focus of the FTF strategy on the Northern and Central transport corridors, sites were selected based on their proximity to these corridors and their role in feeding or receiving produce that transits through the corridors. Individual markets, aggregation points, and border posts were selected based on reported and known volumes of produce that passes through them as part of a regional horticultural value chain. In some sites, multiple markets were visited because each was responsible for different produce. For instance, Wakulima Market is the main FFV wholesale market in Nairobi, but tomatoes are not traded there, but rather, in the adjacent Marigiti Market.

Approach to Fieldwork and Data Collection

Data collection was done through desk research, field surveys, and interviews with stakeholders such as industry associations, large businesses, NGOs. Fieldwork was conducted over a twelve week period in each country between June and September 2012. The field team conducted official interviews with 195 industry stakeholders representing five different segments of the population: Wholesale Traders, Retailers, Transporters, Associations, and Market Managers across Kenya, Tanzania, and Uganda. Data was gathered in regional wholesale markets in urban areas where our teams interviewed traders and aggregators, buyers and sellers, and managers and local trade association representatives.

Instruments were tested and refined during the initial stages of field research to ensure consistency, sufficient response rates, and relevance. The survey instruments included identifying and demographic information and contained a mixture of quantitative and qualitative questions tailored for the type of respondent. Snowball sampling was used to identify survey participants. Men and women were asked about product choices, purchase and sale locations, sales volumes and values, export and import activities, packaging, transportation, nutrition awareness, and perceptions of constraints and solutions for the sector. Gaps in the data reflect instances when respondents refused to answer certain questions.

Field consultants also conducted key informant interviews with industry stakeholders from government, the private sector, and NGOs to collect anecdotal information about the horticulture sector and its potential for expansion in regional trade. Interviews were also conducted with representatives from major commercial fruit and vegetable actors in the supermarket industry in Kenya, in order to inform a snapshot narrative of the current status of the supermarket industry in the region and the roles of retailers, distributors, and wholesalers.

Analysis of Primary Data

The primary data analysis for this study is descriptive. Analysis was done through transcription of questionnaire data into a spreadsheet, enabling comparison and summary across countries, regions, and sites. The qualitative analysis was also compared with the

secondary literature data when possible. Data is presented using descriptive statistics through tables and graphs to show information such as import and export, market volumes, and FFVs price statistics.

Limitations of Methodology

Because most trade in FFV is largely unrecorded, obtaining quantitative data is difficult. Research in this study is therefore, qualitative, using structured and unstructured with experts and industry stakeholders as well as a review of recent literature. The findings are largely empirical—based on observation—but considered to be anecdotal and indicative rather than statistically rigorous. This approach was born out of necessity, in that horticulture trade in East Africa is largely informal and non-transparent.

Seventy to 80 percent of regional cross-border trade in FFV goes unrecorded by relevant authorities. There is a severe lack of published statistics at the local level, and those that are published, like customs figures, data from phytosanitary inspection offices, or market information, are recorded inconsistently across different bodies, making comparability impossible.

Interviews frequently encountered difficulties finding people willing to be interviewed. Many people were concerned that the information would be used by competitors, or about potential tax liabilities of reporting accurate figures. Moreover, most traders and business owners did not keep records, responses were based on memory or unverified estimates. These limitations could affect the quality of data collected.

Annex 4: Wholesale and Aggregator Markets Surveyed

Country	Urban Center	Market	Type
Kenya	Kagio	Kagio	Aggregator
Kenya	Chwele	Chwele	Aggregator
Kenya	Karatina	Karatina	Aggregator
Kenya	Emali	Emali	Aggregator
Tanzania	Mangola	Mangola	Aggregator
Tanzania	Mwika	Mwika	Aggregator
Tanzania	Tarime	Tarime	Aggregator
Tanzania	Tanga	Mgandini	Aggregator
Tanzania	Lushoto	Lushoto	Aggregator
Tanzania	Mwanga	Mwanga	Aggregator
Tanzania	Korogwe	Karogwe	Aggregator
Uganda	Gulu	Gulu	Aggregator
Uganda	Arua	Arua	Aggregator
Uganda	Paidha	Paidha	Aggregator
Uganda	Kasese	Kasese	Aggregator
Uganda	Ntugamo	Ntugamo	Aggregator
Uganda	Kabwohe	Kabwohe	Aggregator
Uganda	Mbale	Mbale	Aggregator
Kenya	Nairobi	Wakulima	Wholesale
Kenya	Mombasa	Kongowea	Wholesale
Kenya	Daraja Mbili	Kisii	Wholesale
Kenya	Eldoret	Eldoret	Wholesale
Kenya	Thika	Madaraka	Wholesale
Kenya	Kitale	Kitale	Wholesale
Kenya	Kisumu	Kibuye	Wholesale
Kenya	Meru	Meru	Wholesale
Kenya	Machakos	Machakos	Wholesale
Kenya	Nakuru	Nakuru	Wholesale
Tanzania	Arusha	Kilombero	Wholesale
Tanzania	Dar-es-Salaam	Mabibo (Urafiki)	Wholesale
Tanzania	Dar-es-Salaam	Kariakoo	Wholesale
Tanzania	Dar-es-Salaam	Temeke Stereo	Wholesale
Tanzania	Dar-es-Salaam	Ilala	Wholesale
Tanzania	Tanga	Muheza	Wholesale
Tanzania	Moshi	Mwasera	Wholesale
Tanzania	Singida	Ukombozi	Wholesale
Tanzania	Tanga	Mgandini	Wholesale
Tanzania	Mwanza	Kirumba	Wholesale
Uganda	Kampala	Nakasero	Wholesale
Uganda	Kampala	Owino	Wholesale
Uganda	Kampala	Nakawa	Wholesale
Uganda	Kampala	Kireka	Wholesale
Uganda	Kampala	Kalerwe	Wholesale

Uganda	Busia	Busia	Wholesale
Uganda	Nimule	Nimule	Wholesale
Uganda	Bwera / Mpondwe	Bwera / Mpondwe	Wholesale
Uganda	Ishasha	Ishasha	Wholesale
Uganda	Mutukula	Mutukula	Wholesale
Uganda	Malaba	Malaba	Wholesale
Uganda	Suam	Suam	Wholesale
Uganda	Lwakhakha	Lwakhakha	Wholesale

Annex 5: Survey Instruments

FFV Study Questionnaire – Retailer **Date:** _____ **Intv:** _____
Individual Name: _____ **M / F** **Age 18 – 35** **Y / N**

Market Name: _____ **Town:** _____

District: _____ **Province:** _____ **Country:** K / T / U

Phone: _____ **Email:** _____

1. When did you begin this business? M: _____ Year: _____			
2. Is this your primary business?		<input type="checkbox"/> YES <input type="checkbox"/> NO	
3. How much of each fresh fruit and vegetable (FFV) product did you buy today?			
Product	Kg	Product	Kg
a)		d)	
b)		e)	
c)		f)	
4. How do you decide what FFVs to buy?			
5. What are the specific requirements you seek? (ask about grades, size, ripeness, etc.)			
6. How do you choose from whom to buy FFVs?			
6. What are your “must-buy” FFV products? Why?			
7. Do you ever trade in African Indigenous Vegetables (AIVs)? (circle all that apply)			
African Nightshade <i>Mnavu / Nsugga</i>	Spider Plant <i>Mgagani / Jobyo</i>	Amaranthus <i>Mchicha / Terere / Dodo</i>	African Eggplant <i>Ngogwe / Ntura</i>
Cowpea <i>Kunde / Kiyindiru</i>	Jute mallow <i>Mrenda</i>	Ethiopian mustard	Others:
8. Where do you buy these AIVs? From this market or from stops along the way?			
9. Where will you sell your FFVs? (write in below and check box)			<input type="checkbox"/> Urban <input type="checkbox"/> Rural <input type="checkbox"/> Peri-Urban

10. How will you transport this FFV product to where you will sell it?

11. To whom will you sell these FFVs? (circle all that apply)

Trader Wholesaler Retailer Consumer Other: _____

12. Will the FFV products you sell be ... (circle) eaten as is processed and sold

13. Is nutritional benefit ever a consideration for buying or selling FFVs? How?

14. Are your clients aware of the nutritional benefits of FFVs? How do you know?

15. Do you ever buy products from neighboring countries? (circle) YES NO

Product	Imported from?	Why import?	When import?
a)			
b)			
c)			

16. What problems do you face in FFV?	18. What would help fix these problems?
a.	a.
b.	b.
c.	c.

FFV Study Questionnaire – Wholesale Trader _____ **Date:**

Intv:

Trader Name: _____ **M / F** **Age 18 – 35** **Y / N**

Market Name: _____ **Town:** _____

District: _____ **Province:** _____ **Country:** K / T / U

Phone: _____ **Email:** _____

1. When did you begin this business? M: _____ Year: _____			
2. Do you have a formal office location? Where?			
3. Are you a member of any groups or associations related to your business? Which? <i>(request contact info and introduction for leadership if possible)</i>			
4. What fresh fruit and vegetable (FFV) products do you trade in?			
5. What specific varieties or grades of FFVs do you look for?			
6. How do you get your daily price information for FFVs?			
7. What percent of your annual volume in FFVs is <i>Imported</i> _____ <i>Exported</i> _____ <i>Domestic</i> _____			
8. What percent of the imported FFVs are sold in large (>=0.5 MT) lots? _____ %			
9. What size trucks do you use for FFVs? (circle all that apply)			
Pickup (1- 2 MT)	Canter (5-7 MT)	Fuso/Fighter (10-15 MT)	10 Wheeler (18+ MT)
10. Do you ... (circle one) own rent both?			

10. Do you prefer specific transporters? Why?	
11. Do you combine shipments with other traders in the same truck? Y / N	
12. What is your cost for renting a stall or a parking spot at the market?	
13. How do you store your FFV products once you bring them to market?	
14. What storage/conditioning facilities do you use for FFVs? What is the unit cost?	
15. How do you hire and pay laborers to assist with shipments?	
16. What problems in FFV do you face?	17. What solutions do you suggest?
a.	a.
b.	b.
c.	c.
d.	d.

FFV Study Questionnaire – Trader/Wholesaler (cont.)

What products do you import (IM)? What products do you export (EX)?	When? (months)	Why? (price, quality, season, etc.)	What units?	How is it packaged?	Where do you buy it?	From who do you buy? (farmer, broker, etc.)	Where is it grown?	What is the final destination?	How do you transport it?	What size truck do you use?	Monthly sales volume?	Monthly sales in Ksh?
IM 1)												
IM 2)												
IM 3)												
IM 4)												
IM 5)												
EX 1)												
EX 2)												
EX 3)												

EX 4)												
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FFV Study Questionnaire – Trader/Wholesaler (cont.)

Describe your top five buyers of <i>imported</i> (IM) and <i>exported</i> (EX) FFVs					
	Broker, trader/ wholesaler, or retail seller?	What do they buy?	Where are they selling the product?	How many kg do they normally purchase?	How do they transport their FFV purchase?
IM 1)					
IM 2)					
IM 3)					
IM 4)					
IM 5)					
EX 1)					
EX 2)					
EX 3)					

EX 4)					
EX 5)					

FFV Study Questionnaire – Association _____ **Date:** _____ **Intv:**

Name: _____ **Title:** _____ **M / F** **Age 18–35** **Y / N**

Market: _____ **Town:** _____

District: _____ **Province:** _____ **Country:** K / T / U

Phone: _____ **Email:** _____

1. What is the full name of your association?
2. What are your responsibilities within the association?
3. Does the association have formal offices? (circle one) YES NO
4. Where are those offices in relation to the market?
5. Does the association have a formal leadership committee? (circle one) YES NO
6. How often does the board/executive committee meet? (circle one) Daily Weekly Monthly Quarterly Less than quarterly
7. What kind of individuals or companies make up your membership?
8. What percent of members are women/women-owned? _____ %
9. What percent of members are youth/owned by youth (18 – 35 y/o) _____ %
10. What dues do you collect from members?
11. How often does the association hold full-member meetings? (circle one) Weekly Monthly Quarterly Every six months Less than every six months
12. What advocacy activities does the association undertake on behalf of members?
13. What benefits and services do you provide for members?

14. For which of these, if any, does the association collect fees?	
15. What other sources of financial and non-financial support does the association receive?	
16. What challenges prevent the association from better serving members needs?	17. What recommendations do you have to address each of these challenges?
a.	a.
b.	b.
c.	c.

FFV Study Questionnaire – Transporters Date: _____ Intv: _____

Name: _____ M / F Age 18 – 35 Y / N

Nationality: _____ LP Country: _____ Truck Size (vol): _____

Market Name: _____ Town: _____

District: _____ Province: _____ Country: K / T / U

Phone: _____ Email: _____

1. For this truck, are you the: <i>(circle one)</i> Owner only Driver only Owner/Driver			
2. Do you own any other trucks used for transport of FFV? <i>(circle one)</i> YES NO			
3. If yes, what sizes and how many of each do you own?			
4. Are you a member of any groups or associations related to your business? Which? <i>(request contact info and introduction for leadership if possible)</i>			
5. Do you transport FFV across international borders? <i>(circle one)</i> YES NO			
6. Which FFV products do you transport?	7. How is each packaged and shipped?	8. Origin (country/ province)	9. Destination (country/ province)
a)			
b)			
c)			
d)			
e)			

7. Describe a normal cross-border or internal trip with FFV, from start to finish. (*Ask about origin, destination, police/other checkpoints, informal payments, road conditions, the border crossing, time at each step, laborers, etc. Use the back of the sheet if necessary*)

8. What problems make it more difficult for you to do business and make money?

a.

b.

c.

9. What improvements do you think are necessary?

a.

b.

c.

FFV Study Questionnaire – Market Manager _____ **Date:** _____ **Intv:**

Name: _____ **M / F** **Age 18 – 35** **Y / N**

Market Name: _____ **Town:** _____

District: _____ **Province:** _____ **Country:** K / T / U

Phone: _____ **Email:** _____

1. What is the full name of the organization responsible for managing this market?				
2. Is this entity ... (circle):	Public	Private	Non-profit	Other: _____
3. What is your title and position within the management team?				
4. What are your responsibilities?				
5. What information does the market management collect?				
6. What fees are collected by the market management? How much are they?				
7. Which are the primary FFVs sold in this market?				
a)			d)	
b)			e)	
c)			f)	
8. For each, what months are they imported for sale, why, and in what volumes?				

Product	Months	Why?	Daily	Weekly	Monthly
a)			MT	MT	MT
b)			MT	MT	MT
c)			MT	MT	MT
d)			MT	MT	MT
e)			MT	MT	MT
f)			MT	MT	MT
9. For each, what months are they exported for sale, why, and in what volumes?					
Product	Months	Why?	Daily	Weekly	Monthly
a)			MT	MT	MT
b)			MT	MT	MT
c)			MT	MT	MT
d)			MT	MT	MT
e)			MT	MT	MT
f)			MT	MT	MT
10. What problems in the market do you see that need improvement?					
a.					
b.					
c.					
11. What improvements would you propose?					
a.					
b.					