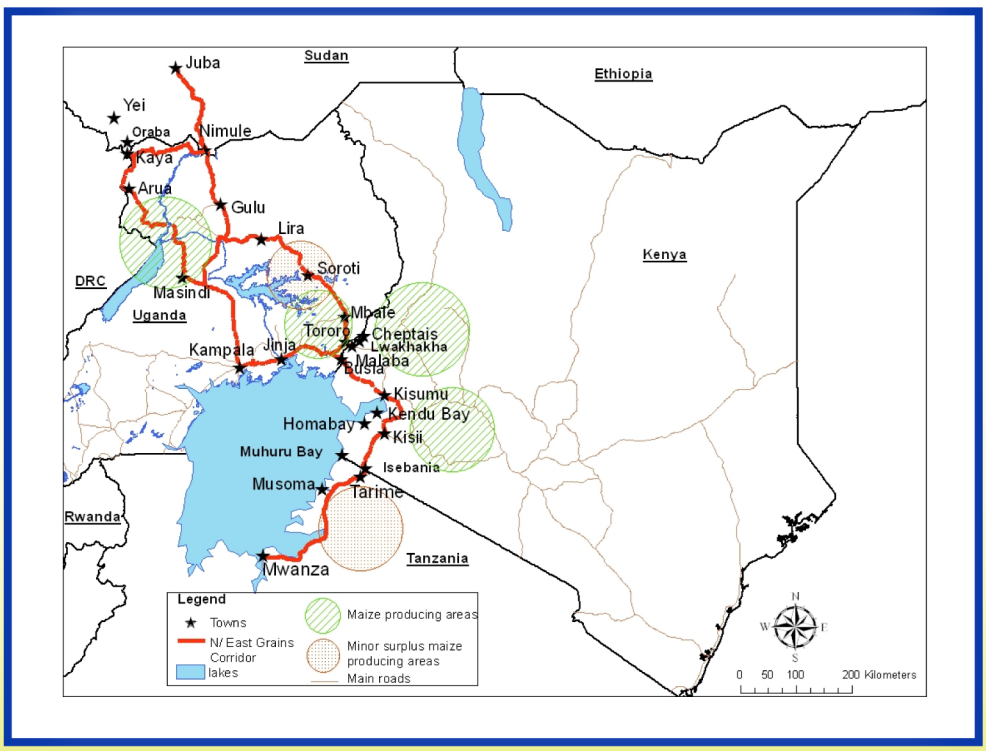
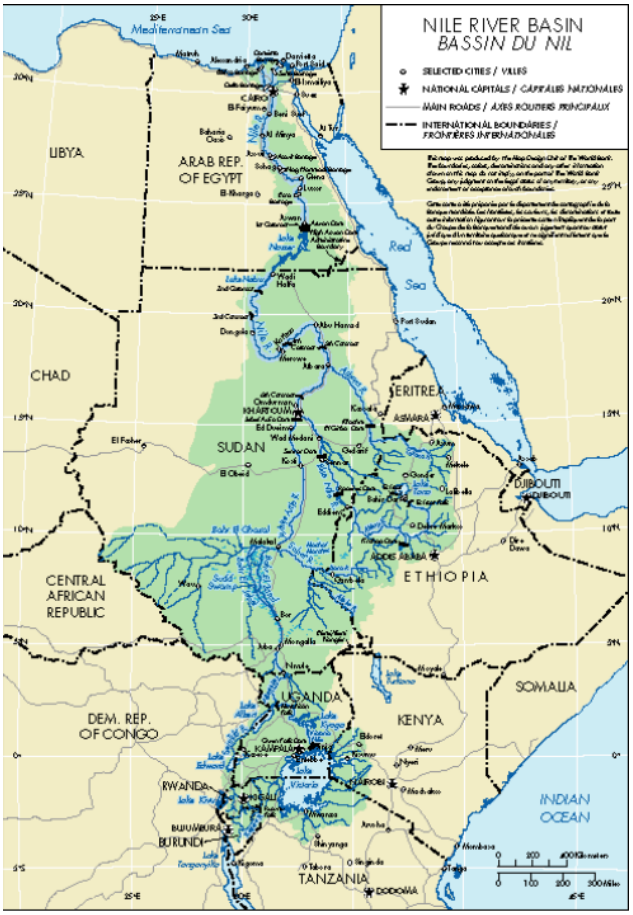
Nile Basin Initiative

ANALYSIS OF CROSS BORDER TRADE IN AGRICULTURAL PRODUCTS ALONG SELECTED CORRIDORS OF THE NILE BASIN



NILE BASIN INITIATIVE
Initiative du Bassin du Nil

Analysis of Cross-border Trade in Agricultural Products along Selected Corridors of the Nile Basin Region



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Abbreviations and Acronyms

AfDB	African Development Bank
ASAL	Arid and Semi-Arid Lands
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
CAADP	Comprehensive African Agriculture Development Program
CBO	Community Based Organization
COMESA	Common Market for Eastern and Southern Africa (COMESA/CU)
EAC/CU	East African Cooperation/Customs Union
EAGC	East African Grain Council
EU	European Union
FAO	Food and Agricultural Organization
FEWS	Famine Early Warning System (FEWSNET)
FTA	Free Trade Area
GDP	Gross Domestic Product
GIS	Geographical Information System
HCA	Horticultural Council of Africa
HYV	High Yielding Varieties
IBAR	Inter-African Bureau for Animal Resources
ICT	Information and Communication Technology
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
IUCN	International Union for the Conservation of Nature
KIPPRA	Kenya Institute for Public Policy Research and Analysis
LLPs	Livestock and Livestock Products
MDG	Millennium Development Goal NGO Non-Governmental Organization
MTP	Medium Term Plan
NEPAD	New Economic Partnership for African Development
NILESAP	Nile Equatorial Lakes Subsidiary Action Program
NTBs	Non-Tariff Barriers
RATES	Regional Agricultural Trade Expansion Services
RATP	Regional Agricultural Trade and Productivity project
RECs	Regional Economic Cooperation (Institutions)
REDSO	Regional Economic Development Services Office
ReSAKSS	Regional Strategic Analysis and Knowledge Support System
SADC	Southern Africa Development Cooperation
SAPs	Structural Adjustment Programs
SPS	Sanitary and Phytosanitary Standards
SWOT	Strengths, Weaknesses, Opportunities and Threats
TBT	Technical Barriers to Trade
UBOS	Uganda Bureau of Statistics
UNCTAD	United Nations Conference on Trade and Development
USAID	United States Agency for International Development
WBCSD	World Business Council for Sustainable Development
WHO	World Health Organization
WTO	World Trade Organization

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MA Consulting Group

& Resource Management and Policy Analysis Institute (REMPAI)

Executive Summary

1. Objectives

The Nile Basin region comprises nine member countries, namely: the Democratic Republic of Congo (DRC), Rwanda, Burundi, Uganda, Tanzania, Kenya, Ethiopia, South Sudan, Sudan and Egypt). Over 60 percent of the region's poor households derive their livelihood primarily from agriculture. For these households, increased agricultural productivity and trade offer the best means of raising income, ensuring adequate food consumption, and accumulating the assets necessary to survive periodic shocks such as droughts and floods. The region has a broad agro-ecological and economic diversity which, together with a huge population of about 380 million people, offer considerable potential for consumer demand and intra-regional trade. Although many governments are reorienting their economies towards more open market regimes, the region's agricultural productivity and cross-border trade are yet to enter a stable growth path and resilience to the impacts of global markets and climate change.

Achievement of broad based and sustainable economic growth in the region has been elusive largely due to challenges relating to: the poor state of infrastructure; underdevelopment of agriculture arising from low investments in the sector, low use of productivity enhancing inputs, particularly improved seeds and fertilizer, and over-reliance on rain-fed production; policy related issues such as low institutional capacity for implementation, corruption and policy reversals; persistence of non-tariff trade barriers; vulnerability to external shocks; and, poor coordination of preparation and response to natural disasters.

This project was designed to assess and analyze the trade flows for three commodity clusters in five trade corridors: grains (Tanzania-Burundi-DRC and Tanzania-Kenya-Uganda-South Sudan corridors), fruits and vegetables (Burundi-Rwanda-Uganda-Kenya corridor) and live livestock (Ethiopia-Kenya and Ethiopia-Sudan-Egypt corridors). The aim of the project was to highlight the opportunities and constraints to trade and their determinants such as types of infrastructure, commodity attributes (e.g. structure and distribution of production and consumption), market structure and policy/regulatory actions.

2. Methodology

The main tasks in the field survey revolved around the following specific objectives:

- Analysis of how markets the selected commodity clusters function
- Evaluating the potential for cross-border trade
- Estimating the level and nature of marketing costs along the selected corridors
- Identifying constraints to cross-border trade and determining their relative importance
- Giving recommendations on policy actions and potential investments to address the identified constraints to trade

The tasks undertaken can be divided into three categories. The first category was mainly literature review leading to documentation of commodity production trends; structure and distribution of regional production and consumption; estimates of formal trade volumes; and, developing the trans-boundary maps for production and consumption. The second category was field-based and required administration of structured questionnaires and focus group discussions in order to achieve the following: characterization of the selected trade corridors; monitoring informal trade in key border posts over a designated period of time (as a basis for projecting annual informal trade flows); and, determining the major value chains in the selected trade corridors.

The last task derived from the second, namely: describing the roles of the value chain players and their constraints such as transport and storage costs; NTBs and their implied costs; and other transaction costs for both formal and informal traders. Similarly, deriving from field work, the study was able to articulate the roles of different agencies and potential investments to address the identified constraints.

3. Main Findings

3.1 Production, Consumption and Trade Patterns

3.1.1 Grains corridors

The grains cluster comprised maize, beans and rice. Despite efforts made to ensure food security in the region, cereals production generally, and maize supply in particular, continues to fall short of consumer demands thus necessitating imports. Although Egypt and Ethiopia lead in terms of maize production, they are also, in the same order, the largest consumers of this staple. Productivity of maize in the region is low due to low application of fertilizers, low quality seed and lack of proper husbandry practices that would enable achievement of 7-8 tons/ha experienced in Egypt. Egypt is also by far the largest producer and consumer of rice in the Nile Basin; the other major producers being Tanzania, Uganda, Burundi and Rwanda. The FAO statistics indicate that the production of dry beans in the Nile Basin is dominated by Tanzania (over 800,000 tons per year) followed by Uganda, Burundi, Rwanda, Kenya and Ethiopia.

The study shows that cross border trade plays a crucial role in fighting food insecurity by creating employment and reducing supply variability in the deficit countries (e.g. in Kenya and South Sudan in the case of maize). Production and trade in rice and maize was mostly done by both adult male and female persons whereas trade in beans was dominated by women. In the markets, young women constituted the largest proportion of informal traders of grains and pulses but they did not own the businesses.

The key production constraints are poor market infrastructure, lack of post harvest handling and storage facilities, and expensive fertilizers and other inputs. The trade constraints, including tariff and non-tariff barriers, are high tax rates (different countries with different taxes), official corruption and many road blocks, lack of market information and information centers, lack of standard units of measurement of bags, frequent government bans and lengthy process in obtaining trade permits (particularly in Tanzania), differences in axle load limit requirements, multiple and independent regulating institutions, harassment by policemen especially when they are not bribed, and high costs of transport. The costs associated with many of these impediments to trade have been evaluated and reported in this report.

3.1.2 Fruits and vegetables corridors

The commodities studied under this cluster were passion, Irish potatoes, pineapples and banana. Production of fruits and vegetables in the Nile Basin region has generally experienced an expansion in the last decade due to favourable international prices and changes of consumption behavior/patterns among the working class. This latter factor has contributed to increased cross border trade among the Basin countries. Banana production in the Basin is dominated by Uganda, whose 2010 production was above 10 million tons/year, followed by Tanzania which has also been the leading consumer in the Basin. For the passion fruits, Kenya is the dominant producer followed by Burundi and Rwanda. The fruits are mainly consumed in Uganda though some are already being exported to Europe. Likewise, Kenya is the leading producer of pineapples in the region with an average production share of 61% (mainly from plantations) in the last ten years. It is followed by the Democratic Republic of Congo

(DRC) with an average share of 26%. However, in terms of small-scale production, DRC leads followed by Uganda which is a leading exporter of the commodity to Kenya (the leading consumer in the Basin). The leading producer of Irish potatoes is Egypt, followed by Rwanda. Most of the Irish potatoes produced in these countries were consumed at home though some were exported through cross-border trade mainly to Uganda and South Sudan. The study found that women dominate the retailing businesses of fruits and vegetables in all the markets of the corridor. However brokers are mainly young men in all the markets and transport is mainly done by male youths of 25-35 years since they have the required strength.

The production constraints and trade impediments identified in this report are similar across the study commodities and corridors. The key production constraints are lack of certified seeds or planting materials, diseases such as potato blight, lack of storage facilities in the farms, poor roads, expensive inputs such as seeds and fertilizers, lack of agro-processing capacity, lack of access to loans, price fluctuations between seasons, and lack of standards leading to legitimization of opportunism by brokers and traders. Key trade impediments among the cross-border traders include poor road and market infrastructure, lack of packaging standards, and lack of storage facilities in the markets.

The adverse effect of these trade impediments is exacerbated by numerous and persistent tariff and non-tariff barriers which include different levels of taxation (lack of common tariffs on both sides of a particular border); multiple tax collectors who do not issue (genuine) receipts; local taxes instituted at unofficial crossing points, e.g., the local councils' barrier points; 'facilitation' fee (bribery) paid to government officials; and women being subjected to violence, threats and sexual harassment.

Despite the presence of these constraints, informal and formal cross border trade creates employment opportunities to local border communities, for example to work as brokers, retailers, transporters. Cross-border trade has been useful in providing income for purchasing food commodities that are not available in a particular country at different times of the year thus improving food security. Trade also offers opportunities for promoting efficient use of Nile water in terms of supporting transport, irrigation and wet agro-processing but the potential is yet to be tapped fully due to lack of equipment, infrastructure and technical skills.

3.1.3 Livestock corridors

Two live livestock corridors were surveyed: corridor 1 comprised Kenya/Ethiopia and Western Ethiopia/Eastern Sudan border points while corridor 2 involved Sudan/Egypt border points. The survey involved four livestock species, namely cattle, camels, goats and sheep. Sudan had the highest population of livestock with 40.7 tropical livestock units (TLU) while Ethiopia, Kenya and Egypt had 34.2, 12.8 and 4.0 TLU, respectively. Sudan had the highest population of camels, goats and sheep while Ethiopia had the highest cattle population of about 42.8 million head between 1999 and 2009. Egypt is the largest consumer of bovine meat in the region at about 650,000 tons per year followed by Ethiopia, Kenya and Sudan at 250,000, 240,000 and 210,000 tons per year, respectively.

There is a thriving cross-border trade in live livestock along the two corridors. For instance, 47,985 head of cattle, sheep, goats and camels valued at US$ 6.6 million were traded annually between Kenya and Ethiopia. In corridor 1, cattle, sheep and goats flowed from southern Ethiopia to Kenya while camels moved in the opposite direction. Cattle moved from the Amhara Region in western Ethiopia to eastern Sudan through Metema/Galabaat border point while sheep and goats went in the opposite direction. In corridor 2, camels, sheep, goats and cattle flowed in a one way direction from Sudan to Egypt through Wadi Halfa border point. Some livestock also moved by the Red Sea road to Cairo. The main consumption points were the major cities in the region: Nairobi, Mombasa, Addis Ababa, Khartoum and Cairo.

Cross-border trade in live livestock employs a large proportion of the population (estimated by FEWSNET, 2010 to be around 17 million) including livestock producers, traders and other groups such as trekkers, fodder traders, brokers and intermediaries. Women are mainly involved in marketing of livestock products such as hides, skins, milk and ghee and not in live livestock trade.

The main barriers to cross-border livestock trade include lack of water supply (for drinking as well as for the production of pasture) due to frequent drought and effects of climate change; lack of marketing infrastructure such as holding grounds, watering points and troughs, feed barns, loading ramps, treatment/vaccination crushes, and isolation facilities; lack of marketing information; poor road and telecommunication infrastructure; rent-seeking/trader harassment by government officers along the trade routes; multiple taxation by local authorities in different States (in Sudan), and the ongoing civil conflicts in Darfur, Kordofan and Somalia.

3.2 Estimates of Marketing Costs

3.2.1 Storage and capital costs

The most popular on-farm forms of crop storage are improved structures and rooms in residential houses. Retailers and wholesale traders store predominantly in open holding grounds suggesting that there are no permanent storage facilities at these levels. However, processors appeared to be using improved storage structures because their operations were generally larger compared to those of farmer/traders and retailers.

Producers reported relatively higher post-harvest losses ranging from about 2.6 percent for rice and maize to 4 percent for beans compared to traders whose losses were highest for maize at about 2.2 percent. On average, formal traders registered higher losses (US$ 2.5 per ton) compared to informal traders (US$ 1.8 per ton) and the value of beans lost was the highest across the board. The highest storage related post-harvest losses were registered for maize, or about 11 percent of total farm production, compared to losses for beans that were estimated at only about 5 percent. In value terms, however, losses for beans were higher at about US$ 44 per ton compared to US$ 22 per ton for maize.

Storage structures in market centers fetched higher premiums due to their scarcity value compared for example to traditional stores and improved structures whose available capacities were much higher. Most of the storage infrastructure was self-owned and managed by men.

3.2.2 Transport

The prevalent modes of transport for crops by producers were small and big trucks, which also was the case for beans. However, traders and retailers preferred to use human transport for beans. Use of small trucks and bicycles was common in rice transportation by producers while traders and retailers preferred human transport.

There were three main modes for transporting livestock depending on the stage along the production chain. Trekking that often cover long distances taking several days, was the only form of transport at the producer stage and was handled exclusively by male youth. Trekking was also prevalent between primary and secondary markets after which road trucking (using 24 or 45 cattle head capacity trucks) takes over almost exclusively as the stocks headed to the tertiary markets.

The cost of transporting livestock depended on a number of factors including mode of transport, volumes per delivery, status of the road and distance to be covered. Trekking was found to be the most stable and probably the cheapest mode of transport especially with regard to financial costs. Trekking distances of about 110km were charged an average of Ksh 337 per head of cattle, translating to about Ksh 3 per km per head.

The major losses of livestock during transportation and in the holding grounds arose mainly from three factors: insecurity, lack of feed and water and diseases. Other minor factors were wildlife and natural disasters.

3.3 Informal and Formal Trade

The border with the highest volumes of informal trade for the project commodities was the Uganda-Kenya border especially in the case of maize, beans, rice and bananas. In value terms, Uganda informally exported US$ 25 million worth of maize to Kenya during the year 2011; the figures for beans and bananas were, respectively, US$ 9.5 million and US$ 615,440. Kenya's major informal export to Uganda was rice valued at US$ 1.4 million during the same period. The other large transactions were noted for informal trade exports from Uganda to Rwanda for Irish potatoes (US$ 468,600), maize (US$ 429,600) and bananas (US$ 303,750); exports of bananas from Uganda to South Sudan (US$ 3.0 million) and, about US$ 4.7 million worth of bananas from DRC to Uganda. Literally all cross-border live livestock movements were not recorded largely due to the high porosity of the borders and are hence treated as informal trade.

Maize had the highest value of formal trade accounting for 46 percent (US$ 97,989,972) of the total value of all the traded commodities along the corridors. This was followed by pulses (beans) which accounted for 30 percent (US$ 63,647,994), 22 percent for rice (US$ 46,679,325) and fruits and vegetables (pineapples, Irish potatoes and bananas) accounting for 3 percent (US$ 5,470,110). Pineapple had the least value of US$ 1,114,008.

Overall, the Uganda and Kenya borders were the most active accounting for about 51 percent of total trade of the study commodities in the selected corridors. This was followed closely by the Uganda/Rwanda border which accounted for 28 percent of cross-border trade. The least active border was between Burundi and Rwanda (1 percent) while Burundi and Sudan had very little or no exports to Tanzania and Uganda, respectively.

In all the corridors, informal trade had higher traded volumes than formal trade. This was especially the case along the DRC-Uganda border which recorded 100 percent informal trade for all the commodities, regardless of the direction of flow (whether from Uganda or DRC). Data from the Uganda-South Sudan border showed that trade in vegetables and fruits, which flowed from Uganda to

South Sudan, was 100 percent informal. Similarly, key commodities flowing from Uganda to Kenya (i.e. maize, bananas, and pineapples) were mainly traded informally, recording 57 percent, 77 percent, 99 percent of informal to total trade, respectively.

3.4 Non-tariff Barriers (NTBs) to Trade

The report highlights the following typical NTBs that continue to persist in the Nile Basin despite efforts of the regional economic corporations (RECs) aimed at fast-tracking customs unions and free movement of goods and services: i) physical barriers (poor road and storage infrastructure, poor market infrastructure, poor customs infrastructure especially along the South Sudan border points, lack of telecommunication services); ii) cumbersome administrative procedures; iii) non-tariff fees and taxes; iv) insecurity and movement restrictions; and, v) lack of harmonization of sanitary and phytosanitary requirements and other food safety and quality standards. The report provides estimates of the cost implications for these NTBs for different commodities and the borders where they are most prevalent. The NTBs together with other constraints relating to weak institutional capacity, corruption and recurrent civil strife constitute a major hindrance to formal cross-border trade in the region. Other consequences of these constraints are poor producer motivation resulting from limited market access and remuneration; low agri-business competitiveness due to unreliable supply of locally sourced raw materials; high transaction costs; and poor integration between deficit and surplus markets within the region that lead to inability to effectively manage price volatility.

3.5 Conclusion and Recommendations

The Nile Basin has abundant land and water resources making agriculture a priority area in strategies aiming at poverty reduction. Although the NEPAD/CAADP has in the last ten years brought agriculture back in the political and development agenda and while many countries are now allocating more resources to the sector, it is only in Egypt where crop productivity is edging closer to their genetic frontiers. Yields of major food grains (maize, rice and wheat) in the rest of the Nile Basin are hardly one quarter of those in Egypt. Low crop productivity is creating major strains in market supply, value addition and agri-business development. The report recommends that:

a) Governments direct more resources towards achieving higher crop productivity by increasing use of fertilizer and high yielding seed varieties and by expanding irrigated crop area. Possible approaches such as subsidies and market-based incentive structures are briefly discussed

b) Livestock productivity in pastoral areas, which are the predominant source of meat supply in the region, can be increased through sustained support to provision of water for example in the form of earth dams along the trade corridors; infrastructure development (roads, electricity, telecommunication and markets); disease surveillance and control; and, developing the capacity of different value chain actors (producers, brokers/middlemen, processors, transporters, drovers, etc) to adequately participate in live livestock trade

c) Promoting competitiveness and access to agricultural markets by smallholders: promoting market access by using innovative ICT-based approaches, providing financial resources, adding value and seeking new markets (within the region and abroad) and taking advantage of the agro-climatic diversity and abundant natural resources in the region

3.6 Potential Investments

The report elaborates on two different categories of potential investments to address the constraints to cross-border trade in the Nile Basin. The first category comprises investments that the Nile Basin Initiative (NBI) Secretariat could prioritize for immediate implementation following pre-feasibility

studies, namely: i) Improving Lake Victoria water transport and landing sites; ii) Strategic earth dams along the live livestock trade corridors (but serving both agriculture and pastoral needs); iii) Storage facilities for grains, fruits and vegetables located strategically along the borders; iv) Regional agricultural trade training centre (administered by the East African Grain Council - EAGC); and, v) Wet agro-processing for grains, fruits and livestock.

The second category of investments requires NBI Secretariat to initiate debate on their harmonization and, where pilot projects are already underway, a discussion of how they could be scaled up to benefit more stakeholders in the region: i) Regional seed multiplication centres for banana, passion and Irish potato; ii) Good agricultural practices (for fruits and vegetables); iii) Grains e-market; iv) Maize Standards 2013. The last three investments could be offered as stand-alone initiatives but they could also be coupled to others in the first category (as a package). Other investments under this second category include efforts aimed at promoting commercialization of livestock production and access to foreign markets (especially in the Middle East); growing urban consumers and hitherto unexploited region markets. In this context, the report highlights four potential investments: 1) Strategic livestock and livestock products (LLPs) processing hubs strategically located in viable catchment areas; 2) Promoting commodity-based trade; 3) Creating compartments (this works well for smaller stocks); 4) Comprehensive animal branding and vaccination program in the Nile Basin as a first step towards achieving a disease-free zone (for livestock).

Finally, the report outlines a strategy for strengthening the capacity of regional commodity groups, notably, EAGC and Horticultural Council for Africa (HCA). The capacity of the commodity groups was built mainly through the following efforts: a) participation in the design of field work and data collection methods and instruments; b) participation in field data collection and analysis as well as in the workshops for experts, stakeholders and RATP/Steering Committee Members; c) sharing of research documents and data; d) joint preparation of potential investments in the region; and, e) participation in the preparation of dissemination and policy advocacy materials. The Commodity groups will also have access to the value chain approach and cross-border trade monitoring instrument developed by the MA and REMPAI team of experts.

1.0 Introduction

The last decade brought some sense of optimism for Sub-Sahara Africa (SSA) as the region slowly emerged from a prolonged period of economic stagnation and declining per capita incomes. Since 2003, the number of armed conflicts in the region decreased from 15 to just about four hot spots[1] although ethnic and border related skirmishes that have the potential of slowing down economic growth creep up from time to time (Binswanger-Mkhize et al, 2011). There is progress in macroeconomic management with the improved business environment making it possible to foster more enduring public/private sector partnerships (World Bank and IFC, 2011). Similarly, in much of SSA, there have been significant advances in democracy, strengthening of the civil society, freedom of the press and adherence to principles of human rights and equality. To some extent, this growth is explained by improved infrastructure, expansion of the manufacturing sector, vibrant telecommunication network (symbolized by increased mobile phone and internet use) and rapid increase in foreign investments, notably from China, India, Brazil and Turkey (Economist Magazine, December 2011). While agricultural growth performance in SSA has mostly been achieved through expansion of land area and to some extent driven by stronger commodity prices, there is a definite upturn and a break from past gloom. In the last decade, the region witnessed GDP growth above 5.5 percent with agricultural growth rates following closely above 3.5 percent (World Bank, 2009).

However, the gains made by SSA remain fragile and conditions for sustained and multi-year economic growth are not yet in place. The stark challenges still facing SSA are exemplified by the fact that the proportion of ultra-poor (those living on less than half a dollar a day) in the region is still the largest in the world. At the root of these statistics is poverty and food insecurity: more than 260 million in SSA still live on less than $1 per day, and the poverty reduction rate still falls far below what is expressed in the first Millennium Development Goal (MDG1). According to recent estimates, only three African countries are likely to halve the total number of undernourished people by 2015, namely, Ghana (that reached this target in 2011), Mauritania and Egypt (Omilola et al, 2010). Over a dozen countries are likely to achieve one of the MDG1 elements – halving poverty or hunger by 2015. Similarly, the region as a whole has been faring rather poorly with respect to the three pillars of food security (namely, availability, access and utilization).

The poverty and food security challenges facing SSA are closely mirrored in the Nile Basin region that comprises nine member countries: the Democratic Republic of Congo (DRC), Rwanda, Burundi, Uganda, Tanzania, Kenya, Ethiopia, South Sudan, Sudan and Egypt) all of which, except Tanzania, are members of the Common Market for Eastern and Southern Africa (COMESA). Concerns about wide spread poverty and food insecurity feature prominently in the national development goals of member countries. In 2006, over 10 million people faced the risk of starvation in Ethiopia while in Kenya, Uganda and Southern Sudan, over 6 million people are perennially in need of food aid principally because of weather related impacts and frequent displacement of populations as a result of civil strife (COMESA, 2008).

The Nile Basin has a combined population of about 380 million inhabitants and, in sheer numerical terms, offers considerable potential for consumer demand and intra-regional trade. However, this potential is yet to be unlocked due to widespread poverty and other development constraints. Among the Nile Basin countries, poverty rates ranged from a high of 84 percent in the DRC in 2002 to 38 percent in Uganda in 2003 (COMESA, 2008). Due to past policy neglect of agriculture where the majority derives their livelihood, poverty incidence, and hence under-nourishment, is higher in the rural areas compared to urban areas.

[1] Casamance (Senegal), Somalia, Northern Uganda and Kivu (DRC)
[2] For the period 1999 – 2002, Egypt was using 448 kg/ha; South Africa (56 kg/ha), Kenya (32 kg/ha) and the consumption in

Sustained economic growth has the potential for reducing poverty and food insecurity but socio-economic inequalities make it difficult even for countries with high per capita incomes to translate such national prosperity into overall poverty reduction and food security. Over 60 percent of the region's poor households derive their livelihood primarily from agriculture. For these households, increased agricultural productivity and trade offer the best means of raising income, ensuring adequate food consumption, and accumulating the assets necessary to survive periodic shocks such as droughts and floods. As household incomes increase due to increased productivity, policy strategies should then shift away from food security to achieving income security through enterprise diversification, value addition and increased participation in markets.

The next two sub-sections highlight the key challenges to economic development in the Nile Basin and the policy initiatives aimed at addressing them while the third sub-section provides an overview of the current status of production and trade in selected agricultural commodities in the region.

1.1 Structural Constraints to Economic Development in the Nile Basin

Low Economic Growth Rates and Inequality

Table 1.1 shows that the economies in the Nile Basin region generally performed poorly in 2009 following the food crisis of 2006/08 and the down-turn in the global financial markets that affected commodity demand. The estimates of GDP growth rates for 2007/10 show that most of the countries in the region have been unable to grow sustainably at rates that are high enough to achieve significant impacts on poverty. The risk of over-relying on a few export commodities that are susceptible to swings in global markets is clearly demonstrated in a number of Nile Basin countries reaching extremes in Burundi where 90percent of foreign exchange earnings are derived from coffee and tea. The region also has examples of the co-existence of healthy economic growth (and high per capita incomes) and inequality manifested in the form of high proportions of the population leaving below the poverty line, for example in Burundi, Rwanda and Tanzania. High income inequalities frustrate human capacity development efforts and ultimately lead to economic instability.

Table 1.1: Economy Highlights of Nile Basin Countries

Country	Real GDP growth rate (percent)				Population below poverty line in 2011	Per capita income in 2011
	2008	2009	2010	2011	percent	US$
1. Burundi	4.5	3.5	3.9	4.2	68.0	400
2. DRC	6.2	2.8	3.0	6.5	84.0*	300
3. Egypt	7.2	4.6	5.3	1.2	20.0	6500
4. Ethiopia	11.6	8.7	7.0	7.5	38.7	1100
5. Kenya	1.7	2.6	5.0	4.4	45.9	1700
6. Rwanda	11.2	4.5	6.0	7.0	60.0	1300
7. Sudan	6.6	4.2	5.2	-0.2	40.0	3000
8. Tanzania	7.4	6.0	6.4	6.1	87.9	1500
9. Uganda	8.7	7.2	5.8	6.4	64.5*	1300

Source: CIA Factbook (accessed 3rd July 2012); * COMESA, 2008

Low investments in agricultural development

The role of governments in providing key public goods such as rural infrastructure (energy, transport, irrigation and water and sanitation), research and extension, support to commodity value chains, value

addition and building capacity of regulatory institutions in order to promote agricultural development is well recognized. However, in reality, the sector suffered from a long stretch of historical neglect and many countries in the Nile Basin are still playing a catching up game. Given important challenges such as rapid population growth, climate change, water scarcity, and the volatility of food prices, policy makers are now increasingly recognizing that investment in agriculture is essential for increasing the welfare of rural households.

The public sector is also playing a leading role in support to agricultural research and development (R&D). As would be expected, agricultural R&D is characterized by marked dependence on public support that accounts for over 75 percent of the total agricultural R&D capacity (Beintema and Stads, 2011). While there has been growth in public expenditure in R&D in a few countries such as Kenya, Sudan, Tanzania and Uganda, public expenditure on R&D has either stagnated or has been too low to make any sizable difference in rural development and poverty reduction (Ariga, 2011). Where change was evident, most expenditure was on rehabilitating neglected infrastructure and augmenting low salaries in public research institutions. Some level of investment in R&D in some countries comes from non-profit institutions that are often linked to producer organizations for example covering coffee, sugar and cotton but overall, contribution of non-profit organizations account for under 4 percent of total public agricultural research capacity. In 2000, Africa invested $0.70 for every $100 of agricultural output; lower than the 1981 level of $0.95. In the Nile Basin the intensity ratios ranged from 0.2 percent or lower in Sudan to about 1.3 percent in Kenya which in 2008 invested US$404 million on agricultural R&D (Beintema and Stads, 2011).

Poor Infrastructure

The rudimentary state of the Nile Basin's rural infrastructure constitutes the single most limiting factor to cross-border trade and economic development. Underdevelopment of infrastructure (power, transport, storage, irrigation and telecommunication) partly accounts for the high transactions costs of doing business in the region. The density of paved roads per one million inhabitants is lowest in DRC where it stands at a mere 59 kilometres but other countries such as Tanzania, Sudan, Rwanda and Burundi do not post significantly higher figures (von Braun et al. 2008). The main trade (transit) corridors in the eastern seaboard of the region that currently originate from the ports of Djibouti, Mombasa and Dar-es-Salaam constitute a economic life line to the land locked Nile Basin member countries. There are two broad policy concerns along these transit routes: a) strategies to increase investments to improve the physical infrastructure which in some cases have deteriorated because of neglect or due to destruction during past civil conflicts; and, b) policies aiming at the 'soft' aspects, namely, regulatory institutions, policy harmonization to minimize costly competition (for example between rail and road), regulations addressing issues to do with insurance, axle load requirements and compliance with sanitary and phytosanitary (SPS) requirements. Infrastructure also has significant implications to agricultural production costs since the region's agricultural inputs (mainly oil, fertilizer and machinery) are largely sourced externally.

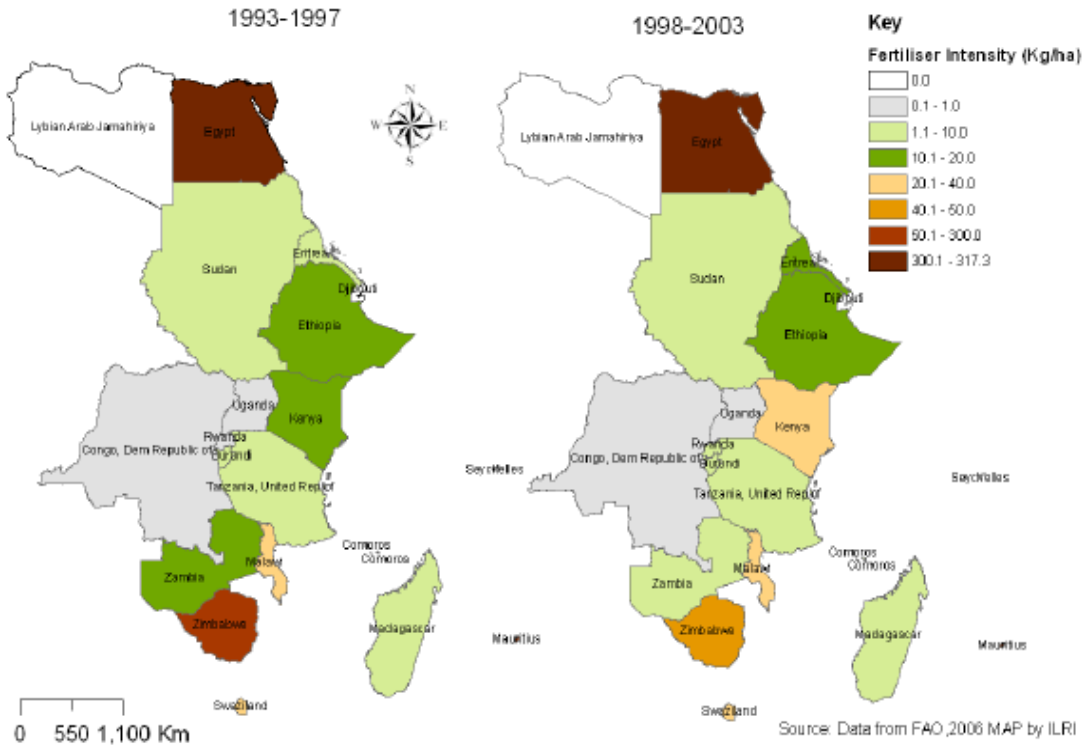
Low Input Use

The Nile Basin's economic potential for fertilizer (largely determined by the prevailing fertilizer responses and prices) is always much larger than actual use. With the exception of Egypt (over 300 kg/ha) and Kenya (20 – 40 kg/ha), all the other countries in COMESA apply no more than 20 kg of fertilizer per hectare (Map 1.1)[2]. The map also shows that between 1997 and 2003, fertilizer application rates in literally all the COMESA countries either declined or remained stagnant. Table 1.2 shows that Eastern Africa, comprising the majority of the Nile Basin countries, performs poorly in terms of yields for main food crops and beef compared to the averages for Africa as a whole. More

[2] For the period 1999 – 2002, Egypt was using 448 kg/ha; South Africa (56 kg/ha), Kenya (32 kg/ha) and the consumption in Uganda was estimated at just about 1 kg/ha FAOSTAT as reported by KIPPRA's Kenya Economic Report (2008).

specifically, maize productivity in literally all Nile Basin countries stagnated in the last two decades (Table 1.3) reflecting low use of high yielding seed varieties and fertilizer.

Fertilizer use correlates closely with area under irrigation and here again, COMESA countries (except Egypt) significantly lag behind their counterparts in Asia: out of a potential irrigable area of about 600 million ha in the COMESA region, only 2 percent is under irrigation (WBCSD and IUCN, July 2008)[3]. About 75 percent of crop production in all COMESA countries, except Egypt and Sudan, rely on rainfall. As the variability of rainfall patterns increase due to climate change, the risks of using chemical fertilizers in degraded tropical soils will increase thus putting into jeopardy any efforts aimed at increasing crop productivity unless efforts are made to increase the crop area under irrigation.



Map 1.1: Fertilizer use Intensity in COMESA

Source: Adapted from ILRI (2008) - Fertilizer Use Map (Stella Massawe)

The low usage of fertilizer in the region is explained inter alia by the following factors:

- Fertilizer costs are higher mostly due to additional transport costs related to under-developed physical infrastructure and the fact that most of the requirements are imported
- The region has a much lower proportion of irrigated land despite the abundant water resources
- Most farmers rely more on traditional crop varieties that are less responsive to fertilizers

Although the answer to the dilemma of low fertilizer consumption may lie in exploiting the region's available irrigation potential, there are inherent socio-economic and environmental challenges (such as prohibitive investment costs for large scale irrigation projects, lack of technical know-how among smallholder farmers, low value-cost ratios for the irrigated crops, competing uses for available water and land resources, and undesirable environmental impacts) that cannot be wished away. In the meantime, however, low crop and livestock productivity will continue to impact adversely on competitiveness of the region's agri-business firms.

[3] WBCSD and IUCN (2008). World Business Council for Sustainable Development (WBCSD) and IUCN (http://knowledge.cta.int/en/content/view/full/7739

Table 1.2: Agricultural Commodity Yields (2003)*tons/ha (except beef*)

Commodity	Eastern Africa	Africa	Global
Maize	1.39	1.16	**4.47**
Wheat	1.28	2.03	**2.66**
Rice	1.12	1.87	**3.84**
Beans	0.60	0.62	**0.70**
Bananas	4.69	6.56	**15.25**
Beef (kg/animal)	**127.00**	**148.00**	**200.00**

***Source**:* FAO (2004)

It is not just the agricultural primary producers in the region that face challenges, processors too have their share of constraints. Except for Egyptian firms, the majority of agribusinesses in the region face high costs of utilities, poor infrastructure (both transport and storage) and inadequate supply of raw materials forcing them to operate at high excess capacities. In Kenya, for example, several grain millers employ old technology and the modern ones have excess capacities in the region of 50 – 60 percent and hence high average costs of production (Ackello-Ogutu, 2005). Generally, value addition along the commodity chain is limited and the range of traded products is usually narrow and undifferentiated across the region. Although some of these challenges originate from primary productivity at farm levels (due to low input use and hence low marketable surpluses), market and policy factors also have their impacts.

Table 1.3: Maize Productivity by Country/Region (1995 – 2007) *tons/ha*

Country/Region	1995 – 1997	1998 - 2000	2001 – 2003	2004 – 2006	2007-2009	Approx. annual growth rate (percent)
Egypt	6.7	7.5	7.5	8.1	8.1	**2.1**
Sudan	0.6	0.7	0.8	1.0	1.9	**10.6**
DR Congo	0.8	0.9	0.8	0.8	0.8	**0.2**
Ethiopia	1.6	1.7	1.7	2.1	2.1	**4.7**
Kenya	1.6	1.5	1.6	1.8	1.5	**(1.7)**
Uganda	1.4	1.7	1.8	1.5	1.5	**(0.2)**
Rwanda	1.1	0.8	0.8	0.8	0.8	**(1.8)**
Burundi	1.3	1.1	1.1	1.1	1.0	**(1.6)**
Tanzania	1.7	1.9	2.2	1.2	1.2	**(6.2)**
COMESA	1.8	1.9	1.9	2.0	-	**-**
Northern Africa	4.7	5.4	5.6	6.1	6.3	**3.8**
USA	**7.7**	**8.5**	**8.6**	**9.6**	**9.8**	**2.9**

Source: Computed from FAOSTAT; (.) denotes negative growth

Policy related challenges

One of the most dramatic economic policy changes in the Nile Basin in the last two decades or so has been the transition from economies dominated by governments to market driven economic configurations. Most of the governments in the region have adopted policies that aim at reorienting their economies towards market regimes with varying degrees of commitment and outcome ranging from partial and intermittent liberalization to more comprehensive economic reforms. These policy reforms have brought some progress in economic growth in many countries but in some cases, agriculture suffered as governments withdrew from provision of basic services such as extension, credit and marketing. Similarly, the private sector players are yet to benefit from the full potential of

markets under the regional economic corporations simply because the markets themselves under-perform due to the absence of the foundations for market institutions. Under such circumstances, the task of agricultural development and trade requires policies that initially promote the development of economic coordination mechanisms that are outside the ambit of markets: because markets themselves are still rudimentary (Doward and Kydd, 2003).

Although tariffs have been drastically reduced under the COMESA Free Trade Agreement (FTA) and the East African Community and the EAC customs union (EAC/CU) to the extent of posing minimal impediments to agricultural trade, a number of commodities are exempted from zero-rating and are thus subject to protection under various safeguard measures. The administration of the safeguard measures (for example to protect the sugar industry in Kenya) is usually ad hoc thus creating unnecessary risks and uncertainties for the private sector, apart from their potential to encourage rent seeking behaviour among public officials. Protectionist trade policies also cause price/efficiency distortions in the regional markets as well as avoidable inequalities in the domestic markets. The rationale of protecting domestic producers (whether for employment or strategic reasons) is hardly justifiable, especially if the underlying structural and policy related causes of inefficiency are not being seriously addressed as is usually the case. Fortunately for the region, safeguard measures with high tariffs or other official import controls apply only to a limited number of commodities (e.g. maize, beans, sugar, milk and cream in the case of Kenya).

Non-tariff barriers to cross-border trade

Non-Tariff Barriers (NTBs) represent a diverse collection of protectionist devices whose only common denominator is their amenability to use by governments in much more subtle and elusive ways than tariffs to influence trade, trade patterns, or free movement of goods and services between nations. Non-tariff policy strategies are dynamic in nature and their application by government agencies is usually quite pervasive. The UNCTAD often uses the term “trade control measures” (rather than non-tariff barriers) comprising: deliberate policies by governments or companies to control imports or exports such as control of information on import/export opportunities, rejection of Certificates of Origin or qualification of goods on non-technical grounds; deliberate delays in effecting payments; and introduction of procedural conditions on traders. The unscientific determination of the value of imports for customs duty purposes that disregards the sales and the deliberate misclassification of goods into tariff codes with higher duties are some of the persistent NTBs.

Health and safety regulations required for the hygienic production and packaging of imported products and labelling requirements showing origin and contents have in the past been treated differently under the Technical Barriers to Trade (TBT) category. Such formal regulations serve legitimate purposes but some are often thinly veiled disguises for restricting imports. The WTO treats all non-tariff barriers to trade (except SPS regulations) as TBTs. Barriers associated with SPS regulations are not so pronounced in agricultural trade in the Nile Basin region but their administration often creates costly bureaucracies that hamper official trade.

Informal technical barriers are defined broadly to include behaviour that is not explicit official policy but which is either practised by officials with the intent of restricting trade, or is a restrictive practice against other market participants that is knowingly permitted to exist despite government’s capacity to stop it. Although such practices exist, they are quite difficult to document and assign to a particular country as they invariably entail collusion between public officials and the traders; the typical examples being bribery, “go-slow” tactics by officials, selective application of regulations to discriminate against certain traders and harassment of foreigners on grounds of flouting immigration rules. As agricultural commodity trade within the region continues to enjoy the success of progressive reduction in tariffs, the struggle to increase formal exchanges must shift to a different frontier, that of dealing with such informal NTBs. The informal trade channels used by traders attempting to avoid NTB-related

bureaucracy pose serious threats to the fight against the spread of plant pests and diseases in the region.

Poor coordination of response to emerging issues and emergencies

The 2006-08 food crisis was a real test of how African countries respond to externally instigated shocks. Globally, food prices had been on a downward trend for several decades, thanks to agricultural bio-technologies, mechanization and farm subsidies initially in the OECD countries, and later because of adoption of Green Revolution technologies especially in the populous countries of East Asia. This declining price regime did not augur well for Africa as it was argued that low prices did not provide incentives for expanding agricultural output and achieving food security. When prices suddenly edged up, it was assumed farmers would take advantage, and to some extent for SSA as a whole they did and agricultural productivity in 2008 -2009 grew faster than population. But while rising food prices offered incentives to producers, they also caused havoc to consumers - through welfare losses - and to producers who are net food buyers. The impact of this on countries depended on factors such as price transmission from the borders, industry composition of GDP (role of the affected commodities in the economy versus receipts from export goods), and safety nets or social protection measures taken by some governments (Abbott and Battisti, 2009). Most of the Nile Basin countries, by virtue of being net food importers, reduced import taxes during the food crisis in order to cushion consumers (using taxes, social safety nets and market stabilization) while a few (Ethiopia and Tanzania) applied export restrictions (ASARECA, 2008 and FAO-GIEWS, 2008).

Vulnerability to climate change impacts

Although global climate change models have increased greatly in number and quality over recent decades thereby improving the scientific understanding of past, present and future climate changes, there remains much uncertainty about magnitudes and impacts of climate changes at any particular location and how best to prepare for these. How people in any given area are affected by climate change will not only depend on the climate changes themselves in that area but also on ecological, social and economic factors (Mendelsohn et al., 2006). Climate changes are hence a prime example of what has been called “socio-ecological systems” with factors from different domains interacting on different spatial and temporal scales (Holling, 2001).

The available literature indicates that changes in precipitation patterns due to climate change will result not only in short term crop failure but will also negatively affect production of most key food crops in the long run in terms of both reduced yields and increased pest proliferation. Apart from direct effects that climate change has on crop yields due to changes in precipitation patterns, climate change indirectly affects crop yields by increasing the water stress on irrigated crops (Nelson et al, 2009). Estimates based on IFPRI’s international model for policy analysis of agricultural commodities and trade (IMPACT) show that both rain-fed and irrigated harvested areas in SSA will decrease by 0.6 percent and 3.5 percent, respectively. Although rain-fed production is predicted to increase by a nominal 0.7 percent, irrigated production will decrease by a sharp 15.3 percent (due to reduced irrigation in some African basins and the fact that some of the irrigated crops such as wheat are very sensitive to heat stress). Overall, total crop harvested area and production are predicted to decline by 0.7 percent and 1.6 percent, respectively (Calzadilla et al, 2009).

In the Nile Basin, the pastoral livestock production systems, and hence pastoralist communities, are generally viewed to be the most vulnerable to climate change impacts (particularly in the large swathes of Kenya, Ethiopia, Sudan and Tanzania). However, other medium and high potential agricultural areas are likely to suffer and thus require pre-emptive policy strategies, especially targeting environmental conservation and use of appropriate technologies and agriculture and livestock husbandry methods. Due to the close links the Nile Basin economies have, vulnerabilities in one part

of the region is easily transmitted to another implying that policy responses to climate change impacts and mitigation will be best addressed through regional collaboration and by investments that cut across the borders.

1.2 Ongoing Efforts to Address the Structural Constraints

Policy reforms and increased attention to agricultural development

All countries in the Nile Basin are in the process of implementing NEPAD's Comprehensive African Agricultural Development Program (CAADP) as a blueprint for increasing investments to the agriculture sector. One of the key goals of CAADP is to improve food security, enhance nutrition, and increase rural incomes by increasing allocations to agriculture to 10 percent of national budgets in order to raise agricultural productivity to at least six percent per year. However, CAADP implementation has been rather slow and many countries in the Nile Basin still face difficulties of poor data availability and quality, lack of ownership, and re-aligning of national policies to conform to its goals (Ackello-Ogutu et al, 2009; Morton, 2010). In 2008, only about 36 percent of all African countries were spending at least 10 percent of their total budget allocations on agriculture (Fan et al, 2009). Despite the challenges, CAADP signaled a major paradigm shift in African Union (AU) member nations' political support and realignment of their national policies and agendas away from budgetary neglect of agriculture.

The program identifies the following four complementary pillars that are critical to the achievement of a minimum of six percent annual growth in agriculture thereby enabling income growth and wealth creation sufficient to cut poverty in half by 2015:

- *Pillar 1*: Extending the area under sustainable land management and reliable water control systems;
- *Pillar 2*: Improving rural infrastructure and trade-related capacities for market access;
- *Pillar 3*: Increasing food supply, reducing hunger, and improving responses to food emergency crises; and
- *Pillar 4*: Improving agriculture research, technology dissemination and adoption.

The AU requested that COMESA takes the lead in developing and coordinating a Pillar 3 strategy that will ensure sufficient food supplies, eradicate chronic hunger and ensure adequate emergency responses in the COMESA region. As Africa's largest regional economic community (REC) and one with large clusters of highly vulnerable groups, the COMESA region has both the requisite expertise and the compelling motivation to address critical food security concerns (COMESA, 2008). Agricultural development in the Nile Basin must therefore be addressed in the context of the COMESA-wide investment strategy in the CAADP framework to which many countries are already aligning their medium term plans (e.g. Kenya's Vision 2030 MTP, Uganda's Plan for Modernization of Agriculture and Rwanda Vision 2020).

Following the awareness created by CAADP, other complementary efforts have emerged that are likely to strengthen the contribution of agricultural science, technology and innovation to the region's agricultural development and intraregional trade. One of these efforts is the 2006 Framework for African Agricultural Productivity (FAAP), which provides a roadmap to improving agricultural productivity by enabling and accelerating innovation. Importantly, FAAP is motivating bilateral and multilateral donors to take a more coordinated approach to funding agricultural development programs and responding to stakeholder priorities thus harmonizing activities at the country, program and project levels. FAAP responds to CAADP Pillar IV by providing a strategy for revitalizing, expanding and reforming agricultural R&D capacity and shifting towards more focus on integrated innovation systems that actively engage public, private and civil society stakeholders (FARA, 2006). CAADP's Pillar III

Framework for African Food Security supports governments' design of agricultural programs to ensure broad-based pro-poor growth and improvement in food security.

Efforts to address poverty and food insecurity

At the national levels, poverty is being addressed broadly through poverty reduction strategies (espoused in poverty reduction strategy papers) that have been largely donor driven and forming the overarching policy strategy. Implementation remains patchy and is often disrupted by emergencies (e.g. the recent food crisis and global financial meltdown) and capacity and coordination constraints. In some of the countries (e.g. Kenya, Uganda, Rwanda and Tanzania), problems of rural poverty and food insecurity are being addressed through implementation of input subsidy programs aiming at increasing agricultural productivity and household incomes as well as by short term programs such as *Njaa Marufuku* Kenya, school feeding, food for work, vitamin fortification, etc). In the medium and long term, strategies will have to place more emphasis on exploiting the region's irrigation potential in order to avoid over-reliance on rain-fed production that tends to increase risks in fertilizer use.

At the regional level, the MDG1 forms the main poverty reduction thrust but indications are that none of the countries in the region is on course to achieving the goal by 2015. The NEPAD/CAADP program, on the other hand, aims at increasing public budgetary allocation to agriculture in order to increase the sector's GDP growth and thus have some meaningful impacts on poverty, assuming sensitivity on issues relating to equity. However, the CAADP agenda is off course (according to a recent external review) even as many countries in the region make efforts to adopt and internalize its investment framework. There are also fears that there will be strong temptations for countries with oil and mineral resources (e.g. DRC, Uganda, South Sudan and Rwanda) to neglect agriculture (so called natural resource curse) thereby exacerbating food insecurity and inequalities in income distribution.

Improving intra-regional trade and infrastructure development

The main thrusts for promoting intraregional trade in the Nile Basin are through the EAC and COMESA that have been steering their member countries through market liberalization and open borders in the context of customs unions. Regional markets offer opportunities for exploiting economies of scale in production and hence specialization and economic efficiency through comparative advantage. In the case of food crops and livestock, market expansion also acts as a means to attaining regional food security by ensuring that scarce resources are optimally allocated in accordance with prevailing regional opportunity costs. In practice, however, the Nile Basin faces numerous challenges that prevent its agricultural markets from functioning optimally, partly due to the inherent nature of agricultural products and partly because of persistent retrogressive trade policies, imperfect markets and the poor state of the region's infrastructure.

In the spirit of the "Cairo Declaration" during the COMESA Agricultural Ministers' Meeting of November 2005, COMESA has been actively pursuing a regional approach to food security by promoting infrastructure development and harmonized policies that will enable free flow of food staples from surplus to deficit areas driven primarily by price incentives and market forces. A number of the region's production and trade challenges such as crop and trans-boundary livestock diseases, limited national research and breeding capacities, knowledge sharing and establishment of databases, early warning and forecasting systems all require a regional approach.

The gradual move towards fully functioning customs unions for EAC and COMESA promises to minimize NTBs relating largely to: SPS standards, vehicle axle load and weight limits, insurance requirements, trade administration, suspended taxes and rules of origin. But, ultimately, the rationale for the so-called 'sensitive list' of commodities often presented for derogation and which slows down the implementation of regional integration protocols must be unearthed. A move towards regional trade

based on product differentiation, for example through value addition, rather than 'differences' is likely to spur intraregional trade and avoid unnecessary controversy.

Building Institutional Capacity

Regional integration offers opportunities for the private sector investment. However, experience thus far suggests that progress is being hindered by weaknesses in institutional capacity and lack of clear division of roles (among key stakeholders). There is a demonstrated need for governments to increase budgetary allocations to agricultural research and development (to at least two percent of the national budgets as envisaged in the Maputo Declaration), to help build capacity and to staff public agricultural institutions at thresholds able to tackle emerging and diverse policy issues. Where government allocations have fallen behind resource needs, development partners have intervened but this has implications on priority setting, project relevance and sustainability. Rwanda, Uganda and Sudan are some of the Nile Basin countries where donor support has been quite dominant and concerns have been raised regarding sustainability of the donor supported programs such as input subsidies and support to building of institutional capacity for increased private sector participation in regional trade.

The Nile Basin already hosts private sector initiatives such as the regional commodity groups whose capacity to lobby for trade policy reforms need to be bolstered especially with regard to analytical capacity, dissemination of market information, and enterprise/regional coverage. The private sector will be expected to play a critical role in filling the lacuna created by the withdrawal of the public sector (following the adoption of structural adjustment programs) from the provision of agricultural services relating to extension, veterinary medicines and artificial insemination, input distribution, credit and marketing. In order to provide these services effectively, the private sector institutions need both the enabling environment and private-public partnerships; the latter are already in fledgling stages in countries like Kenya. The main commodity groups in the Nile Basin are the East African Grain Council (EAGC) and Horticultural Council of Africa (HCA); trans-boundary livestock issues (mainly diseases/animal health) in the region are currently handled by AU-IBAR.

The Nile Basin Initiative

The Nile Basin Initiative (NBI) began with dialogue among the riparian states that resulted in the shared vision which was formally launched in February 1999 by the water ministers of nine countries that share the river: Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Burundi, Rwanda, the DRC as well as Eritrea[4]. The NBI is a partnership that seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security. The Nile, a shared water source for about 160 million people living along the watershed boundaries, supports agricultural, industrial and domestic users. Its waters are also used for hydro-power generation as well as for sustaining the region's eco-system with agriculture being one of the largest users. These demands on the Nile are expected to increase with growing economies and populations. Due to the high dependence on agriculture in the region, more pressure will be exerted on the Nile thus necessitating efficient water demand management and water use planning. These demands exerted on a very important but finite resource have reinforced the need for the NBI shared vision to achieve sustainable socio-economic development through equitable utilization of, and benefit from, the common Nile basin water resources.

To achieve its objectives of poverty alleviation, sustainable economic growth, reversal of environmental degradation and controlling the cost of extreme water events such as flooding and drought, the Nile basin initiative through its implementation agency, Nile Equatorial Lakes Subsidiary Action Program (NELSAP), initiated the Regional Agricultural Trade and Productivity project (RATP) in 2006. Countries participating in the RATP are Burundi, DRC, Egypt, Kenya, Rwanda, Sudan,

[4] Eritrea, which shares only a very small portion of the Nile Basin, is not an active participant in the Initiative

Tanzania, Uganda and Ethiopia. The RATP objectives are aligned with the Pillars 1 and 2 of the Comprehensive Africa Agricultural Development Program (CAADP) combining sustainable water management with the promotion of trade and agribusiness linkages. The project supports generation of agricultural knowledge that is basin-wide, in line with the aims of the NBI's Institutional Strengthening Project (ISP) and NELSAP's Subsidiary Action Program.

Prior to planning trans-boundary projects for the promotion of cross-border agricultural trade, NELSAP undertook a pilot assessment of the selected cross-border trade corridors, which are important for the regional food security and trade through RATP. Therefore, this regional trade and productivity consultancy will undertake analysis of issues as a follow-up of the pilot assessment done in the project Inception Phase.

1.3 Significance and Growth of Agriculture in the Nile Basin

The role of agriculture in the region's poverty reduction and food security strategies cannot be gainsaid yet the sector has steadily been losing its global competitiveness and hence access to lucrative export markets. Countries in Africa as a whole have fared poorly in capturing expanding global markets and although the continent contributes about 12 percent of the world population and five percent of agricultural GDP, its share of global agricultural exports has declined from eight percent in the 1960s to just two percent in 2009 (Byerlee, 2011). Much of this decline occurred during the pre-structural adjustment period, but it has continued to fall since 2000 at a time when global exports were steadily rising. While there have been success stories of countries (e.g. Cote d'Ivoire, Ethiopia, Kenya, Ghana, Uganda, Mozambique and Zambia) that increased their agricultural export market share since 1991, 15 out of 24 countries with a population of over 10 million in Africa lost their share. Conversely, food import shares have been trending upwards thus changing SSA in particular from being a net agricultural exporter in the 1970s to a significant net agricultural importer in the 2000s.

The instability of global markets seems to have provoked serious questions regarding the ability of markets as a basis for resource allocation, and in particular distribution of food products and requisite inputs from surplus to deficit regions. In the Nile Basin, where poor transport and communication infrastructure is a major contributor to production and distribution costs, instability in the global food prices can have particularly dire consequences on the welfare of land locked countries, populations in remote rural villages and for net food importing countries. Although countries in the region are actively pursuing export oriented policy strategies, market liberalization and regional integration under the auspices of EAC and COMESA, the food crises of 2006/08 and 2010/01 seem to have awakened a sense of urgency about national food self-sufficiency and renewed commitment to agriculture.

Agriculture is of strategic importance in the economic development of the Nile Basin. With the exception of Tanzania, all countries in the region are members of COMESA whose main goal is achievement of an integrated market with free movement of goods and services. Among the countries in the Nile Basin, it is only in Egypt where agriculture contributes less than 20 percent of the GDP highlighting the importance of agriculture for the development of the region. About 40 percent of COMESA's trade portfolio is based on agriculture compared to about 45 percent that is accounted for by manufacturing. Agriculture has great potential in the fight against poverty and achievement of regional food security. This notwithstanding, the sector has expanded in most COMESA member states at a lower rate than their economies and populations. During the past three decades, COMESA's agricultural production rose by an average of only 1.9 percent per annum in the face of an annual population growth rate of about three percent per annum, with the GDP growth rate standing at barely 1.4 percent. Among the challenges that hamper the growth of agriculture and agribusiness are issues relating to low productivity, inappropriate policy framework and factors that continue to restrict market access within the region and in foreign markets.

Agricultural growth in most of the Nile Basin countries is highly erratic due to high dependence on rain-fed production (Table 1.4). Due to poor planning and price transformation, weak market structures and limited value addition, abundant production during the good seasons does not always translate to increased producer income. With high post-harvest losses, surpluses are often lost while at the same time lack of storage creates gluts that exert a downward pressure on prices thereby reducing private sector confidence in agricultural markets and commercialization.

Table 1.4: Agricultural growth and contribution to GDP in the Nile Basin (1998 – 2009)

Country	Average annual growth rate Agriculture sector				Agriculture sector as percent of GDP					
	1988-1998	1998-2008	2007	2008	1988	1998	2007	2008	2009	2010
Burundi	-1.4	-1.9	…	…	54.2	46.3	…	…	31.8	31.6
DR Congo	2.5	0.0	3.0	3.0	29.8	47.5	42.5	40.2	55.0	…
Egypt	2.9	3.4	3.7	3.3	19.0	17.1	14.1	13.2	13.5	13.5
Ethiopia	3.1	5.8	9.4	7.5	53.9	25.6	46.3	44.5	38.7	42.9
Kenya	1.1	2.8	2.1	-5.0	29.9	31.2	25.0	27.0	19.7	22
Rwanda	-0.8	4.5	0.7	15.0	39.2	45.5	35.6	37.4	42.1	42.1
Sudan	6.1	2.1	3.1	4.0	41.5	46.3	28.3	25.8	32.1	32.1
Tanzania	3.2	4.7	…	…	…	44.8	…	…	41.6	41.6
Uganda	3.7	2.4	-0.3	9.1	56.7	42.1	24.0	22.7	23.6	22.5

Modified from: World Bank Countries at a glance 2010 data;… denotes missing data

1.4 Food Price Changes and Implications in the Nile Basin

Global food prices have been both erratic and generally inflationary and the impacts on the Nile Basin region, which is a net importer of key staples, have profound development implications. For example, the prices of major foodstuffs increased by an average of about 55 percent between March 2007 and March 2008 and there are indications that the upward pressure on regional food prices is likely to persist through 2015 (ASARECA, 2008). For every 10 percent increase in the prices of all cereals (including rice) nearly US$ 4.5 billion is added to the aggregate cereals import bill of developing countries that are net importers of cereals (OECD, 2008). Although favourable weather patterns led to production increases in the major producing countries, mainly, Ethiopia, Kenya and Uganda, demand still outstripped supply thus necessitating imports, especially for maize, wheat and rice. The simultaneous co-existence of pockets of deficits and surpluses in the region and governments' preference of policies that restrict official trade tend to encourage informal cross-border trade (ICBT). Prices of major foodstuffs increased by an average of about 55 percent between March 2007 and March 2008 and there are indications that the upward pressure on regional food prices is likely to persist through 2015 (ASARECA, 2008).

Food prices are major drivers of inflation while price volatility leads to household income risks and uncertainties. The impact of food prices is highly significant on household consumption and nutrition particularly in the arid and rural areas of low income regions of the Basin where food accounts for a large share of the family budgets. Unlike the food crises of mid-1970s and the one in 2007-08, the ramifications of the most recent spike that commenced after mid-2010 are yet to be fully understood. A recent study by Hossain and Green (2011) reveals a more varied impact compared to the price spike of 2006/08: the informal urban sector, small-scale farmers and small traders have generally been more negatively affected compared to commodity producers and workers in export sectors; and, high food prices forced consumers to shift to cheaper and less preferred, and often poorer quality foods.

In the longer run, upward trends in food prices could provide major additional opportunities for Nile Basin farmers, especially in terms of access to domestic and regional markets that will also grow because of rising incomes. The farmers would also have a major opportunity to re-conquer other global markets lost over the past decades. Internationally, the changing food demand and supply patterns will lead to more South/South trade, which in the long run will bolster the opportunities arising from domestic and regional markets.

2.0 Aims and Objectives of the Project

This project was designed to assess and analyze the trade flows for specific commodities along selected corridors in the Nile Basin. It also aimed at highlighting the opportunities and constraints to trade and their determinants such as types of infrastructure, commodity attributes (e.g. structure and distribution of production and consumption), market structure and policy/regulatory actions prevailing at country and regional levels. The information gathered and results emanating from their analysis will facilitate identification and profiling of potential investments to improve intra-regional trade and economic development. The main analytical approaches applied entail the following thrusts: mapping out the production structure; value chain analysis, estimating trade volumes and values; identification of main chain participants and institutions, including gender/youth roles; highlighting main resource use and market access challenges; and, identifying investment opportunities.

2.1 Objectives of the Project

Achieving food security and poverty reduction, while conserving the environment and scarce natural resources, are unequivocally the common policy goals in the Nile Basin region. One of the critical assumptions in the design and articulation of the objectives of this project is that increased agricultural productivity, especially among the smallholder producers, can lead to wealth creation that ultimately impacts positively on food security and poverty. In the introductory section, we have highlighted the following factors deemed to impinge negatively on this critical link between aggregate economic growth (measured, for example, by GDP) and food security and poverty reduction:

- Inequalities in income distribution lead to unsustainable economic growth
- Low investments in agriculture hinders innovation, value addition and global competitiveness
- Low input use among smallholder farmers, including under-use of irrigation potential, has implications not just on productivity and income but also on regional effective demand for manufactured and value added products
- Poor physical infrastructure and coordination of related regulatory institutions increases transaction costs
- Private sector players are unable to take advantage of regional market opportunities because of: i) policy challenges at national and regional levels; and, ii) non-tariff trade barriers
- Poor coordination of responses to external impacts, for example, those arising from global markets, climate change and natural disasters lead to costly duplication of efforts and in the long run distort regional markets

The above constrains essentially constitute the underlying ‘problem’ and, hence, the rationale for the study. The broad objective of the consultancy is therefore to undertake regional agricultural trade analysis in order to provide policy strategies for addressing the constraints with a view to improving the region’s productivity and marketable surpluses as well as identifying potential investments that will improve efficiency in water management. The latter will work in synergy with policies that reduce intra-regional trade obstacles and thus create an environment where food security and poverty reduction can be sustained.

The specific objectives of the study were to:

(i) Examine the functioning of selected agricultural markets
(ii) Evaluate the potential for cross-border trade
(iii) Identify constraints to trade across selected corridors and determine their relative importance
(iv) Estimate the level and nature of marketing costs at national and cross-border levels
(v) Prepare recommendations for investments and policy actions to reduce identified, and to the extent possible costs and constraints to trade

2.2 Scope of Services Provided and Limitations

2.2.1 Commodity Clusters

In line with RATP, the study focused on products that are critical for food security and income generation. The products were categorized into three major groups of tradable clusters: (a) grains and pulses (maize, rice and beans); (b) fruits and vegetables (passion fruit, pineapple, banana, and Irish potatoes); and (c) live livestock (cattle, sheep, goats and camels). The crop selection was based on suitability for water use intensification (irrigation), management of the structural deficits and involvement of large numbers of smallholder producers, opportunities for value addition and access to lucrative foreign markets. It is important to point out that cross-border trade in agricultural inputs and other commonly traded consumer goods was not the subject of the consultancy.

The Nile Basin contains large regions that are classified as arid and semi-arid and in which livestock production under pastoralism currently constitutes the predominant source of livelihood. These pastoral livestock production systems have immense opportunities and market potential because of rising global consumer demand for animal resources. But, they also face daunting challenges relating to declining water resources access over which invariably lead to communal conflict. Despite the rapid growth in consumption of dairy products and other value added livestock products such as hides and skins, these commodities did not fall within the scope of the analysis.

2.2.2 Main Tasks (Summary)

The tasks were broadly delineated as follows:

- **Task 1** - Describing national and regional markets, and defining and characterizing the "Trade Corridors"
- **Task 2** - Developing the methodology and estimating the spatial and seasonal marketing costs of activities along the chain, from producers to consumers along the corridors (infrastructure/storage, capital costs and organization/management) – Task 2 entailed two components comprising: a) Estimates of Marketing Costs; and, b) Developing a value map showing the distribution of various functions, actors and their transactional inter-relationships, and overlays including cost-build up through the value chains and the time frame
- **Task 3** – Preparing recommendations giving conclusions on the key constraints, problems and investment opportunities and the roles to be played by different stakeholders in the medium and long terms
- **Task 4** - Strengthening the capacity of the regional commodity groups

2.2.3 Activities within Tasks

The specific activities falling under each of the above tasks are expounded below:

Task 1: National and regional markets
i) Describing production trends for the selected commodities
ii) Delineation of structure and distribution of production and consumption in the region
iii) Characterization of the 'trade corridors' and estimation of formal and informal cross-border trade (ICBT) flows along the corridors:

a) Identification and characterization of the trade corridors
b) Estimation of ICBT volumes and values; direction of trade flows; and seasonality in trade;
c) Assessment of implications of ICBT to employment and food security;
d) Identification of constraints faced by traders;
e) Evaluation of gender and youth dimensions of informal trade along the corridor
f) Estimation of formal trade along selected corridors
g) Estimation of total cross-border trade and projected trade flows

h) Assessment of implications of formal and informal CBT to efficient water use

iv) Description of major value chains and main players:

a) Description of how the markets function in-season compared to off-season and in good compared to bad harvest/production times for the selected commodity trade corridors

b) Description of trade methods used by small and large importers/exporters

c) Description of gender and youth mainstreaming elements that exist a long the value chains

v) Assessment of trade and investment opportunities and challenges along selected corridors:

a) Identification of national and cross-border trade opportunities for communities along the corridors in the trade and supply of the selected commodities

b) Documentation of main barriers (tariff, non-tariff and physical barriers) to cross-border movement of the selected commodities

c) Highlighting of trade and investment policies in existence that have impacts on trade along the commodity corridors

d) Preparation of trans-boundary maps showing production and consumption areas, direction and magnitude of trade flows and seasonality of flows for the trade corridors

e) Description of the roles to be played by different agencies (e.g. governments, commodity groups, RECs) and policy reforms needed to expand investments and intraregional trade for the selected commodities.

Task 2 Part I: Estimates of Marketing Costs

STORAGE ACTIVITIES

a) Storage infrastructure and post-harvest losses

i) Describing the typical post-harvest/post-production storage infrastructure at different value chain stages

ii) Estimating post-harvest storage-related losses as percent of farm level production and the value (US$ per ton or US$ per animal)

iii) Main factors contributing to storage losses for different storage structures along the G/P and F/V corridors

b) Capital Costs

i) Describe the operating costs of different types of storage infrastructure (depreciation/life of godowns)

ii) Identify cost-effective and small-scale post-harvest/post-production storage facilities at various stages of the supply chain in each of the commodity corridors

c) Organization - management – ownership of storage infrastructure

d) Comparative analysis to assess whether the above costs (in parts a, b and c) differ for formal as opposed to informal commodity trade channels and to bring out similarities ad contrasts

TRANSPORT INFRASTRUCTURE COSTS

a) Describe the prevalent modes of transport for different commodities at different stages along the corridors

b) Estimate transport charges to traders (in US$ per ton-km or US$ per animal-km) for different modes, commodities and market destinations

c) Give disaggregated operating costs for transport owners/operators: fixed (staff, depreciation, finance) and variable costs (fuel, tires, maintenance, weighing bridges, bribes) for each mode and at each stage of transportation. This may also include waiting time spent (wasted) because of checks at roadblocks.

d) Identify the major determinants of transport prices/and costs at each stage: all possible causes should be clearly delineated: market structure (with possible market power e.g. existence of

monopolies, oligopolies, monopsonies, etc), cash scarcity, quality of roads, transport infrastructure, transport services availability and affordability, low production in remote or mountainous areas, etc

e) Compare the above costs (parts a, b, c and d) for formal as opposed to informal commodity trade channels

COSTS OF DOMESTIC NTBS

a) Catalogue the existing non-tariff trade barriers (NTBs) and their cost implications along different borders: local taxes; fees and regulatory measures; roadblocks; expenses at weighing bridges; bribes to public officials; losses due to pilferage in storage or transit; costs arising from poor road conditions; costs of poor policy harmonisation across the borders.

b) Compare the above costs for formal as opposed to informal commodity trade channels

OTHER TRANSACTION COSTS

a) Estimate and distinguish between regulations and other expenses in the formal and those in the informal trade in the commodity corridors.

b) Estimate the costs of commercial transaction arrangements in terms of reservations, agreements, durable relationships, etc in the commodity corridors

c) Establish the terms and conditions and the payment methods used by formal and informal traders in the commodity corridors (cost implications?)

Task 2 Part II

Develop a value map showing the distribution of various functions, actors and their transactional inter-relationships, and overlays including cost-build up through the value chains, and the time factor in the flow.

Task 3: Recommendations

a) Conclusions on constraints/problems and opportunities by considering:

- **i)** The traded commodity in each of the corridors
- **ii)** The 'link' of the value/ to the commodity chain
- **iii)** The sectors of private, public (which administration, institutional), and the CBOs.
- **iv)** The level of trade such as: local, national, regional, and Nile basin
- **v)** The time horizon for example: immediate, short, medium term and probably long-term for strategic planning

b) Draw conclusions with recommendations on identified potential investments in trans-boundary roads, customs facilities and equipment, storage facilities and other infrastructure investments in the corridors

c) Make recommendations on identified priorities for public sector at national and regional levels to remove unnecessary obstacles to trade and to crowd in private sector investments, while distinguish between: (i) short and longer-term policy recommendations; and (ii) actions to be undertaken at three levels: (a) regional, (b) national, and (c) district/local production/consumption cluster levels

d) Propose corresponding solutions/mitigation measures on identified priority interventions linked to the recommendations in part (a)

e) Recommend the role for NBI vis-à-vis other regional (EAC, COMESA, EAGC, HCA, etc) and national stakeholders in promoting and preparing investments for regional agricultural trade related to commodity clusters

Task 4: Strengthening capacity of the regional commodity groups

a) Indicating the role and responsibilities of the regional commodity groups in the proposal/action plan
b) Involving the regional commodity groups in the study process
c) Training the regional commodity groups on the methodology of the study
d) Document issues/practices that could be used by the regional commodity groups for advocacy in the improvement of cross-border trade in the corridors
e) Encourage strengthening of commodity groups during project activity-related workshops: enhanced organization; capacity building for improved administration/secretariats' actions and advocacy programs

3.0 Methodological Approaches

3.1 Basic Principles Guiding the Approach

The economics of regional agricultural markets is not different from that of domestic markets except that the former, by virtue of being under the aegis of a 'foreign' sovereign government, entails added risks and uncertainties to decision makers (producers and marketing agents) and consumers in a trading partner. All the same, regional markets offer opportunities for exploiting economies of scale in production and hence specialization through comparative advantage. In the case of food crops and livestock, market expansion, theoretically, acts as a mechanism for achieving regional food security by ensuring that scarce resources are optimally allocated in accordance with prevailing opportunity costs. In practice, however, there are numerous challenges that prevent regional agricultural markets from functioning optimally, partly due to the inherent nature of agricultural products and partly because of trade policies and market structure. Price formation under imperfect markets, or where markets have failed, tends to be the order of the day implying that resources used in production are hardly allocated to their most deserving users and hence raising issues to do with efficiency and equity.

Regional trade is premised on 'gains' to both exporter and importer but this often masks the reality that trade invariably creates short term losers who may require a helping hand from government. It is these fears of short term 'static' losses from trade that often influence trade policies such as tariffs and non-tariff barriers whose aim is usually to protect potential domestic losers, comprising largely import competing producers and consumers as well as tax revenue collectors. Whether such protection is good or bad becomes a normative issue but the work of regional integration arrangements such as EAC and COMESA is to ensure that borders remain open and that regional partners reap maximum benefits from trade.

Factors likely to influence the functioning of regional agricultural markets are: structure (number of players and entry and exit conditions), availability of marketable surpluses, access to capital and market information, technology, infrastructure, seasonality, consumer demand and random events. Most of the global trading is no longer guided just by the Ricardian theory and differences in resource endowments that lead to inter-industry trade. Through value addition and product differentiation, it is now possible for countries to trade even if their product mix is identical as is usually the case in agriculture. Trading 'likes' for likes' is the way of the future but it requires innovation and appropriate facilitation from the public sector and development partners. Government policies aimed at improving infrastructure, communication, access to capital and information can raise the potential for trade while poor policies (e.g. inward looking strategies), bad governance and insecurity will inhibit trade.

As we endeavoured to identify constraints to increased cross-border trade and investment opportunities, we were cognizant of the diversity of the region and the multiplicity of roles stakeholders play in the market place with varying consequences on costs and returns. For example, in its efforts to protect urban consumers, government can end up distorting investment opportunities for smallholder farmers, making it unprofitable, for instance, to use irrigation. In some cases, the private sector is crowded out by a government that is apprehensive of the impacts of open borders that would be the avenue for supply of raw materials. Similarly, institutional failure often leads to poor administration of customs and legal requirements at border crossing points thus leading to most trade passing through informal channels. But in other cases, factors beyond the control of regional decision makers are at play: these may include global market factors and emergencies caused by uncontrollable natural phenomena or human conflict. All these different scenarios have different impacts and welfare implications. The value chain approach adopted in this study aimed at capturing the different roles played by stakeholders and identifying areas where policy interventions are likely to have maximum impacts on regional food security and poverty reduction.

3.2 Methodological Approaches for Different Tasks and Activities

3.2.1 Approaches for collecting secondary data

Secondary data was collected mainly from UNCOMTRADE, FAOSTAT, EAGC, HCA, livestock marketing organizations, FAO and government ministries in order to determine the *trends and structure of production and consumption* of the selected commodities. The trade channels linking the main production and consumption regions were traced taking into account seasonality and the main factors influencing production and productivity. The secondary data was supplemented with

The construction of the *transboundary maps* showing production and consumption areas, direction and magnitude of trade flows, and seasonality of flows relied heavily on the secondary data and on key informant interviews and focus group discussions with value chain players at various levels. The transboundary maps were based on administrative boundaries for the nine Nile Basin countries and application of the ArcGIS10 platform (ESRI 2011). All the maps required the GIS data highlighted in Table 3.5.

Table 3.5: GIS Datasets gathered for mapping

Types of datasets	Source	Details
Base maps		
Infrastructure	Survey of Kenya, World Resources Institute (WRI)	Highway/street centreline, databases at national levels
Elevation	National and international mapping organizations (NIMOs)	DEMs at regional levels
Hydrology	NIMOs	Water bodies at national and regional levels
Socio-economic		
Administrative boundaries	NIMOs	Obtained from maps at different scales
Human population census	National governments/ international bodies who make projections of these data up to a common year	Data collected typically every 10 years with annual estimates and projected to a common year e.g. 2010

3.2.2 Characterization of trade corridors and estimation of formal and informal trade

a) Identification and characterization of the trade corridors

The trade corridors were profiled on the basis of the following parameters: i) major agro-ecological zones within the corridor; ii) commodities produced, traded and the direction of trade flow; iii) seasonality of production and trade; and, iv) major trade constraints and opportunities. The corridors correspond to the commodity clusters or value chains.

The cluster for **Grains and Pulses** had two corridors, namely, the North-East Corridor starting from the Shinyanga Region in Northern Tanzania and covering 3 main borders (Northern Tanzania/Kenya, Kenya/Uganda, and Uganda/South Sudan); and the Western Corridor that began in the surplus maize and beans producing region of Kigoma in Western Tanzania and covering the Tanzania/Burundi, Tanzania/DRC and Burundi/DRC borders.

Fruits and Vegetables focused on passion fruit, pineapple, banana and Irish potatoes and the corridor stretched from Burundi, through Rwanda to Uganda and finally to Kenya.

In the **Live Livestock cluster**, where the major livestock species involved were live cattle, sheep, goats and camels, two corridors were surveyed:

Corridor 1: This corridor started from the Taita Taveta ranches and Mombasa in the Coast Province of Kenya, through Garissa, Nairobi, Isiolo and Moyale town on the Kenya-Ethiopia border. From there, the corridor joined the southern Ethiopia livestock catchment area around Wabeir, Teltele, Arero, El Leh and Mega towns.

Corridor 2: Starting from western Ethiopia/eastern Sudan border, the corridor included Khartoum, Wadi Halfa on the Sudan/Egypt border and ended in Cairo, Egypt.

b) Estimating Informal Cross-border Trade (ICBT)

An alternative to border monitoring using observations at designated border posts would theoretically be through the use of secondary data from the Departments of Commerce and Industry. Official records at the national offices usually provide accurate values and volumes of imports (inclusive of informal components) while the export data tend to underestimate informal trade. Ideally, exports of one country should equal recorded imports of the trading partner in terms of value since one finances imports with proceeds of exports. The discrepancy between imports and export figures of two trading partners can be used as an estimate of unrecorded/informal trade. However, there are a number of exceptions and possible errors that make this approach unreliable. This leaves actual border monitoring as the only, albeit tedious, way of quantifying ICBT (technical details can be gleaned from the 1996 *ICBT Methodology* document by Ackello-Ogutu, and its various adaptations by RATES, COMESA, EAC, FEWSNET, EAGC and ReSAKSS).

An important consideration in border observations for informal trade flows is the proper definition of informal cross-border trade (ICBT), traded commodities and identification of the roles played by different actors. The term Informal Cross-Border Trade (ICBT) is applied mainly to *un-recorded* trade of easily observable goods passing *through* and in the *neighbourhood* of the established customs points. This definition includes goods that are under-invoiced or mis-declared without necessarily including clandestine operations involving sophisticated secret deals that are difficult and risky to track. For budgetary and sampling reasons, transactions along the open border, outside the established roads and trading centres are not included in the sampling frame. It is assumed that such transactions are usually in the form of a rather balanced and insignificant barter trade.

Definitions of the informal sector usually adopt two approaches: the labour market approach and the sectoral approach. The former emphasizes the individuals involved in the activities and the latter stresses the activities (source). We have not made any particular distinction in terms of the two approaches here. There is instead more emphasis on the activities undertaken in the sector (particularly the type, quantity and value of the traded goods) and the profile of the individuals involved in such activities.

The main ICBT players comprised: informal trade participants; traders; hawkers/agents; transporters; consumers; and public officials. The border sites were selected on the basis of popularity, volume and regularity of trade. Procedures for determining the observation time frame were based on Ackello-Ogutu (1996). Monitoring of informal trade lasted for 60 days at each site in order to account for seasonality, active market days and prevailing trader practices at the selected sites and their neighbouring supply and consumption markets that are located at distances influenced by the traded commodities (e.g. in terms of perishability or surplus/deficit status). The monitoring period was representative enough to allow extrapolation of trade flows to one year and comparison with data collected by other agencies such as EAGC, FEWSNET, RATIN and UBOS.

c) Estimating formal trade along selected corridors

Both formal and informal trade corridors are a function of physical infrastructure (such as roads, storage and social amenities such as hotels and shopping centres), security, cultural practices and traditions and the target demand locations (for example, urban population and distance to border points). A combination of these factors determines the trade volumes and commodity diversity in a corridor. This in turn influenced the sampling of the points to monitor along national borders: the general rule is that cross-border markets function only through or in the neighbourhood of supporting infrastructure and institutions. The commodity markets are characterized in terms of their structure, conduct, price formation and roles played by other trade agencies such as EAC, COMESA, AU, IGAD, ASARECA and private sector organizations such as the EAGC.

The data collected for this activity included volume and values of traded commodities and information on source and country of import for each commodity. The data sources for this activity were: UNCOMTRADE, FAOSTAT, customs records in Nile Basin countries, records from Ministries of Trade and Industry, case study reports, RATIN, UBOS, FEWSNET and other internet sources. Since national trade and investment policies (and hence, trade volumes between trading partners) are rarely corridor specific, trade transactions on the ground along the trade corridors could grossly under-estimate actual trade flows between countries. The formal trade data has therefore been interrogated through discussions with traders, informed market players and governments and regional market integration bodies such as EAC and COMESA. The directions in trade flows are further checked against production figures and supply considerations derived from trend lines and incidences of droughts that affect production and supply in different countries.

d) Estimates of total cross-border trade and projected trade flows

Data on the total cross-border trade for each commodity (sum of volumes and values) are presented on an annual basis and assessment made of their implications to efficient water management in the Nile Basin. Trade flow projections were made using annual growth rates of both forms of trade.

3.2.3 Describing major value chains and main players

A “value chain” consists of the set of activities undertaken in the management of the flow of goods and services along the value-added channel of agricultural and/or food products, in order to realize superior customer value at the lowest possible cost (Genova et al., 2006). In other words, it consists of the “full range of activities which are required to bring a product or service from conception, through different phases of production (involving a combination of physical transformation and input of various producer services), delivery to final consumers, and final disposal after use” (Kaplinsky and Morris, 2000). Efficiency of a value chain requires that the activities of producers are actively integrated with those of other actors such as input suppliers, transporters and processors and that the volume of products produced is a function of the consumer needs.

A value chain analysis for a particular agricultural product involves a systematic assessment and examination of all the activities involved in marketing, including, among others: research and development; production and supply of raw materials; and, transport and delivery activities. The analysis should also delineate where value could be added, agribusiness needs and how upgrading particular activities could enhance profitability and incomes. In this study, data collection on the value chains entailed interviewing all actors, from producers (Photo 3.1) to consumers.

Photo 3.1: A focus group discussion among the producers

The cereals, fruits and vegetables, and livestock value chains were divided into four stages: Production, Marketing, Processing, and Distribution (Figure 3.1). Each of these stages has actors that directly handle the product from the 'farm to fork'. Other indirect actors that contribute to the flow of products through the value chain include government, research, extension and financial institutions. Farmers producing cereals, fresh fruits and vegetables are usually of different categories based on scale of production. They use own and hired resources such as land and labor as well as purchasing capital/modern inputs such as seeds, chemicals and irrigation equipment.

Figure 3.1: The Analytical Framework for the Grains/Pulses and Fruits/Vegetables

Source: Adapted from Kaplinsky and Morris (2000)

Processors of cereals include millers and food service industries that produce value-added products such as flour and cereal-based foods. In contrast, fruits and vegetables are processed into dried fruits, fruit juice, fruit jams, canned fruits, chips, flour by food service industries. Both of these processors sell value-added products through various channels including wholesale and retail traders, supermarkets, and institutions. By-products are sold mainly to livestock producers to be used as animal feed. Indirect actors that play a critical role in the functioning of these value chains include government and its related institutions. In addition to providing farmers with key inputs such as new seeds and extension services, government and its related institutions also establishes, monitors, and enforces rules, regulations, and policies regarding quality standards. Credit institutions also provide some of the much needed capital to farmers, traders and processors in these value chains.

Unlike the case in Figure 3.1, the live livestock value chain comprises fewer stages due to the fact that the analysis does not involve livestock products. The value chain thus entails mainly production and marketing, with the animals ending up directly at the abattoirs (processors), or being channelled first through fattening (in feedlots or commercial ranches) before processing/export; the immature animals on the other hand could go directly to another region for breeding purposes.

Farmers keep livestock under both traditional and modern systems that differ in cost regimes and the marketing is done through various channels: auction markets, traders, butchers (rural and urban) and slaughterhouses. To enhance the performance of this value chain, government and its related institutions establishes, monitors, and enforces rules, regulations, and policies regarding health, quality standards and movement. Together with other indirect actors, the government is also responsible for the provision of productivity enhancing inputs.

For each type of value chain, questions relating to the following aspects were explored:

- Where the most value is added to the value chain
- The most important actors within the value chain
- The institutional framework
- Main bottlenecks
- Market potential for growth and upgrading
- The size of the sector/chain
- Where possible synergies exist

The specific data collected included:

- Commodity traded and gender of the trader
- Size of exporter/importer - e.g., small as opposed to large
- Questions on the interaction between sellers/buyers on both sides of the border
- Nature of contractual arrangements [if any] in place
- Constraints to trade e.g., effects of customs, police roadblocks, sanitary requirements and the strategies the exporters/importers use to circumvent/deal with them
- Whether gender has any influence on how the constraints are dealt with

3.2.4 Methods for estimating different cost categories

This task aimed at developing a methodology for estimating the structure and nature of marketing costs faced by various value chain players. It was intended that the methodology so developed be adopted for future use in other value chains by country governments, private sector, CBOs, and regional commodity groups, among others. The spatial and seasonal costs include, but are not limited to, infrastructure such as roads and storage, non-tariff barriers, and other expenses such as value-addition.

The estimation of costs applied a methodology based on the framework of transaction cost economics. Accordingly, costs for each value actor were classified either as direct costs or transaction costs. The transaction costs were associated with storage, transport as well as those due to domestic NTB and by definition, covered: 1) searching and gathering information on (potential) transaction partners and agents, goods or services, technologies, prices; 2) bargaining and negotiating contracts, terms of exchange (or transaction arrangements), executing the exchange process, and adjusting the terms of exchange if necessary; and, 3) monitoring and enforcing the contracts (arrangements, agreements, rules, etc.).

In most cases, the transaction costs are hidden and can only be captured using the opportunity cost of labour (e.g. waiting time at collection points during delivery of commodities). According to the above interpretation, direct costs of transport and purchase costs of goods and services were not considered as 'transaction costs' and were thus catered for in a different cost category.

The direct costs are payments for factors of production (such as land, capital and entrepreneurial skills) required to physically transform inputs into outputs and costs of processing (value addition) and marketing. Both direct costs and transaction costs are divided into investments and recurrent components; the former being incurred during the pre-production phase of farm businesses or processing while the latter arising during the production/processing phase. For transaction costs, the monitoring and enforcement cost components are largely recurrent costs.

The cost estimation distinguished between formal and informal traders in addition to assessing the cost implications of participation by particular actors. The results of the analysis were presented in two formats to capture the costs of different marketing operations/activities as shown below, and in the form of value cost maps.

i) Storage activities

a) Storage infrastructure and post-harvest losses: This component had the following sub-activities: i) describing the typical post-harvest/post-production storage infrastructure at different value chain stages; ii) estimating post-harvest storage-related losses as a percentage of farm level production and the value (US$ per ton or US$ per animal); and, iii) identifying the main factors contributing to storage losses for different storage structures along the commodity corridors.

b) Capital Costs: The sub-activities of this component included: i) describing the operating costs of different types of storage infrastructure (depreciation/life of godowns); and, ii) identifying cost-effective and small-scale post-harvest/post-production storage facilities at various stages of the supply chain in each of the commodity corridors. Costs associated with storage infrastructures/facilities included maintenance expenses in preventing destruction, repair due to destruction by animals and other factors, depreciation, information acquiring costs when seeking for information on repairs and maintenance, and any contractual/agreement costs when interacting with repairers. Capital costs were derived from producers, traders and processors (except for live livestock) through questionnaire interviews.

c) Organizational Costs: This component estimates costs relating to institutional (exchange interrelationships contractual, etc) arrangements in supply chain management such as procurement of the commodity (for traders or processors) and/or sale of the commodity (for producers), including the management of the storage infrastructure. The costs captured included contract costs (for either procurement or sale), storage costs, human resource costs for the supply chain management, membership costs (e.g. if the producer/trader/processor is a member of a marketing association/group), insurance costs (if the inventory is insured), and the opportunity cost of inventory.

d) Comparative analysis: All the costs compiled under the above three categories were tabulated in order to assess their incidence on formal as opposed to informal commodity traders as well as describing similarities and contrasts between formal and informal trade channels.

ii) Costs of transport infrastructure

This segment focused on four aspects: **a)** describing the prevalent modes of transport for different commodities at different stages along the corridors; **b)** Estimating transport charges to traders (in US$ per ton-km or US$ per animal-km) for different modes, commodities and market destinations; **c)** presenting disaggregated operating costs for transport owners/operators: fixed (staff, depreciation, finance) and variable costs (fuel, tires, maintenance, weighing bridges, bribes) for each mode and at each stage of transportation. This also included waiting time spent (wasted) because of checks at roadblocks; and, **d)** identifying the major determinants of transport prices/and costs at each stage: all possible causes were clearly delineated: market structure (with possible market power e.g. existence of monopolies, oligopolies, monopsonies, etc), cash scarcity, quality of roads, transport infrastructure, transport services availability and affordability, low production in remote or mountainous areas, etc.

As in the case of storage costs, a comparative analysis was undertaken in order to assess the differences in the incidence of the transport infrastructure costs among formal and informal trade.

iii) Costs of Domestic NTBs

The costs associated with non-tariff trade barriers (NTBs) were estimated and comparisons made to determine their significance along formal and informal trade channels. These costs relate mainly to: local taxes; fees and regulatory measures; roadblocks; expenses at weighing bridges; bribes to public officials; losses due to pilferage in storage or transit; quality depreciation while goods are stored or in transit; costs arising from poor road conditions; costs of poor policy harmonisation across the borders.

iv) Transaction costs of formal and informal trade

Estimation of the transaction costs entailed: a) quantifying and distinguishing between regulations and other expenses in the formal and those in the informal trade in the commodity corridors; b) estimating the costs of commercial transaction arrangements including terms of reservations, agreements and durable relationships in the commodity corridors; and, d) establishing the terms and conditions and the payment methods used by formal and informal traders in the commodity corridors.

3.3 Sampling and Field Data Collection and Analysis

3.3.1 Methods for collecting primary data

Both qualitative and quantitative methods were used to generate primary data. The fieldwork began by use of qualitative methods entailing interviews of various actors along the corridor, understanding the geographical coverage of the chains and collecting data on average marketing costs (to determine their seasonal trends) and other characteristics of the chains. During this time a scoping study was

also carried out in order to determine market centres where quantitative data was to be collected using a semi-structured questionnaire.

a) Qualitative methods

Qualitative methods included focus group discussion with producers, key informant interviews with various chain actors, extended case studies and participant observation. The details of these methods are provided below:

i) Focus Group Discussions (FGDs)

This method was only applied to collect data from producers. The information collected during the focus group discussions was particularly important in assessing the reliability of information gathered from key informants such as government and NGO officials, and secondary sources. For each of the value chains, we propose to conduct one focus group discussion comprising 20 producers at each of the selected surplus producing areas of the commodity corridors. The 20 producers comprised 5 men, 5 women and 10 youths[5]

The researchers liaised with Ministry of Agriculture officials at the local districts and divisions in order to identify one pocket of production where the FGDs was conducted. This pocket had the highest production level of the targeted crop produce/livestock. The twenty (20) farmers of the FDG was selected using systematic random sampling after establishing household population in the selected study pockets. From each of the identified areas, a group of three to five village elders, including at least one local assistant chief assisted the researchers in listing all resident households in a systematic way. A checklist of questions was used to guide the discussion.

ii) Key Informant Interviews

Informal interviews or consultations were held with relevant players participating in the value chains. These players was derived from all direct actors (producers, transporters/shippers, traders, processors, exporters, retailers and consumers) as well as indirect actors (leaders of direct actors' associations and government officials) in the value chains. Direct actors in the value chain was interviewed about their operations, levels of costs and margins, storage of produce, transportation issues, upgrading and governance issues, and technical and policy constraints, transactions and agreements, etc. Leaders of associations were asked about the operation of their associations and opportunities available for and challenges faced by the actors. Government officials were interviewed about the prevalent policies and regulations in the selected sectors and how they affect trade (see details of data to be collected in Section 3.6.2).

iii) Extended case studies

Extended case study analyses were undertaken with individual market actors, opinion leaders and subject matter specialists from the government ministries that are involved in value chain activities in the commodity corridors. Ethnographic interviewing technique was applied in carrying out the case studies. We propose to conduct at least a case study in each chain in order to capture unique contemporary socio-economic phenomena among all the actors in the commodity corridors.

iv) Participant observation

[5] The United Nations defines '*youth*' as persons between the *ages* of 15 and 24 years. This definition is applied in this study.

This involved direct examination of value chain logistics for verification purposes, for example individual farmer transport, drying and storage facilities, transport infrastructure, factories/plants, and warehouses. By walking around in the villages, markets, etc., and talking to different key informants, some vital information about the actors, practices and beliefs were recorded and presented in the report.

b) Quantitative methods

Quantitative data was generated through personal interviews using a semi-structured questionnaire. This questionnaire targeted randomly selected market actors in identified key markets in towns, cities and peri-urban areas, along the corridors. The questionnaire was carefully pre-tested and revised before administration. Trained enumerators were used to conduct personal interviews with randomly selected market actors.

3.3.2 Sampling Procedures for market actors

The first target for the market actor quantitative survey was the **local markets** in the grain/pulses, fruit/vegetable and livestock producing areas of the corridors. The respondents for these interviews were value chain actors such as **producers, middlemen (traders), processors and millers, transporters and consumers**[6]. It is expected that the number of chain actors (or length of the value chain) depended on the commodity and the operational characteristics of the corridor. Also, some value chains are likely to start and end in some big cities/towns in the corridors such as Kisumu, Kampala, Kigali, Bujumbura, Masaka, etc. instead of continuing up to the end of the entire corridor as specified in the project terms of reference.

Before embarking on interviews using the semi-structured questionnaire, a scoping mission was conducted in order to establish key market centres in both surplus and deficit areas of the different commodities in the corridors. The markets for different commodities were purposively selected according to criteria such as the number of market actors involved in the relevant commodities, use of water from regional rivers and lakes in the Nile Basin, trade activities of actors that are related to study commodities and survey budgetary constraints. To eliminate small and *ad hoc* trading markets from the survey, only formal (licensed) markets which have designated market days were considered. However, the condition of 'having market days' was relaxed for big towns and cities which have large markets that are active on a daily basis.

Having selected the survey markets, the sampling frame for different chain actors in each market was established by conducting a head account which was then be authenticated or validated by key informants, regular traders and licensing officers or 'market askaris' by asking them to confirm the number of suppliers who 'normally' frequent the market. A probability proportional-to-size systematic random sampling was used to select the interviewees out of which a sample of 20% from each category of actors in every market was selected. This implies that markets with many actors for a particular category had a larger representation. Also, small markets with less than five actors for a particular category shall not be considered. Efforts were made to avoid double counting of actors that move from one market to another (mobile actors) though such actors were used as key informants when tracking origin and destination of commodities.

The above sampling and interviewing processes was repeated in all selected markets within the corridors; whether they were **mainly primary producer markets**, **secondary producer markets** or **consumer markets**. The corridors (including border points) were monitored for 1-2 months (30-60

[6] Consumers are not included in the live livestock value chains

days), depending on length and/or target centres, with recall questions being used to capture seasonality of data in the corridors.

3.3.3 Administering field surveys among market actors

The data collection process was structured in such a way that most of the qualitative methods, with the exception of focus group discussions (FGDs), were first employed from the starting point of the corridors to the end. This was followed by a detailed survey of market actors in the corridors, whereby individual direct players were sampled and interviewed in selected markets using a semi-structured questionnaire. The FGDs were also conducted in the surplus producing areas at this stage.

For the **North East corridor for grains and pulses**, major markets for grains and pulses were selected from the following towns: Mwanza, Kisumu, Kitale, Bungoma, Tororo, Jinja, Kampala, Masindi, Gulu and Juba. In addition, the following border towns were included in the survey: Isebania along the Kenya-Tanzania border, Busia and Malaba along the Kenya-Uganda border, and Nimule and Oroba along the Uganda-Sudan border. Considering the volumes of trade and 'porosity' of the border, we plan to allocate 2 border monitors at Isebania, 3 at Busia and Malaba (each), and 1 each at Nimule and Oroba. In addition, 6 enumerators were used to collect value chain data among various actors along this corridor. Both border and corridor monitoring activities ran concurrently and for 60 days. The grain and pulses commodity expert was the overall leader of data collection in this corridor and he was assisted by an MA & REMPAI assistant and 3 local field supervisors.

Major markets targeted for the **Western corridor for grains and pulses** included Kigoma, Zomba, Kalemie, Fizi, Uvira and Bujumbura. Here the role of water in the transportation of grains and pulses was also investigated. One border monitor was placed on each of Lake Tanganyika's ports: Bujumbura, Uvira, Kigoma and Kalemie. Six (6) enumerators were used for monitoring activities along the corridor. As with the North East corridor, the grain and pulses commodity expert was supported by an assistant (from MA/REMPAI) and 3 locally recruited field supervisors.

In the **fruit and vegetable corridor**, large markets that were targeted for collection of both qualitative and quantitative data included Kisii (bananas), Kisumu, Molo/Njoro (potatoes), Bungoma (passion fruits), Kitale (passion fruits), Jinja, Kampala, Masaka (bananas), Mbarara (bananas), Kisenye (pineapple and bananas), Kigali (passion fruits) and Bujumbura. Other markets that were surveyed include Cyanika (for Irish Potatoes that are traded between Kisoro and Rwanda border), Kagitumba (has different fruits and vegetables), Gatuna, Ntungamo and Bushenyi (bananas). Efforts were also made to track cabbage movement from DRC to Uganda through Bunia and Butembo.

A total of 10 border monitors and 6 enumerators, 3 supervisors and one assistant were allocated to this corridor. As this corridor shares the Kenya - Uganda border with the North East corridor, efforts were made to use the same border monitors for the collection of cross-border trade data. Similarly, these two corridors shared enumerators and field supervisors that were used to collect value chain data in Kisumu, Kitale, Kampala and Jinja.

Data collection in the **Kenya-Ethiopia-Eastern Sudan live livestock corridor** targeted Isiolo, Garissa, Wajir, Marsabit, Moyale, Mega and Arero. Border monitoring was conducted in Moyale (Kenya-Ethiopia border), and Akobo and Pochalla (Ethiopia-Sudan border). Each of these towns had one border monitor while a market actor survey was conducted by 4 enumerators. The field team was under the leadership of the livestock commodity expert, one assistant from MA/REMPAI and 2 locally recruited field supervisors.

The **Sudan – Egypt livestock corridor** monitored movement of camels by trucks to Port Sudan on the Red Sea. One border monitor was placed at (or near) Port Sudan. There was no trade of other live

livestock in this corridor as cattle are normally slaughtered and the beef exported to Cairo by air. This corridor involved data collection using the key informant interviews only hence only the livestock commodity expert and one local assistant were involved. The corridor monitoring activities took 30 days.

3.3.4 Data types collected using different methods

Data collection from the market actors was operationalized through different sets of checklists of issues and a detailed semi-structured questionnaire. Cross-cutting issues such as food security, gender and youth dimensions, policies and use of water in the Nile Basin were incorporated into all the instruments. The different types of data collected using these instruments are highlighted below:

Data collected using **focus group discussions (targeting producers only)**:

- Main crops grown in this area, trend in production over the last 5 years, which varieties/breeds are kept/grown, whether production is done individually or collectively, gross margins, etc
- How producers obtain inputs for production of the study commodity and the live animals, general trend of prices of inputs,
- Extension, credit, and others services,
- Post-harvest technologies practiced, transport of produce, losses, charges by other actors, % of losses to gross margins, etc.
- Economic importance of the crops and livestock to the household, region,
- Key constraints in their production and marketing of these products, opportunities for enhancing production and trade,
- Labour allocation among adult women, adult men, female youth and male youths, etc.
- Factors inhibiting and/or facilitating participation of men, women, male and female youth for selected agricultural products and corridors
- Women, men, male & female youths
- Perceptions (attitudes) and practices of men, women, male and female youth related to participation and deriving of benefits from trade

Data collected using **key informant interviews with transporters and shipping companies**:

- Ownership of the company, period of existence, its competitors and clients, etc.
- Origin and destination of the products (Uganda, Kenya, Sudan, Rwanda, Burundi, DRC, Ethiopia, Egypt or other African country), etc.
- source of information on the value of products,
- Processes to follow when sending products within and outside the country to other Nile Basin countries,
- Transport /shipping fee structure, current shipping rates, etc.
- Services offered to clients such as packaging, payment transfer, etc.
- Gender and youth dimensions in the transporters and shipping firms
- Use of water in the rivers and lakes in the Nile basin

Data collected using **key informant interviews with leaders of producer/traders/processors associations**:

- Current membership, services (roles), scope, types of crops/ livestock members are involved in, services provided to the members and the advantages of being a member etc.
- Formation of the associations and their evolvement over time, initial objectives, initial number of members, etc
- Sales and marketing data, coordination and negotiation of sales by the association, markets for association's products, location of new markets, etc.
- Product requirements/specifications and quality standards, compliance,

- Perceptions on tariff and non-tariff barriers, costs or risks to members, etc.
- Economic portfolio of the members, whether production is part-time or full time activity for the members, efficiency in production by members, etc
- Trade challenges and opportunities for the associations and their members
- Perceptions on how policies in the trade corridors affect trade
- Gender and youth dimensions in the associations and their members
- Use of water in the rivers and lakes in the Nile basin

Data collected **using key informant interviews with exporters and traders**:

- Quantity of cereals, fruits/ vegetables and number of livestock traded, quality, etc.
- Main clients, initial finding of clients, seasonality of clients and trade
- Type of storage and its capacity, transport issues and costs, other costs, etc.
- Interaction with other traders and trader associations, power wielding among value chain actors, assistance offered by the clients in terms of advances, credit, information inputs, technical assistance, recommendations, etc
- Satisfaction level with trade, challenges experienced, opportunities for increasing trade, policies related to the value chain business economic environment, etc.
- Government's role in the industry, price determination, sourcing of products and communication channels in place, role of other indirect players, etc.
- Risks encountered in the trade, future of trade (time horizon), etc.
- Gender and youth dimensions among traders
- Use of water in the rivers and lakes in the Nile basin

Data collected using **key informant interviews with government officials and other indirect actors**

- Importance of cereals, fruits/ vegetables and livestock sub-sector to the economy, etc.
- Role of the government, other key (indirect) players in this sub-sector, their roles, interests, etc.
- Any expected changes overtime in terms of research, extension, input distribution, production, transportation, processing and marketing, etc.
- Existing rules, policies and legislation related to the sub-sector and channels of communication to the various value chain actors, etc.
- Monitoring and enforcement mechanisms of trade and traders, problems experienced, inter-regional relations, etc.
- General business economic environment, strategic interventions put in place by government to boost cross-border value chain
- Technical skills and other capacities to integrate women and youths in trade
- Use of water from rivers and lakes from the Nile Basin

Data collected **using key informant interviews with retailers**:

- Prices paid by retailers, storage capacity, forms in which produce is bought (processed or unprocessed),
- Ways of buying the supplies, the preferred suppliers and how they are found, etc
- Services retailers provide to their suppliers in terms of inputs, credit and advice on market demand,
- Ways of communicating with the suppliers about the product requirements and also how the prices are determined.
- Customers/ clients of the retailers, their preferences, changes in requirements and preferences of the products, consumer trends which influenced the future direction of these products industry, etc
- Interaction with other traders and trader associations, power wielding among value chain actors

- Gender dimensions among the retailers, including labour allocations
- Use of water in the rivers and lakes that drain to the Nile Basin

Data collected using **key informant interviews with processors**:

- Main products bought, processed and sold, modes of processing,
- Raw products (material) prices, value addition, processing costs, sales prices and technological upgrades
- Traders/ middlemen interactions in obtaining products to process, suppliers preferred, source of the products,
- Services provided to the suppliers, communication with the suppliers, etc.
- Type of storage, transport modes, charges, losses, reasons for losses,
- Market outlets, meeting of clients and challenges faced, opportunities expected, etc.
- Roles of indirect actors such as the government, policies, etc
- Interaction with other actors and conflicts of interests

A summary of categories of data collected using the **semi-structured questionnaire**:

- Socioeconomic and demographic data of men, women, male and female youths involved as market actors, e.g., gender, age, education, etc.
- Key functions of actors and agricultural commodities involved and approximate amounts
- Details of respondents' businesses, including financial aspects, and legal requirements.
- Membership to trader associations/farmer groups, market information and its usefulness, information about commodities traded
- Estimated gross margins
- Post- harvest technologies, transport modes, their costs (charges), advantages, disadvantages and reasons for preference
- Post-harvest losses, magnitude/extent of losses and reasons for losses, possible solutions to curb losses
- Costs of production, storage, transport, market transactions, operating costs, depreciations, maintenance and repair, organizational/managerial costs, costs of institutional arrangements (e.g., contracts), waiting times for transactions, costs (losses) due to breach of contracts, etc.
- Local taxes, fees and regulatory measures, roadblocks, expenses at weighing bridges, bribes to public officials, costs (losses) due to pilferage in storage or transit, costs arising from poor road conditions, costs of poor policy harmonization across the border, etc.
- Costs of commercial transaction arrangements, regulations and their associated costs, reservation and their associated costs, time wastage and other expenses, cost implications from terms and conditions and the payment methods used, etc
- Data on livestock also included the general market characteristics such as number of livestock sold per market, assistance from veterinary officers, etc.
- Labour allocation among adult women, adult men, female youth and male youths, etc.
- Factors inhibiting & facilitating participation of & accruing of benefit to men, women, male and female youth for selected agricultural products and corridors
- Women, men, male & female youth positions in cross border trade for the selected agricultural products & corridors
- Perceptions (attitudes) and practices of men, women, male and female youth related to participation and deriving of benefits from trade for selected agricultural products and corridors
- Interventions needed to address the negative attitudes & practices against men, women, male and female youth related to participation and deriving of benefits from trade for selected agricultural products and corridors
- Use of water in the rivers and lakes in the Nile Basin

3.3.5 Data Entry and Analysis

After the approval of the inception report and data collection instruments by the Client, a data template for the market actor questionnaire was built using SPSS. The template was split according to the sections of the semi-structured questionnaire in order to ease data entry and also minimize errors. Each section was done by one trained data entry clerk in order for him/her to become fully familiar with the section and therefore minimize data entry mistakes.

For the qualitative data (from key informant interviews and focus group discussions), entry was done using qualitative templates prepared by the commodity experts. Data in these templates was later analyzed and used to write the qualitative reports of the different study corridors.

4.0 Production and Consumption Structure and Distribution

4.1 Production Trends for Selected Commodities

Production of the major food crops in the Nile riparian countries stagnated in the last two decades and only in the past five years does one see some degree of consistency in growth. In particular the Eastern Africa region continues to experience deficits in most of the food commodities (Table 4.6). Crop production is predominated by smallholders whose productivity has been severely affected by their over-reliance on rain-fed agriculture (rather than irrigation), increasing costs of off-farm inputs, poor infrastructure and rapid depletion of soil nutrients due to shortening of fallow periods. Although some of the Nile Basin countries, notably Kenya, Uganda, and Ethiopia had exemplary post-independence records in agricultural research and extension services aimed at promoting adoption of high yielding seed varies and fertilizer (especially in the production of commercial crops such as tea, coffee, tobacco and horticulture), the adoption of these improved technologies by producers of food crops has been singularly disappointing except for Egypt. Food crop yields in Eastern Africa fall below the averages for Africa, except in the case of maize; they also compare quite poorly with global averages. The region's yields for the major cereals (maize, wheat and rice) are only 13, 10 and 20 percent of their potentials, at the research stations, respectively (Ackello-Ogutu, 2008).

Table 4.6: Supply of and demand for selected agricultural commodities in 2003, 2009 and 2015 (000' tons)

Commodity	2003		2009		2015	
	Supply	Demand	Supply	Demand	Supply	Demand
Maize	10,546	10,803	12,508	12,709	14,968	15,032
Rice	2,558	3,069	2,954	3,691	3,424	4,470
Cereal Other	1,690	1,681	1,859	1,862	2,053	2,057
Potatoes	3,137	3,181	3,777	3,885	4,582	4,763
Beans	1,359	1,330	1,471	1,463	1,626	1,725
Vegetables	9,844	8,666	10,915	10,148	12,181	11,952
Bananas	15,335	15,334	17,825	17,824	20,825	20,825
Fruits	3,940	3,789	4,568	4,303	5,334	4,904
Bovine Meat	1,290	1,294	1,538	1,537	1,842	1,842
Mutton Meat	432	425	463	474	500	526
Meat, Other	573	574	611	659	656	764

***Source*:** ASARECA/IFPRI, 2005

MAIZE

Apart from Egypt whose maize production is irrigated, output in the other main Nile Basin producing countries - Ethiopia, Kenya, Uganda and Tanzania – is highly erratic and susceptible to weather patterns. The harvested area in all the Nile Basin countries, except Egypt, has generally been on the rise since 1998 (Table 4.7). Area expansion has been most noticeable in Uganda and somewhat marginal for Kenya, Ethiopia and Tanzania (Table 4.8). The latter three countries allocate the largest areas for maize production (between 1.5 and 3.0 million hectares in the last five years) but their national outputs have stagnated at about 3 million tons for over two decades (Figure 4.2). The smaller of the maize producers in the region (Burundi and Rwanda) also had significant area expansion probably reflecting consumption patterns that favour maize and hence the public policy emphasis on the commodity.

Table 4.7 : Maize production trends (000 mt)

Year	Burundi	DRC	Egypt	Ethiopia	Kenya	Rwanda	Sudan	Uganda	Tanzania
1990	168	1008	4799	--	2290	101	27	602	2445
1991	172	1023	5122	--	2400	104	61	567	2332
1992	176	1053	5069	--	2430	98	51	657	2226
1993	172	1130	5039	1456	2089	87	40	804	2282
1994	123	1184	5112	1396	3060	67	48	850	1486
1995	153	1008	4535	1990	2699	56	21	913	2874
1996	144	1101	5165	3164	2160	67	54	759	2822
1997	145	1167	5806	2987	2214	83	52	740	1831
1998	132	1215	6337	2344	2464	59	42	924	2685
1999	129	1199	6143	2832	2322	55	37	1053	2421
2000	118	1184	6474	2683	2160	63	53	1096	1965
2001	124	1169	6094	3298	2790	81	53	1174	2653
2002	127	1155	6431	2826	2409	92	53	1217	4408
2003	127	1155	6530	2744	2711	79	53	1300	2614
2004	123	1155	6236	2906	2607	88	60	1080	3157
2005	135	1155	7085	3912	2906	97	10	1170	3219
2006	117	1155	6374	4030	3247	92	109	1258	3423
2007	116	1156	6243	3337	2929	102	70	1262	3302
2008	118	1156	7401	3776	2367	167	62	1266	3556
2009	120	1156	7686	3897	2439	286	66	1272	3326
2010	126	1156	7041	4400	3222	432	35	1373	4475

Source: FAOSTAT (2011)
"--" means data unavailable

Table 4.8 : Maize harvested area (000 ha)

Country/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Burundi	112	115	116	113	114	116	115	106	117	120	126
DRC	1482	1463	1482	1482	1483	1483	1483	1484	1484	1484	1485
Egypt	843	873	828	834	789	868	762	776	936	983	969
Ethiopia	1656	1893	1507	1791	1802	1950	1526	1695	1767	1768	1772
Kenya	1500	1640	1592	1671	1351	1771	1888	1615	1700	1884	2008
Rwanda	89	106	105	103	115	109	115	141	145	147	185
Sudan	72	72	63	72	58	10	104	37	31	37	26
Uganda	629	652	676	710	750	780	819	844	862	887	890
Tanzania	1018	846	1718	3463	3173	3110	2570	2600	2848	2961	3100

Source: FAOSTAT (2011)

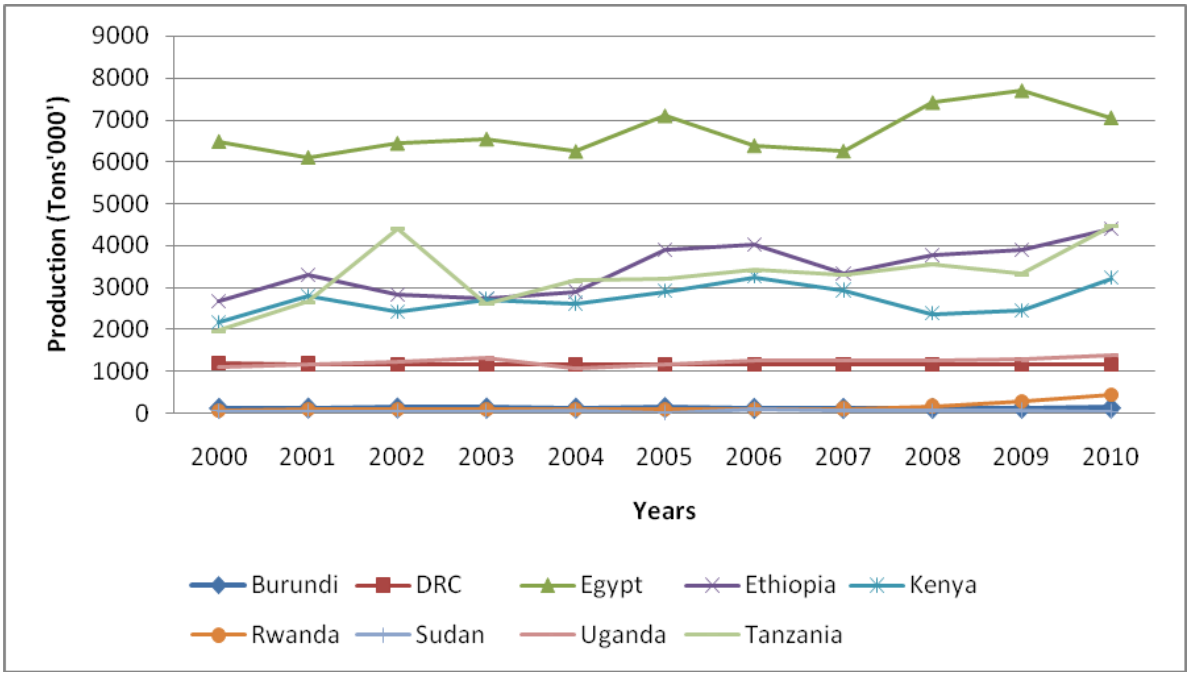


Figure 4.2 : Maize Production in major producing countries of Nile Basin (000 tons)
Source: FAOSTAT (2011)

In all the major maize producing countries, strategies supporting increased access to improved seeds and fertilizer by smallholder farmers (who supply over 75 percent of total agricultural production in the region) and favourable weather seem to be paying some dividends. Kenya was in 2006 and 2007 finally hitting the 3 million tons and meeting domestic requirement, a feat it achieved only once before (in the 1994 season) while Tanzania peaked over 4 million tons in 2002 and 2004. Within the region, only Uganda has had a consistent upward trend in maize output, but the country applies very little high yielding variety (HYV) seeds and fertilizer compared, for example, to Kenya. Productivity in the region is low due to low application of fertilizers, low quality seed and a lack of husbandry practices that would enable the achievement of 7-8 tons/ha experienced in Egypt (Figure 4.3).

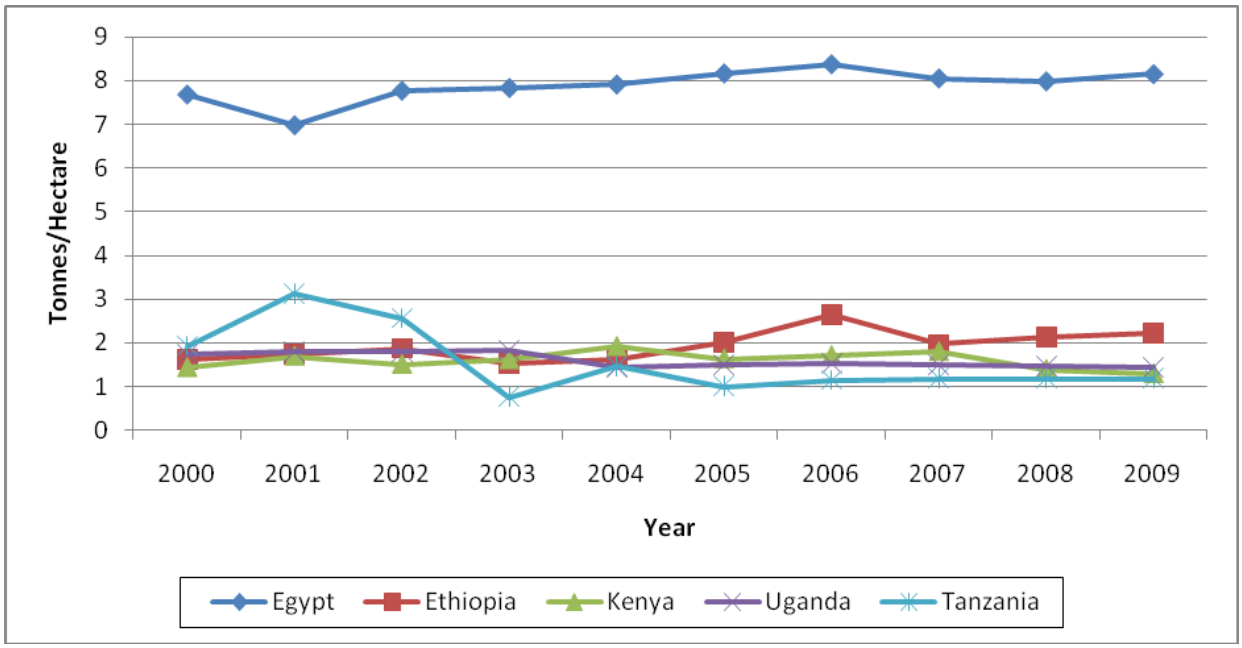


Figure 4.3 : Productivity of Maize in Selected Nile Basin Countries
Source: FAOSTAT (2012)

Maize is the most important enterprise in the region in terms of food security and its consumption has increased considerably over time across the Nile Basin. Despite efforts made to ensure food security in the region, cereals production, generally, and maize supply in particular, continues to fall short of consumer demands thus necessitating imports. The decline in production of food staples like maize has taken place against a backdrop of growing demand for food caused by, among other factors, high population growth thus leading to structural deficits. For Kenya, since the year 2001, the general increase in maize production has resulted in declining deficits and this is expected to improve with more open borders, considering the staggered nature of maize marketing seasons in the region. Within the East Africa region (using statistics for Kenya, Uganda, Tanzanian and Rwanda), the net supply is estimated to improve from a deficit of 201,000 tons in 2009 to a deficit of only 64,000 tons by 2015 (ASARECA/IFPRI, 2005).

RICE

Rice is the world's most popular cereal in terms of consumption. The total area allocated to rice production in SSA is about 8.5 million ha (just about 5.5 percent of total area globally) and Nigeria and Madagascar account for 60 percent of this area. Compared to Asia which irrigates slightly over 50 percent of its rice, the proportion of irrigated area in SSA is a mere 10percent. The SSA yields average 1.5 tons/ha (40 percent of the yields in Asia) and have not changed significantly in the last three decades (Mahabub Hossain, IRRI, 2006). The highest national rice yields reported in Africa (and in the world for that matter) were in Egypt in 2005 and 2006 (Figure 4.4). The Egyptian experience is as a result of irrigation and improved management that are lacking in the other Nile Basin countries (FAO, Newsroom - September, 2006).

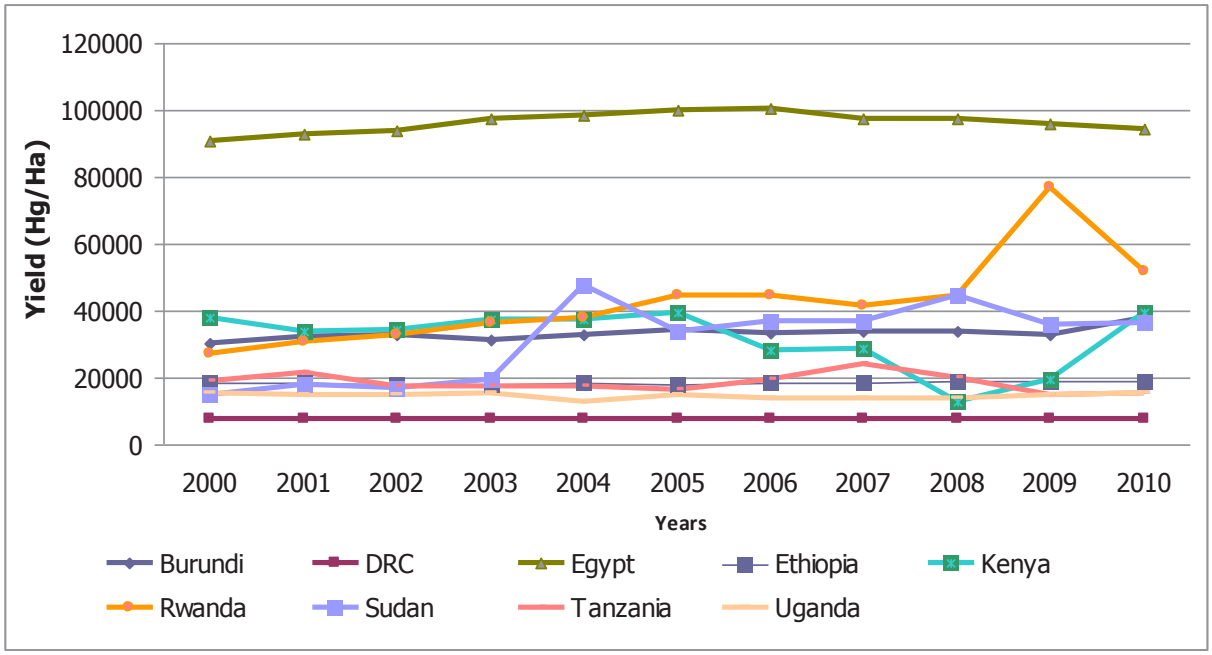


Figure 4.4: Productivity of Rice in Selected Nile Basin Countries
Source: FAOSTAT (2012)

Apart from Egypt, which is by far the largest rice producer in the Nile Basin, the other major producers are Tanzania, Uganda, Burundi and Rwanda (Table 4.9). Production in Kenya which is currently a net importer of rice stagnated at an average of about 45 thousand tons between 1990 and 2004 but the period 2005-2007 saw some marginal increase in production to an average of 60 thousand tons but still this has not been able to meet the demand. Some of the main reasons cited for the dismal performance in Kenya are high costs of inputs, mismanagement of large scale irrigation projects and poor utilisation of donor funds meant to promote production of rain-fed rice in Western Kenya (AfDB, 2005).

Table 4.9: Average milled rice production in selected Nile Basin countries (tons)

Year	Egypt	Tanzania	Uganda	Burundi	Kenya	Rwanda	Sudan	Ethiopia
2000	6000490	781538	109000	51678	52349	11654	8000	15000
2001	5226703	867692	114000	60920	45000	15610	11000	15412
2002	6105456	984615	120000	62648	45000	20976	8000	14000
2003	6176266	1096923	132000	61256	40502	27891	15748	13000
2004	6352370	1058462	121000	64532	49295	46191	36000	12000
2005	6125300	1167692	153000	67947	62677	62194	20000	11244
2006	6755000	1206154	154000	68311	64840	62932	26000	12000
2007	6876830	1341846	162000	70911	47256	62000	23000	11244
2008	7,253,373	1,341,846	171,000	70,911	63,248	82,000	30,000	24,434
2009	7,500,000	-	181,000	-	37,198	80,000	22,500	-

Source: FAOSTAT (2012)

Rice consumption in the region is growing at fast rates, and the commodity is becoming a strong substitute for the more traditional crops due to changing dietary trends, especially among rapidly increasing urban populations. Net supply estimates indicate that, out of all the food commodities, rice will have the highest deficits in the East and Central Africa part of the Nile Basin, with supply shortfall rising from 737,000 tons in 2009 to 1.05 million tons in 2015 (ASARECA/IFPRI, 2005). The global rice consumption (growing at 3.2 percent annually) and the wide yield gap between farmers' fields and the potential levels should act as a strong incentive for governments in the Nile Basin to increase investments in the rice sub-sector. The technologies are already available so more attention will have to be directed towards improving their adoption, uplifting crop husbandry methods and minimising the cost of inputs and irrigation.

BEANS

Farmers plant about 3 million hectares of beans annually in eastern, central and southern Africa, usually as a mixture of varieties (CGIAR website, 2010). Beans are an attractive crop for farmers, because of its adaptability to different cropping systems and short growing cycle. However, beans are susceptible to many diseases and climatic stresses. The common (dry) bean is a major staple food crop in Africa and is valued as one of the cheapest sources of protein for vulnerable sections of the population. Close to 70 percent of bean output in SSA is produced by Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda (FAOSTAT, 2011). The crop is predominantly produced in low off-farm (purchased) input systems by small scale farmers (mostly women) but yield gains of up to 150 percent are possible under optimal management. In the recent past, farmers have been increasingly looking for improved varieties which meet specific market demands and/or varieties which are adapted to local agro-ecosystems. To this effect, between five to twenty bean varieties have been released in seventeen countries in the region[7] but this does not seem to be having impacts as estimates show that by 2015, the region may be experiencing excess demand to the tune of about 100,000 tons.

According to FAO statistics, production of dry beans in the Nile Basin is dominated by Tanzania (over 800,000 tons per year) followed by Uganda (about 450,000 tons per year); the other main producers are Burundi, Rwanda, Kenya and Ethiopia, whose annual production is in the range of 200,000 to 300,000 tons (Figure 4.5). In general, the production of this commodity has been erratic in the region, despite its high ranking as one of the main food stuffs. Priorities for bean production in the region rely

[7] (www.ciat.cgiar.org/africa).

on advancing research activities, increasing productivity, enhancing market linkages, and improving knowledge management and utilization. More impact can be achieved by increasing acreage under improved varieties, adopting improved bean management practices (IBMPs) and exploiting regional market opportunities especially in Ethiopia, east DR Congo, northern Tanzania, and eastern Uganda. In the medium term, investments in scaling out dissemination of recently-released varieties and IBMPs can increase bean production in the Nile Basin. In the long term, sustaining benefits to producers and consumers region-wide can be achieved through investments in research to overcome major production constraints.

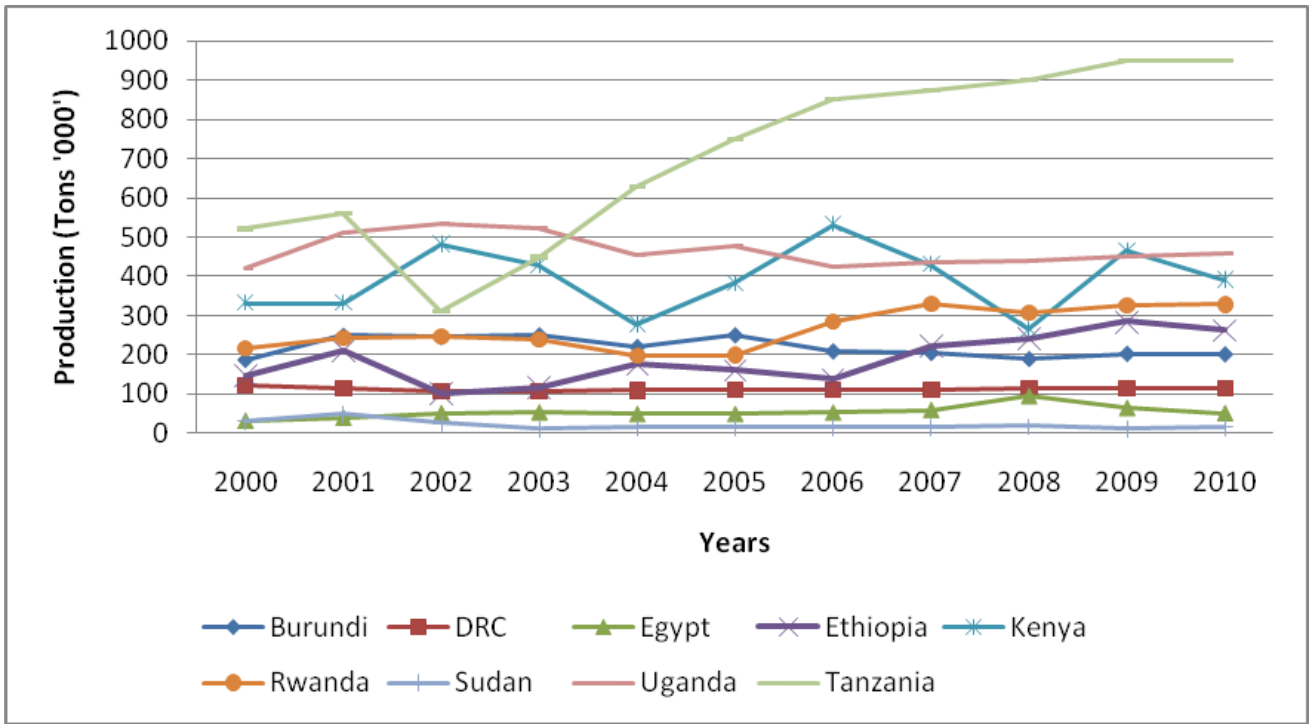


Figure 4.5: Dry beans Production Trends
Source: FAOSTAT (2012)

FRUITS AND VEGETABLES

A large proportion of the horticulture industry within the Nile Basin is still at infancy stage and is based on smallholders who can hardly meet stringent foreign market requirements. The supporting grassroots infrastructure and farmer-based marketing institutions are usually poorly developed. However, a number of countries in the Nile Basin are now venturing more aggressively in foreign markets for fruits and vegetables following the successes demonstrated by Kenya. International trade in horticultural products is growing at a rate of seven percent per year, compared with only two percent for staple crops. According to the World Bank, high-value products can provide an opportunity for farmers in developing countries to compete for a share of this lucrative export market. Because of their characteristics as mainly perishable products, and in view of the comparative advantage enjoyed by the countries producing them, horticultural products offer substantial prospects for export growth within the Nile Basin due to the relative proximity to the growing European markets.

Horticulture has generally experienced an expansion in export levels boosted by favourable international prices but, from 2001, the sector started experiencing substantial fluctuations mainly attributed to new and stringent requirements from international markets. Kenya's experience with horticultural exports shows considerable success and potential. The country has remained the leading exporter in the Eastern Africa region over the years. Largely due to recent government efforts aimed at boosting production and marketing, Ethiopia's horticultural exports have been growing steadily since 2000 when its total export income was about 2.8 million USD, a mere 2.2 percent of Kenya's export income from the same sub-sector in the same year (World Bank, 2004).

Horticulture exports and imports for the other Nile Basin countries are still negligible (e.g. Rwanda and Uganda export less than 50,000 tons each annually thus suggesting opportunities that could be tapped provided that productivity is increased and standards in the lucrative EU market are met. Regional net supply estimates for fruits and vegetables for the period 2009 and 2015 show surpluses that could increase as more smallholder farmers adopt irrigation practices.

BANANAS

Banana production in the region is dominated by Uganda, whose 2010 production is just above 10,000,000 tons, followed by Tanzania (Table 4.10). Limited access to factor markets (labour, land and credit), low private sector investment, lack of value addition opportunities as well as critical biophysical factors (pests, diseases and soil degradation) have led to a decline or stagnated banana production in Uganda. Kenya's production shows a positive trend in the last five years, thanks to increased adoption of improved planting materials (such as tissue-cultured seedlings) but, as in Uganda, the crop is considered merely as a safety-net for food security rather than as a commercial enterprise. The yield potential for the improved planting materials with resistance to the main diseases and pests is 35-40 tons/ha compared to the current average of under 5 tons/ha for Eastern Africa.

Intraregional trade in bananas and horticulture remains subdued largely because of low productivity, subsistence orientation among the smallholders and low levels of value added production. The region recorded the worst performance in merchandise export of bananas with Uganda being its largest exporter of the commodity.

Table 4.10: Banana production in tonnes ('000)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
Burundi	1603	1600	1650	1720	1780	1701	1760	620	137
DRC	1509	1521	1513	1507	1514	1520	1522	1516	1566
Egypt	878	871	875	880	855	945	1062	1121	1029
Ethiopia	140	175	182	211	228	250	261	209	172
Kenya	1073	1019	1200	1200	1238	1187	1687	1687	1583
Rwanda	2785	2408	2470	2593	2653	2686	2604	2994	2749
Sudan	74	74	76	75	74	79	84	89	85
Tanzania	2806	2465	2793	3572	4112	3696	3576	3873	3585
Uganda	10503	10303	10288	9608	9617	9805	9954	10104	10150

Source: *FAOSTAT (2012)* - combination of desert banana and plantains)

PASSION FRUITS

Kenya dominates in the production of passion fruits in the region with an average production of 55,116 metric tons in the last five years. The fruits are mainly exported to Europe though some are consumed in the country and also traded with Uganda and other Nile Basin countries. Kenya is followed by Rwanda at an average production of 13,000 metric tons which is mostly sold within the region. With the high demand for the fruit in the European Union, most farmers are abandoning the production of staple foods like maize in favor of passion fruits. However, a major problem facing passion fruit farmers across the region is an increase in fungal and bacterial diseases, inadequate technical knowledge on crop management and poor post-harvest handling which reduces the quality of the crop. This has forced most growers to stop production altogether. Rwanda has a potential yield of 20-25 tons/ha under normal commercial farming as compared to the current 15 tons/ha. This low productivity is mainly attributed to too many suppliers, supplying too little quantity which results in uncontrolled primary sourcing and lack of coordinated activities, a problem that is common in the Nile Basin countries. With such uncoordinated production and marketing activities it is not known where and when products are harvested and it is difficult to comply with the stringent quality, hygiene and traceability requirements of the European markets. This implies that opportunities for scaling up smallholder production of passion fruits in the region are very limited.

IRISH POTATOES

Irish potato production in the region is essentially for food security reasons. According to FAO statistics, Egypt dominates in production of potatoes with an average production of 2,669,000 metric tonnes in the last ten years and is followed by Rwanda with an average production of 1,181,000 metric tones (Figure 4.6).

There has been a decline in potato production in Uganda and Rwanda over the years, mainly due to the fact that farmers do not use clean seed, and although there are no taxes on agricultural inputs, few farmers use fertilizer or pesticides in their farms. Kenya's productivity has been on the increase in the last ten years because of a strong potato research-extension programme, with emphasis on use of tissue culture and high yielding potato varieties. This is coupled by the strong demand for the potato in major urban areas such as Nairobi. Opportunities for regional and global trade exist but are limited.

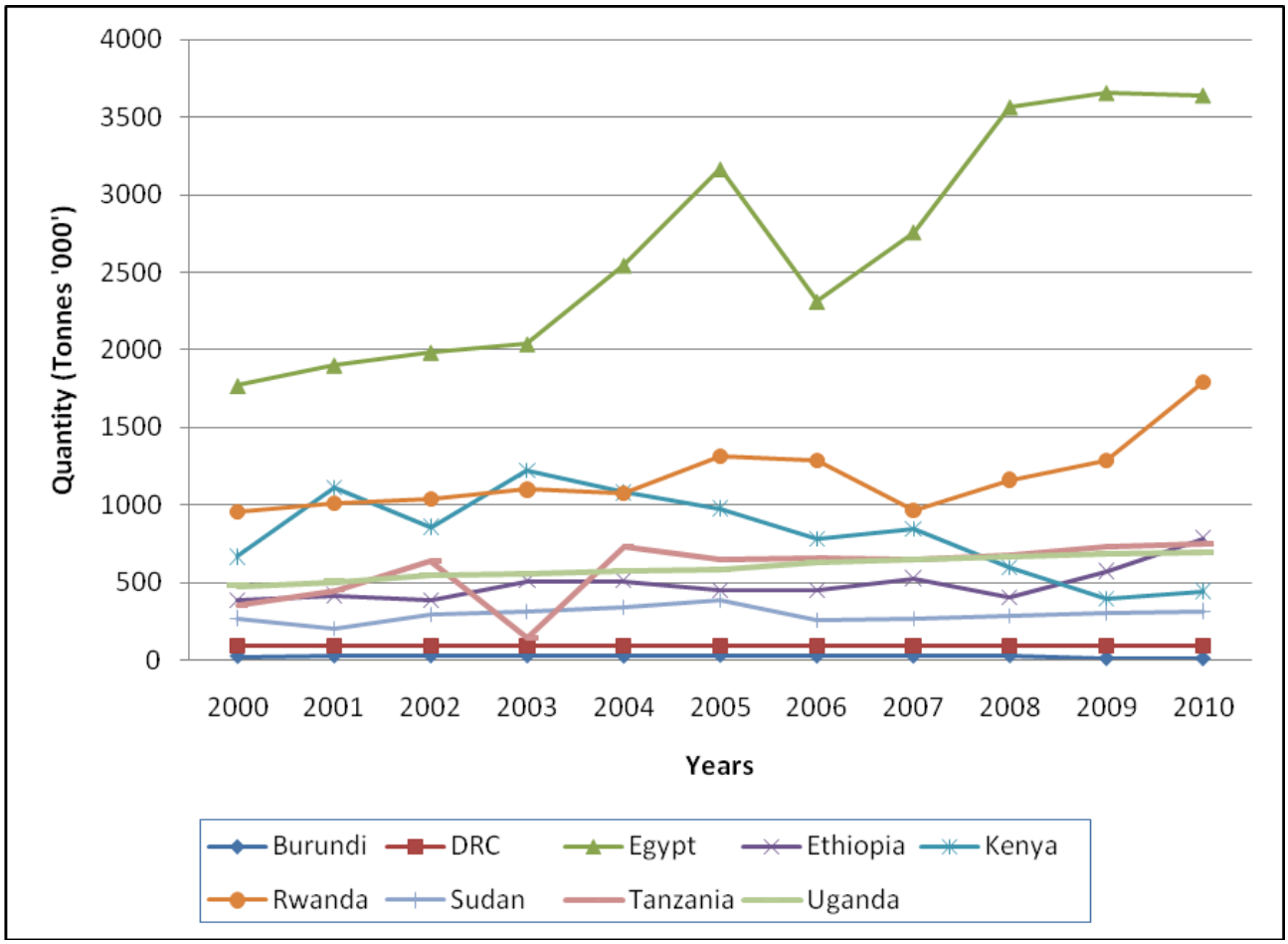


Figure 4.6: Potato Production in Tonnes ('000)
Source: FAOSTAT (2012)

PINEAPPLES

Kenya is the leading producer of pineapples in the region with an average of 61 percent in the last ten years and is followed by Democratic Republic of Congo with an average production of 26 percent (Figure 4.7). Production in Kenya is mainly by large-scale commercial farms with very few small-scale producers. In contrast, pineapple production in Uganda and Rwanda is exclusively done by small-scale farmers. The few small-scale farmers in Kenya are faced with the problem of secure market outlets partly because no processor can be licensed other than Delmonte Kenya (a subsidiary of Delmonte Royal, USA) because of its monopoly status granted by the Kenya Government, and partly due to competition by imports from Uganda. Rwanda has little comparative advantage for large-scale export of pineapples to the European Union, except in small niche markets or in its dried form. The majority of supplier countries ship pineapples to EU markets by sea. DRC and Rwanda have not been able to compete in the EU prices since they do not meet varietal quality and size requirements in that market. The potential of DRC producing and supplying the region with pineapple is largely untapped.

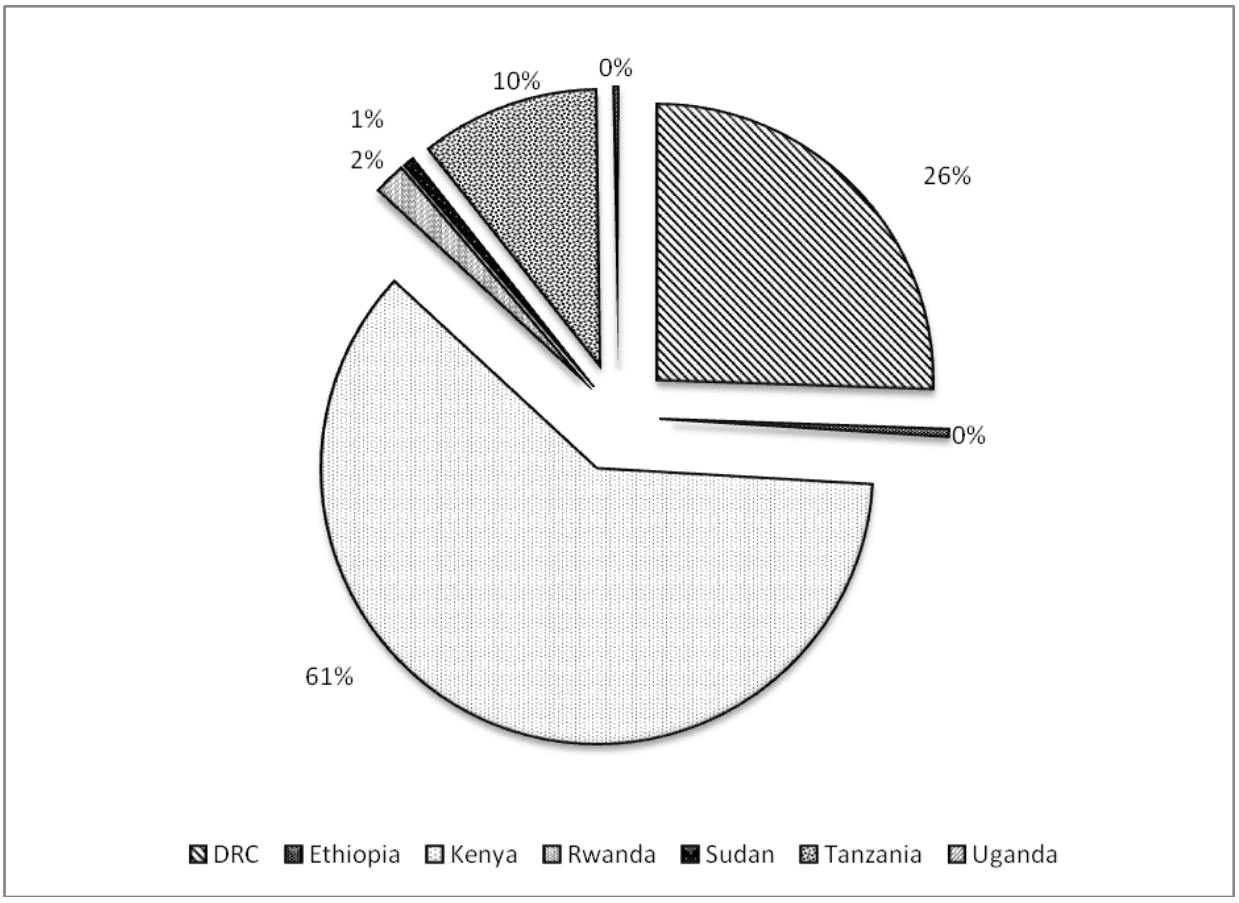


Figure 4.7: Pineapple Production and Distribution in the Nile Basin Region
Source: FAOSTAT (2012) [entries marked zero denote less than 1%]

In Uganda, pineapple production has no clearly documented history. Traditionally, the fruit has been grown for home consumption but in the last two decades it assumed commercial importance in some parts of the country; it is now by far the most widely grown commodity in the fruit crop range and value chain.

LIVESTOCK

Production trends for live cattle depend on grazing conditions in the pastoral areas (state of pasture, water and security). There are a lot of cross-border exchanges in livestock but actual herd sizes at the national levels are rarely known with any degree of certainty since there is no identification and almost all of the countries in the region have not undertaken any livestock census in the past three to four decades[8]. Ethiopia has one of the largest cattle populations in Africa with livestock ownership currently supporting and sustaining the livelihoods of an estimated 80 per cent of the rural population. The majority of the countries however have registered declining stocks of live cattle in recent years (according to estimates) with Sudan (especially the Southern part) that was a major exporter of live cattle during the country's troubled years going through a restocking period.

Table 4.11 shows the average number of animals in each of the nine Nile Basin countries between 1999 and 2010. Sudan had the highest livestock population by TLU followed by Ethiopia, then Tanzania and Kenya in that order. It is worth noting that countries in the Great Lakes region (Uganda, Tanzania, Rwanda, Burundi and DRC) did not keep camels, probably because those countries are wet throughout the year and the camel thrives well in dry areas. The fact that no camels were reported in Uganda is surprising given that the Karamoja area in north eastern Uganda is relatively dry just like the Turkana County in Kenya, yet the Turkana keep camels. Besides, the high incidence of livestock rustling between the two communities should have introduced camels among the Karamoja, which seems not to have been recorded.

It is worth noting that although countries in the Great Lakes region are wetter and therefore have adequate pasture and water resources, they are prone to insidious diseases[9] such as trypanosomisis, *Peste des petits ruminants* (PPR) and contagious pneumonias, whose vectors inhabit the humid subtropical climate and therefore limit livestock production.

Table 4.11: Average population sizes of various livestock species in Nile Basin countries (1999-2010)

Country	Mean (Millions)				
	Camels	Cattle	Goats	Sheep	TLU
Kenya	0.9	13.8	12.60	9.20	12.8
Ethiopia*	0.6	42.8	16.30	19.00	34.2
Sudan	3.8	39.70	41.60	49.10	40.7
Egypt	0.1	4.30	3.90	5.10	4.0
Uganda	-	6.74	7.58	1.46	5.2
Tanzania	-	17.97	12.48	3.87	14.2
Rwanda	-	1.05	1.40	0.50	0.9
Burundi	-	0.41	1.32	0.25	0.4
DRC	-	0.77	4.07	0.91	1.0

Source: Derived from FAOSTAT (2012)
*Population based on country data except for 2000
TLU = Tropical Livestock Units

[8] Kenya recently did one in conjunction with the 2009 national population census
[9] See http://web.oie.int/hs2/zi_pays.asp?c_pays=218

CAMELS

Sudan is the leading producer of camels, contributing about 70 percent of the stock in the region (Figure 4.8). It is followed by Kenya and Ethiopia at 18 and 10 percent respectively. Sudan has experienced increasing production trend in camels over the last ten years. The rest of the countries show a constant production trend.

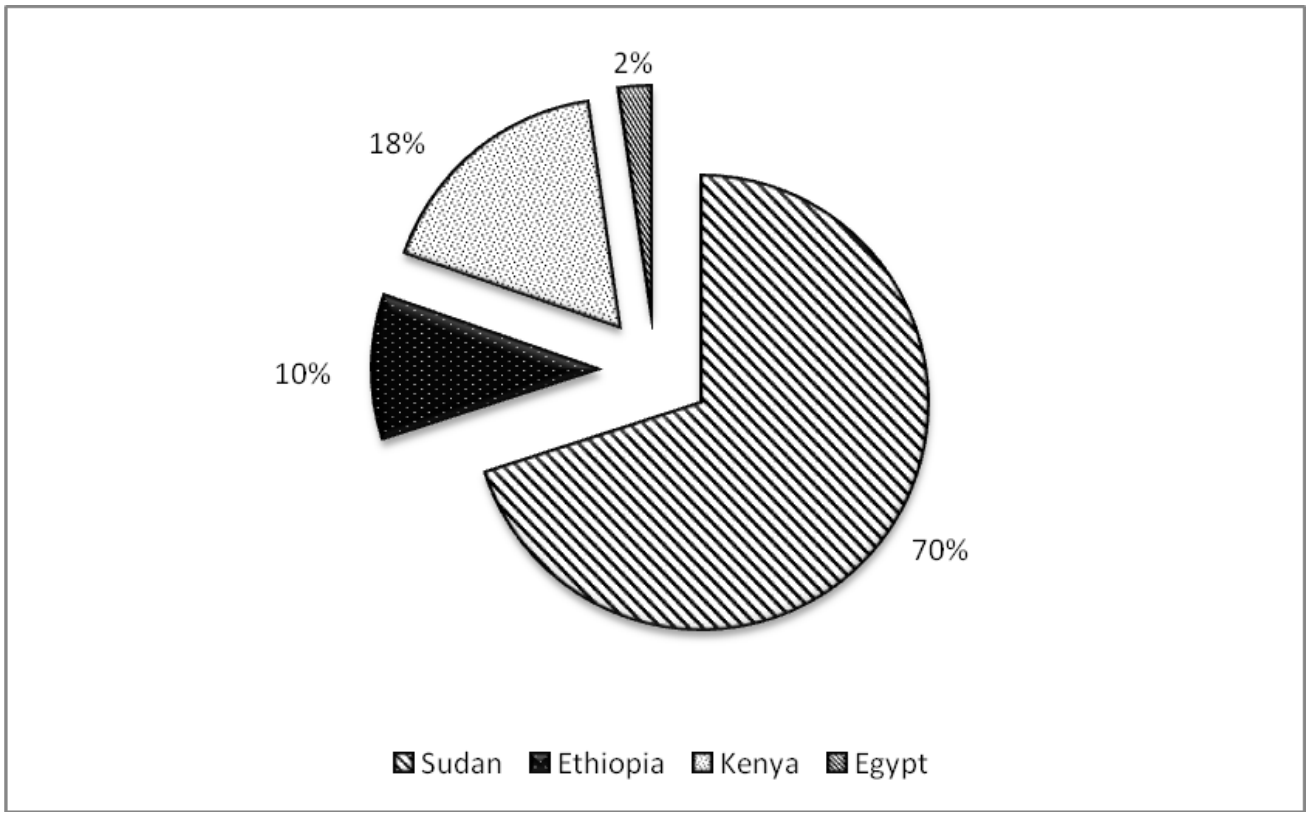


Figure 4.8: Camel Production in Stocks (Head)

Source: FAOSTAT (2012)

CATTLE

Since 2005 Ethiopia has had an increasing production trend in cattle production with the rest of the countries having relatively constant production trends (Figure 4.9). The country is the leading producer of cattle with an average contribution of 34 percent followed by Sudan at 31 percent for the last ten years. There was an upward shift in Kenyan numbers between 2007 and 2008 but since then there has been no real positive growth.

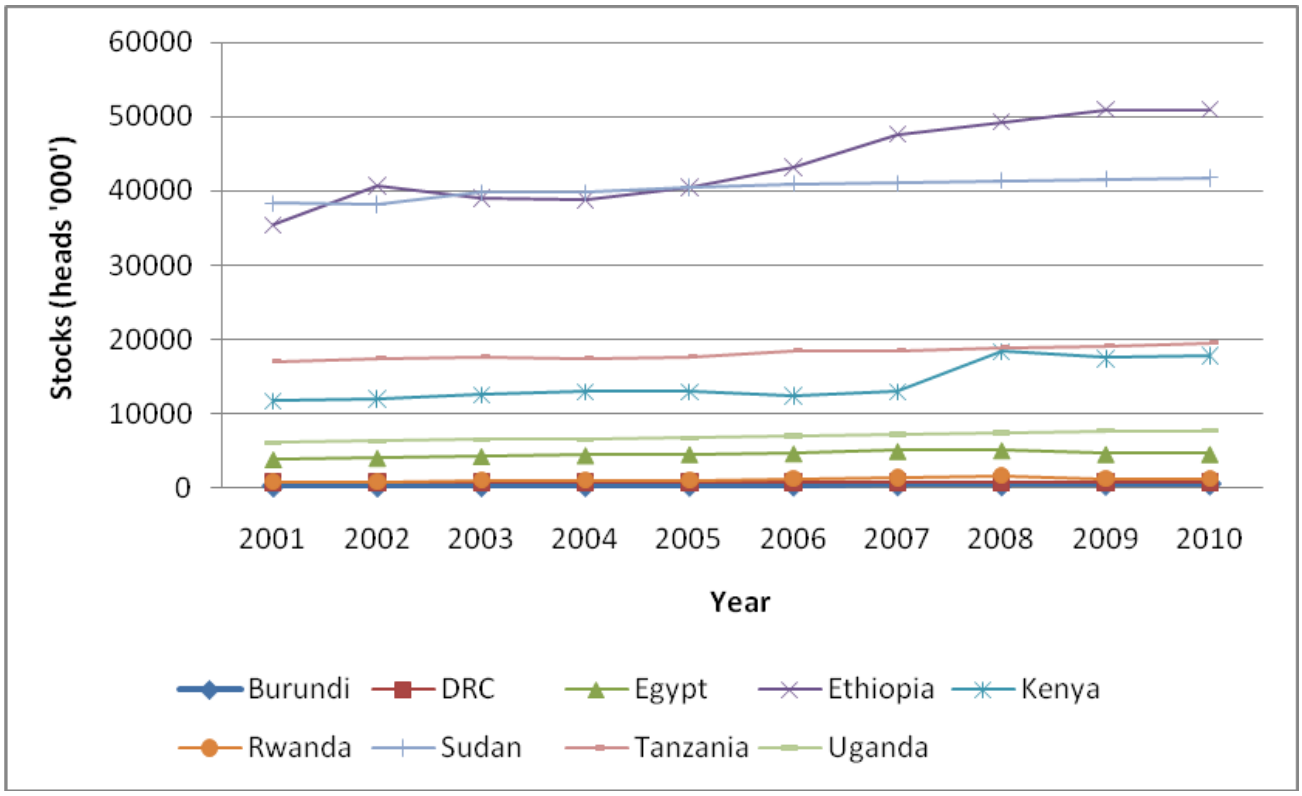


Figure 4.9: Cattle production in stocks (head)

Source: FAOSTAT (2012)

GOATS AND SHEEP

Sudan is the leading producer of goats in the region. It contributes about 41 percent of goat stock in the region, followed by Ethiopia at 16 percent, Kenya at 13 percent and Tanzania at 12 percent. The subsector has had relatively constant production trends in the last ten years though Ethiopia experienced an increasing production trend from 2001 to 2007 (Figure 4.10). Similarly, Sudan is the leading producer of sheep, with more than 50 percent of the sheep stock. It is followed by Ethiopia at 22 percent and Kenya at 10 percent. Most of the countries, with the exception of Ethiopia, have experienced a relatively constant production trend over the last decade. However, the growth trend of both goats and sheep also stagnated in 2007 probably due to the constant droughts in the country (Figure 4.11).

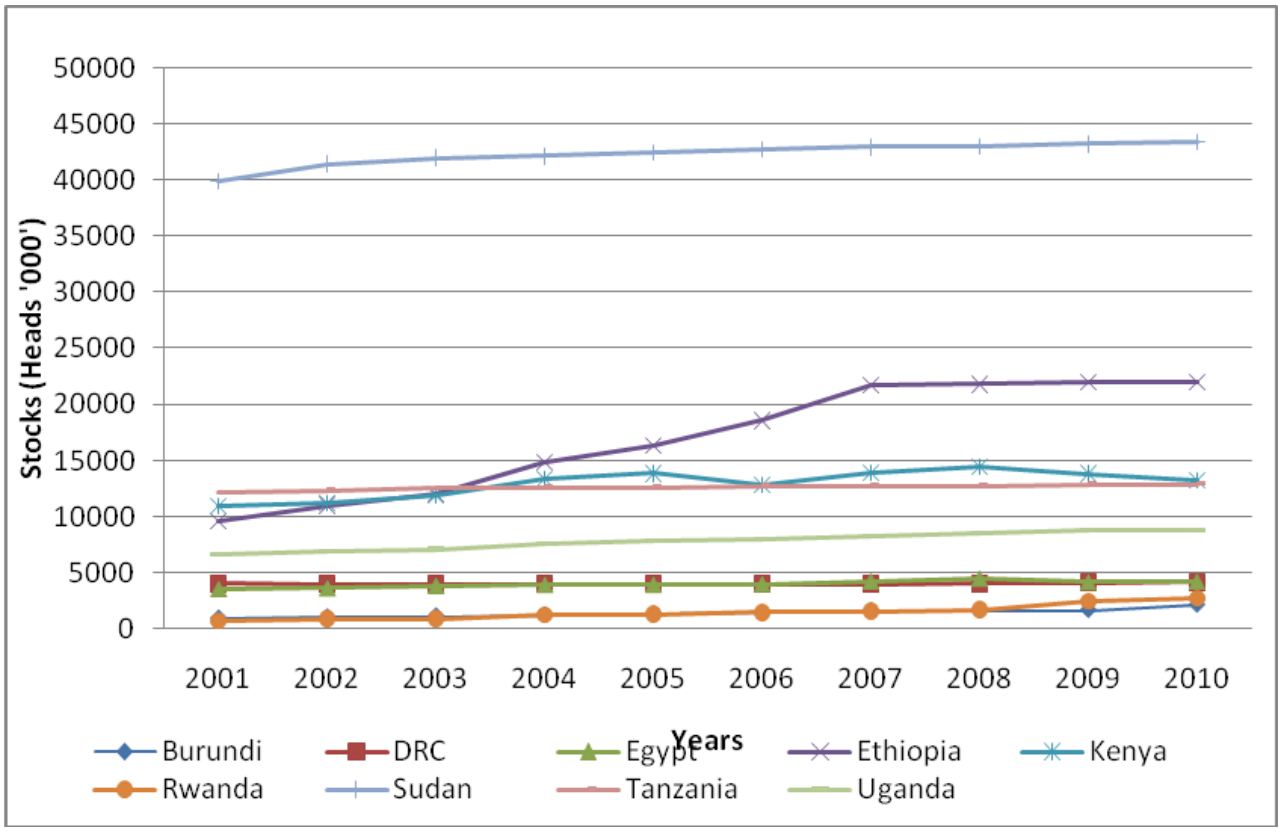


Figure 4.10: Goat Production in stocks (Head)
Source: FAOSTAT (2012)

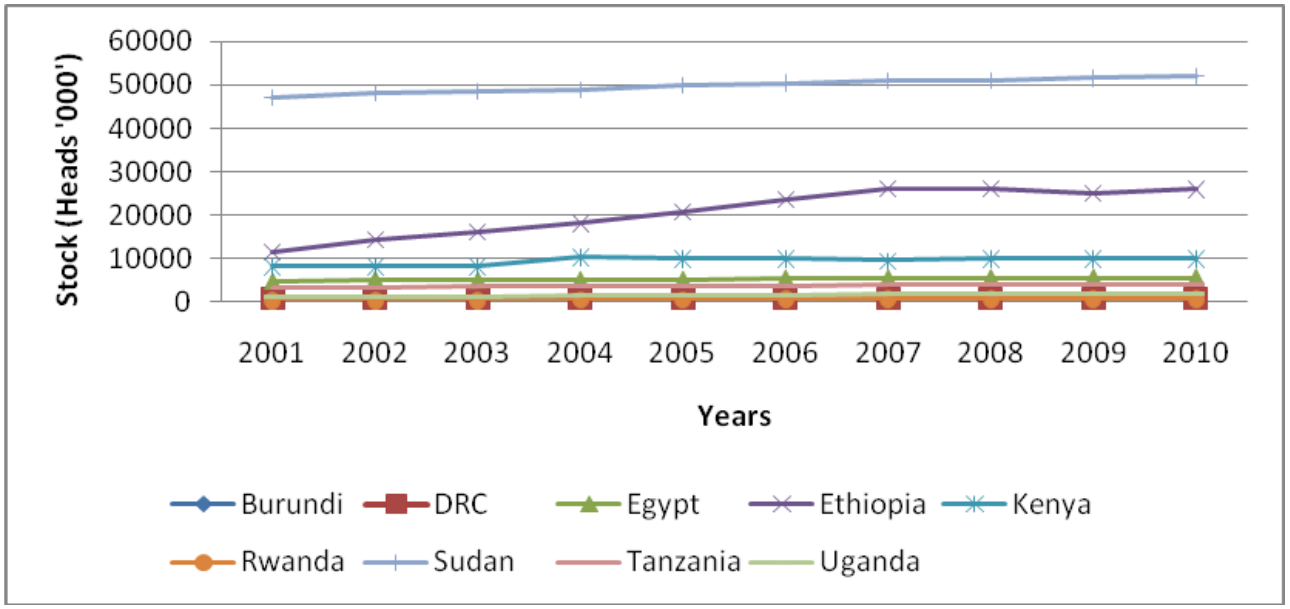


Figure 4.11: Sheep production in stocks (Head)
Source: FAOSTAT (2012)

The Nile Basin countries rely heavily on revenues from livestock trade with countries outside the region (Figure 4.12), the Euro zone being one of its largest trading partners. A number of countries in the region, notably, Tanzania, Sudan, Ethiopia and Kenya, have remained net exporters of livestock and livestock products (LLPs) but net importers of cereals, mainly maize, rice and wheat. The region's export of live animals (mainly cattle) is marked by sharp declines since late 1990s (Figure 4.12). Declining trends are observed for Kenya, Sudan and Ethiopia who have been characterised as having enormous potential for expanding trade in live animals given the large numbers of animals in the countries[10]. The fall in exports from the region can be attributed to the many challenges facing the livestock sector in SSA, among them: livestock diseases that limit access to lucrative foreign markets, poor animal husbandry, traditional value systems (so called cattle complex) that inhibit increased levels of commercialization and off-take, recurrent droughts in pastoral rangelands, and weak institutional structures to support the industry. Despite the widespread stagnation in cattle numbers, the region is generally a net exporter of live livestock with the exception of a few odd years such as 1994, 1996 and 2001 as shown in Figure 4.12. Trade flows are usually quite random but droughts in the rangelands, price differentials and civil strife often play significant roles in stock movements. For instance imports rose sharply in 1994 due to the Sudan famine (1993-94) and political strife in Ethiopia.

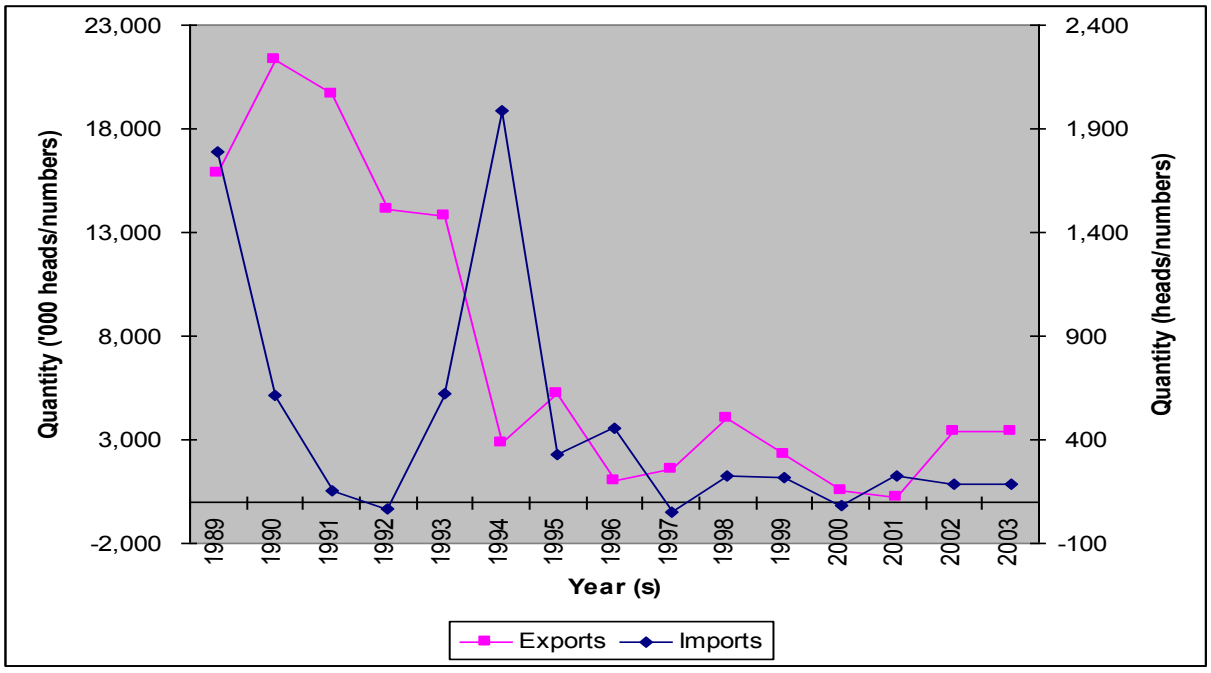


Figure 4.12: The Nile Basin Region's Live Cattle Exports and Imports
Source: FAOSTAT and KIPPRA (2007)

There is considerable potential for development and improvement of livestock production among the pastoralist communities of the Nile Basin who supply some 60 to 70 percent of the domestic market for red meat products. However, investments are needed to develop the rangelands, upgrade livestock breeds and improve access to markets and information. Camel trade across-borders in the Nile Basin is confined to just a few corridors, notably, Sudan/Egypt, as the main trade routes for Kenya/Uganda, Kenya/Tanzania, Sudan/Kenya/Uganda and DRC/Rwanda/Burundi do not feature camel trade at commercial magnitudes. There are different breeds of camel, the main uses being milk, meat, transport and sports (camel racing that apparently is quite popular in Egypt and other Middle East countries). Due to their quick growth, sheep and goats (shoats) that also fall under this cluster are critical components of wealth, food security and post drought recovery in pastoral areas of the Nile

[10] Little, P.D., T. Teka, and A. Azeze (2001)

Basin. Shoats have external market potentials (mainly in nearby Middle Eastern countries) that are yet to be exploited, while, within the region, there are niche markets, for example, for goat milk and its by-products such as cheese that provide opportunities for value addition.

4.2 Structure and Distribution of Consumption in the Region

4.2.1 Grains and Pulses

MAIZE

Egypt is the largest consumer of maize in the region over the years. It is followed by Ethiopia and Kenya respectively (Figure 4.13).

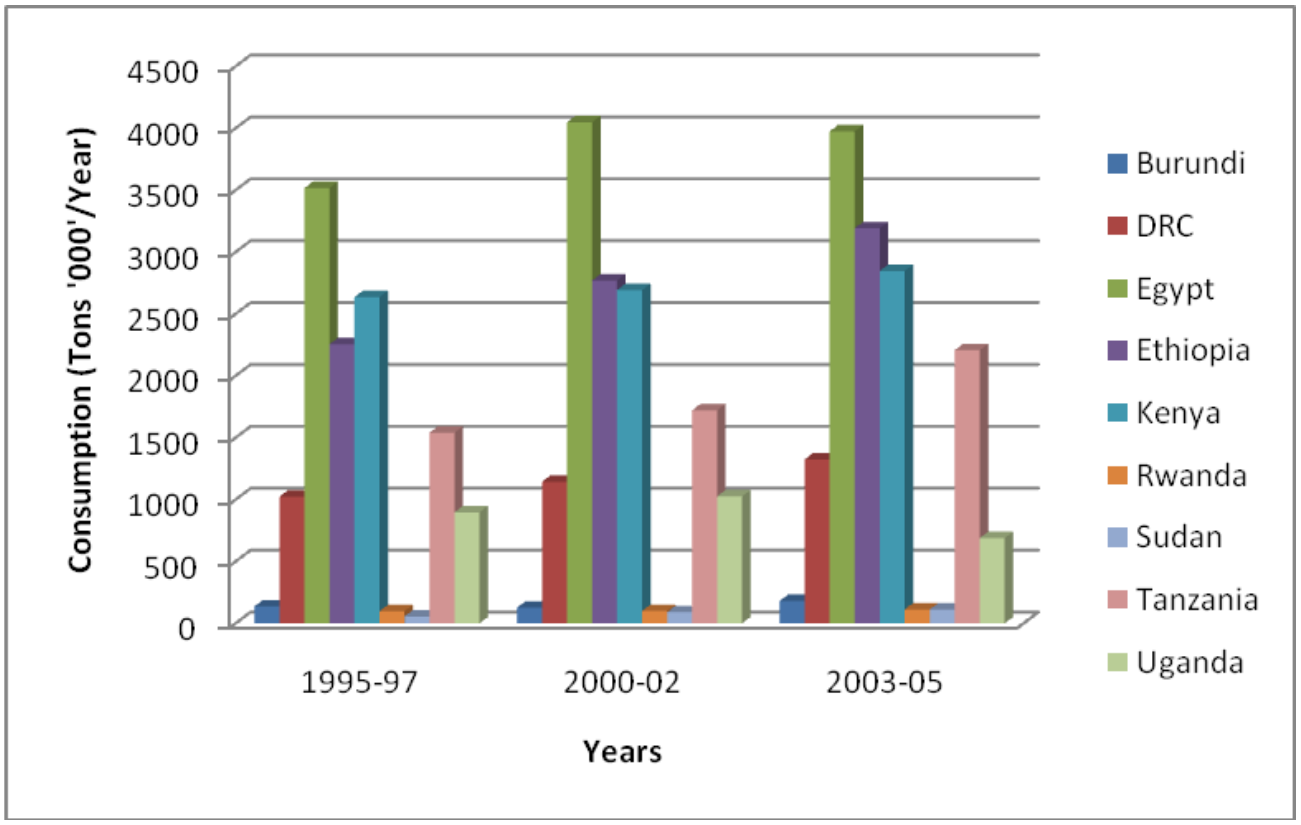


Figure 4.13: Maize consumption in the region

Source: FAOSTAT (2012)

RICE

Egypt is the largest consumer of milled rice in the region. This is in line to its production of the crop. It is then followed by Tanzania and the Democratic Republic of Congo (Figure 4.14).

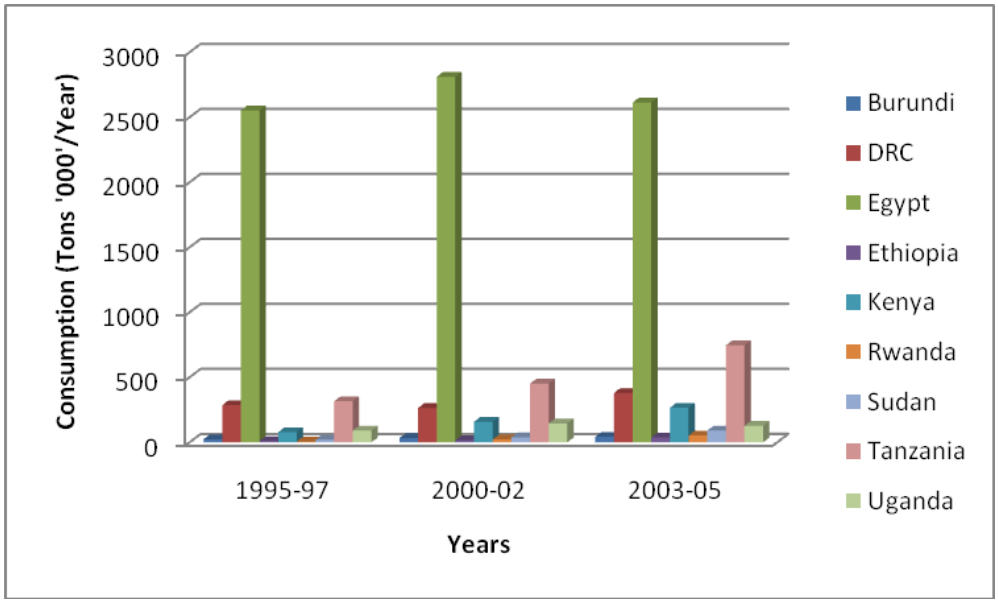


Figure 4.14: Rice consumption in the region

Source: FAOSTAT 2012

BEANS

Uganda had the highest average consumption of beans between 2000 and 2002 while just before that (the years between 1995 and 1997) the country was the second largest consumer after Kenya. Other major consumers of beans in the region include Tanzania and Rwanda (Figure 4.15).

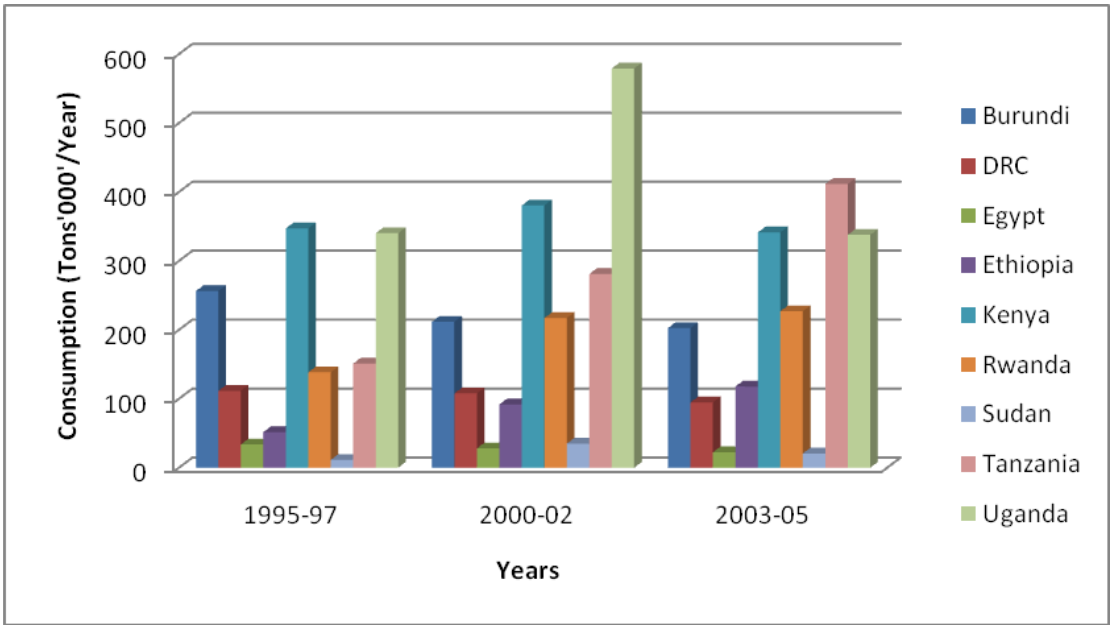


Figure 4.15: Beans consumption in the region

Source: FAOSTAT (2012)

4.2.2 Fruits and Vegetables

BANANAS

Tanzania had the highest average consumption of bananas between 2003 and 2005. The country's consumption had been increasing gradually since 1995/97. The other major banana consumers are Burundi, Egypt and Uganda (Figure 4.16).

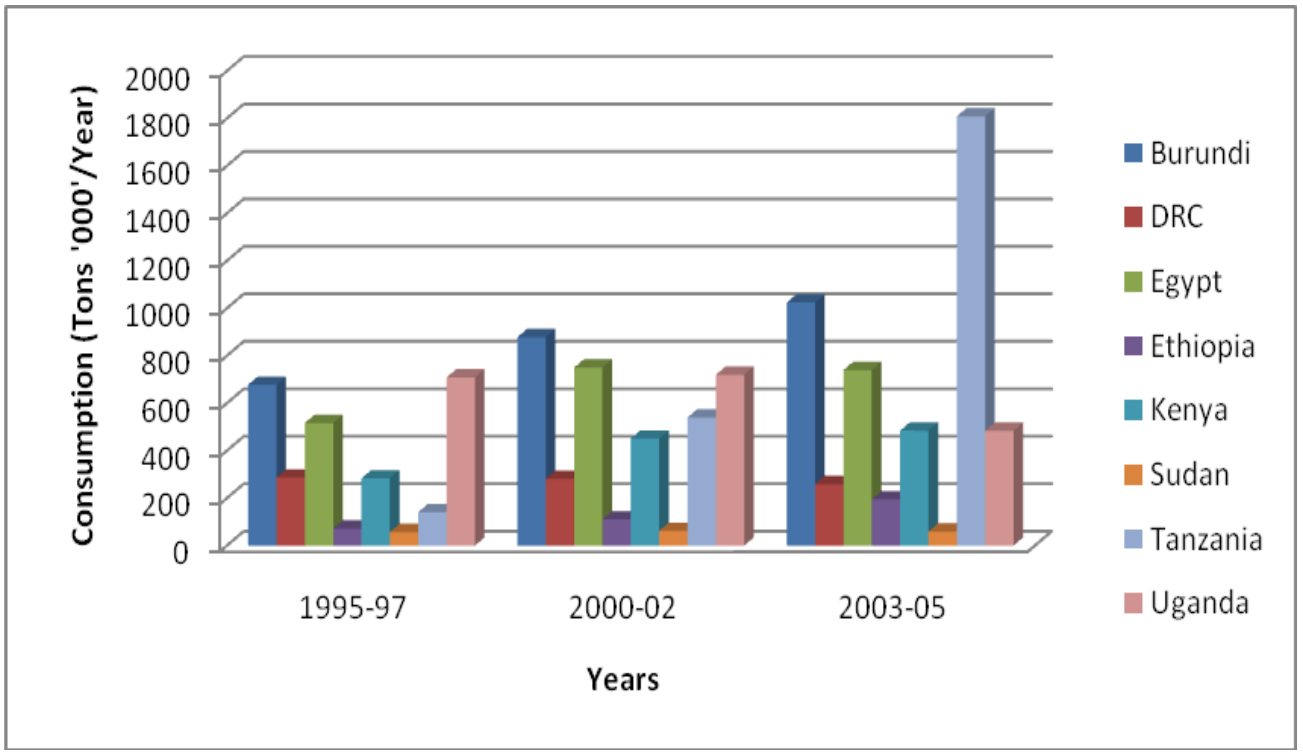


Figure 4.16: Bananas consumption in the region

Source: FAOSTAT (2012)

IRISH POTATO

Egypt is the largest consumer of potatoes in the region, followed by Rwanda and Kenya, respectively. The consumption of Irish potato had a close correlation with the production of the crop as these three countries are also the leading producers (Figure 4.17).

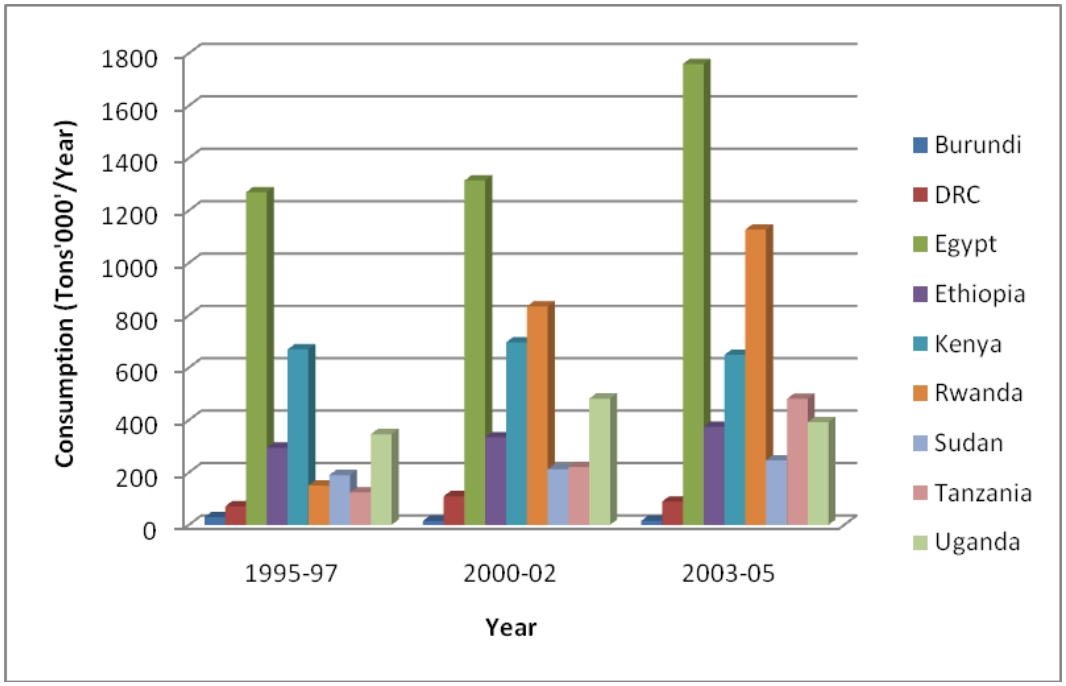


Figure 4.17: Irish potatoes consumption in the region
Source: FAOSTAT (2012)

PINEAPPLES

Kenya has been the leading consumer of pineapples in the region over the years. This is in line with its production of the crop; it is the largest producer of the crop in the region, followed by DRC and Sudan (Figure 4.18).

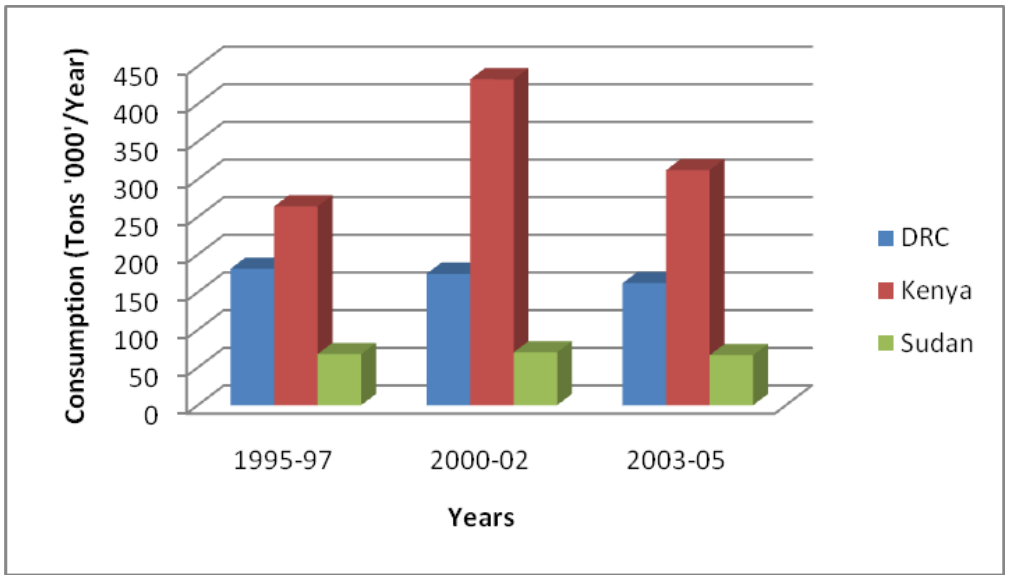


Figure 4.18: Pineapples consumption in the region
Source: FAOSTAT 2012

4.2.3 Live Livestock

BOVINE MEAT

Egypt is the largest consumer of bovine meat in the region. It is then followed by Ethiopia, Kenya and Sudan at almost equal measure. Consumption of bovine meat has increased generally in the countries over the years (Figure 4.19).

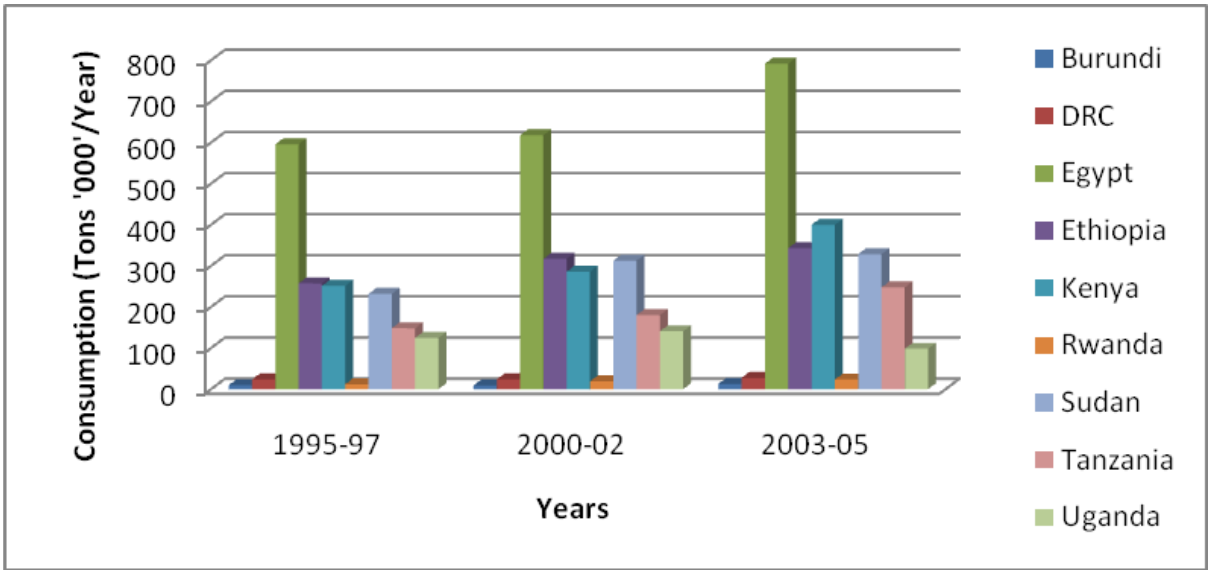


Figure 4.19: Bovine meat consumption in the region
Source: FAOSTAT (2012)

MUTTON AND CHEVRON

Sudan is the large consumer of mutton and chevron in the region and it is also the largest producer. Other large consumers are Egypt, Ethiopia and Kenya while, in comparison, the figures for Burundi were found to be insignificant. (Figure 4.20).

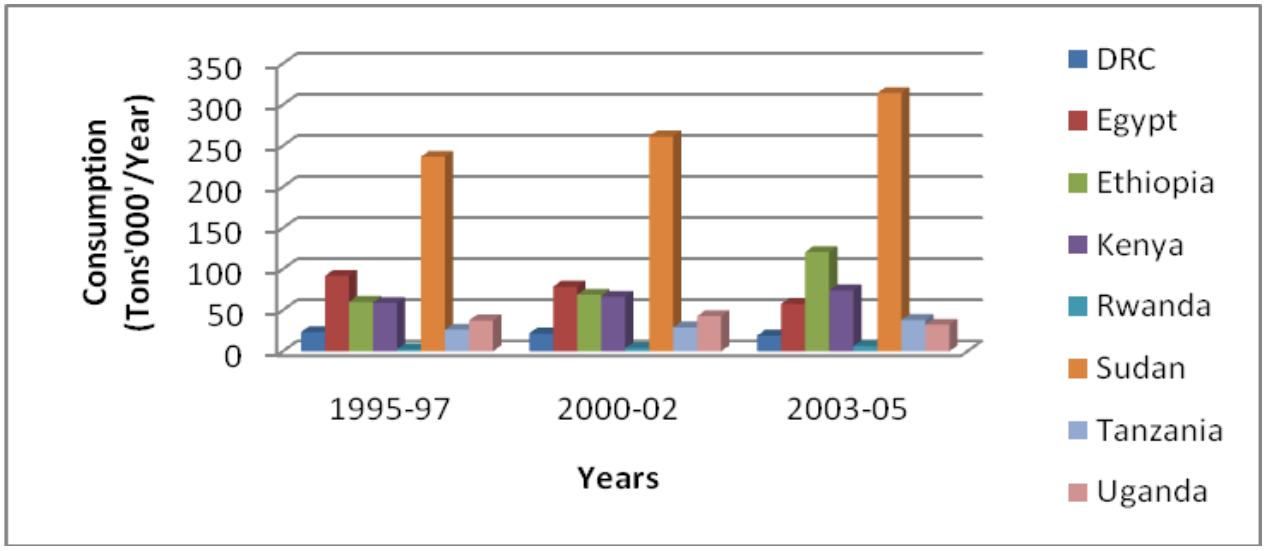


Figure 4.20: Mutton & chevron consumption in the region
Source: FAOSTAT (2012)

POULTRY MEAT

Egypt is the largest consumer of poultry meat in the region; consumption by the rest of the countries are insignificant (Figure 4.21).

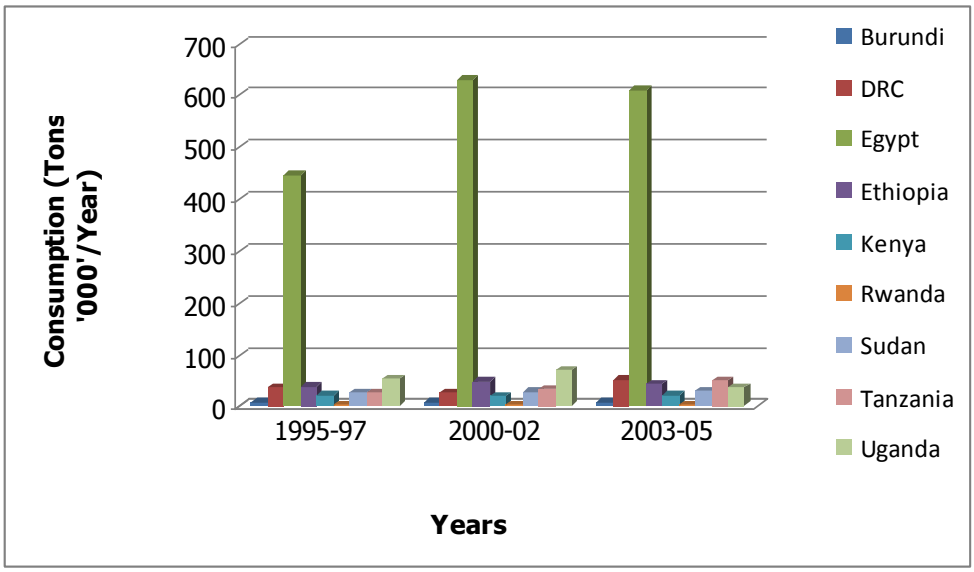


Figure 4.21: Poultry meat consumption in the region

Source: FAOSTAT (2012)

PIG MEAT

Uganda is the largest consumer of pig meat in the region. It is followed by DRC and Kenya. The rest of the countries have very minimal consumption of pig meat or no consumption at all. Lack of consumption in Sudan, Egypt and Ethiopia can be attributed to religious affiliation because most of people in these countries profess the Muslim faith (Figure 4.22).

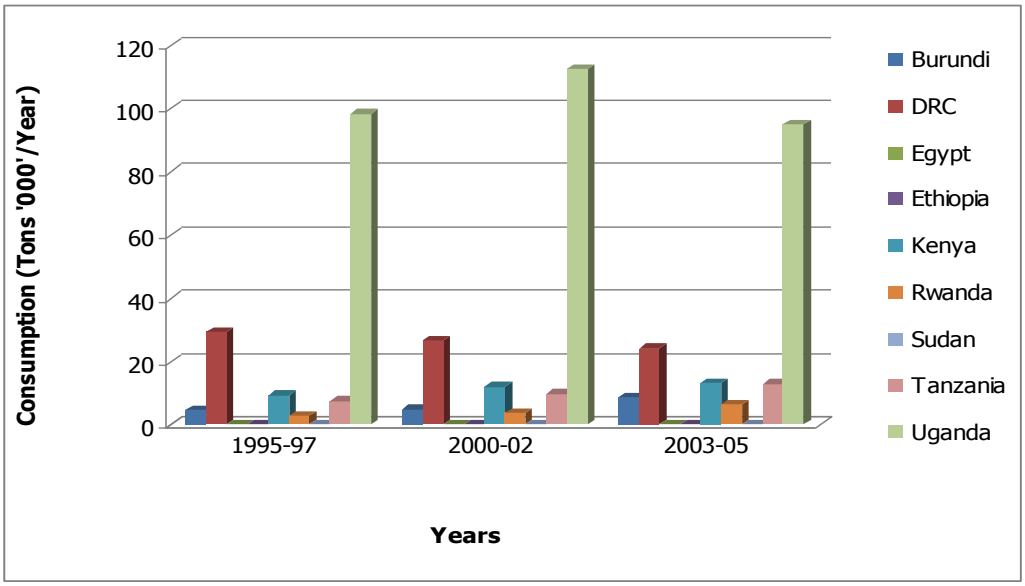


Figure 4.22: Pig meat consumption in the region

Source: FAOSTAT (2012)

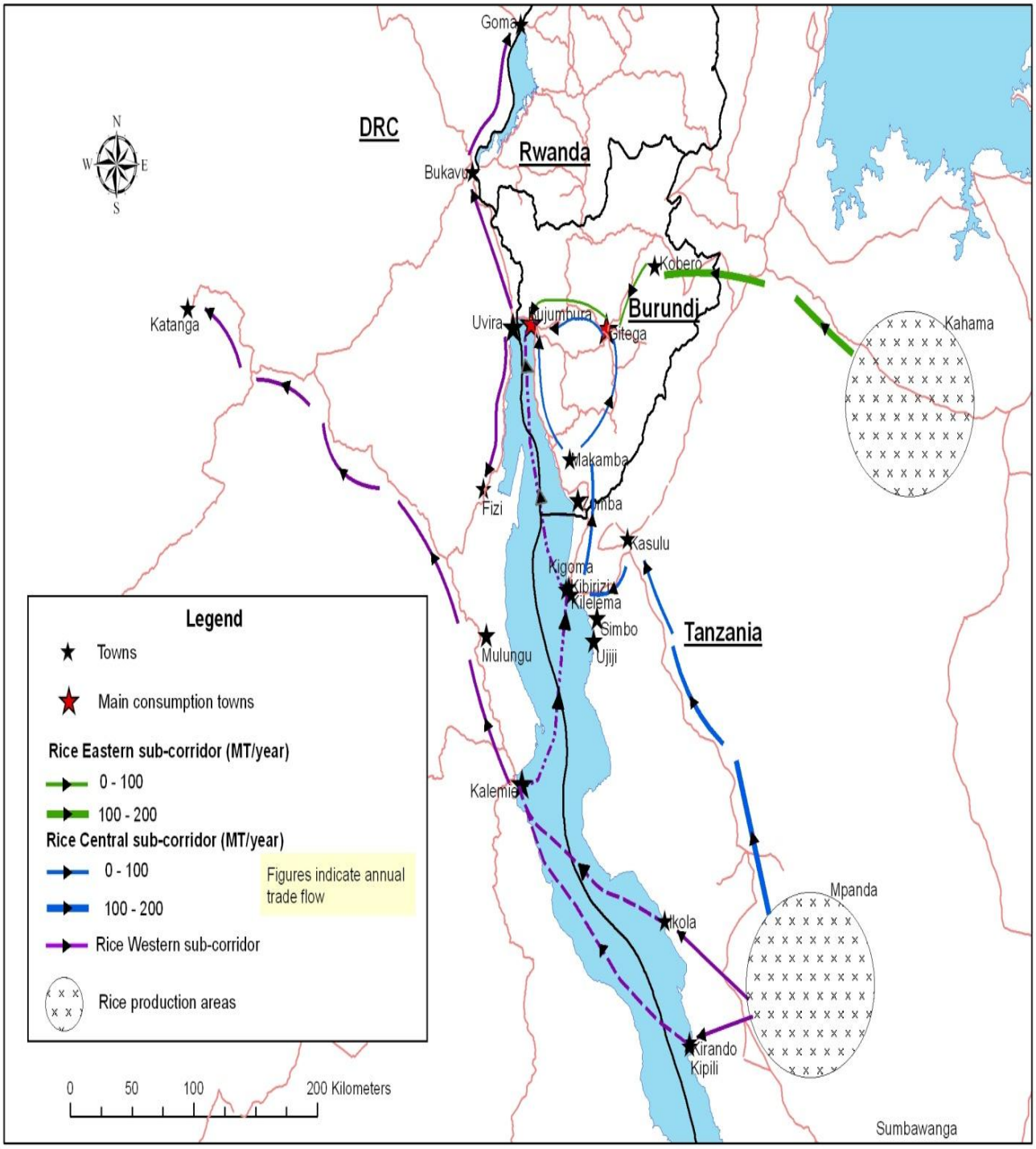
5.0 Corridor and Value Chain Analysis

This chapter provides the identification of production and market areas within the corridors and addresses the following specific issues: characterization of the corridors; assessment of implications of cross-border trade to employment and food security; constraints faced by traders; evaluation of gender and youth dimensions; and assessment of implications of trade to efficient water use. Others issues addressed include functionality of markets; trade methods used by small and large traders; cross-border trade opportunities and specific investment priorities along the corridors.

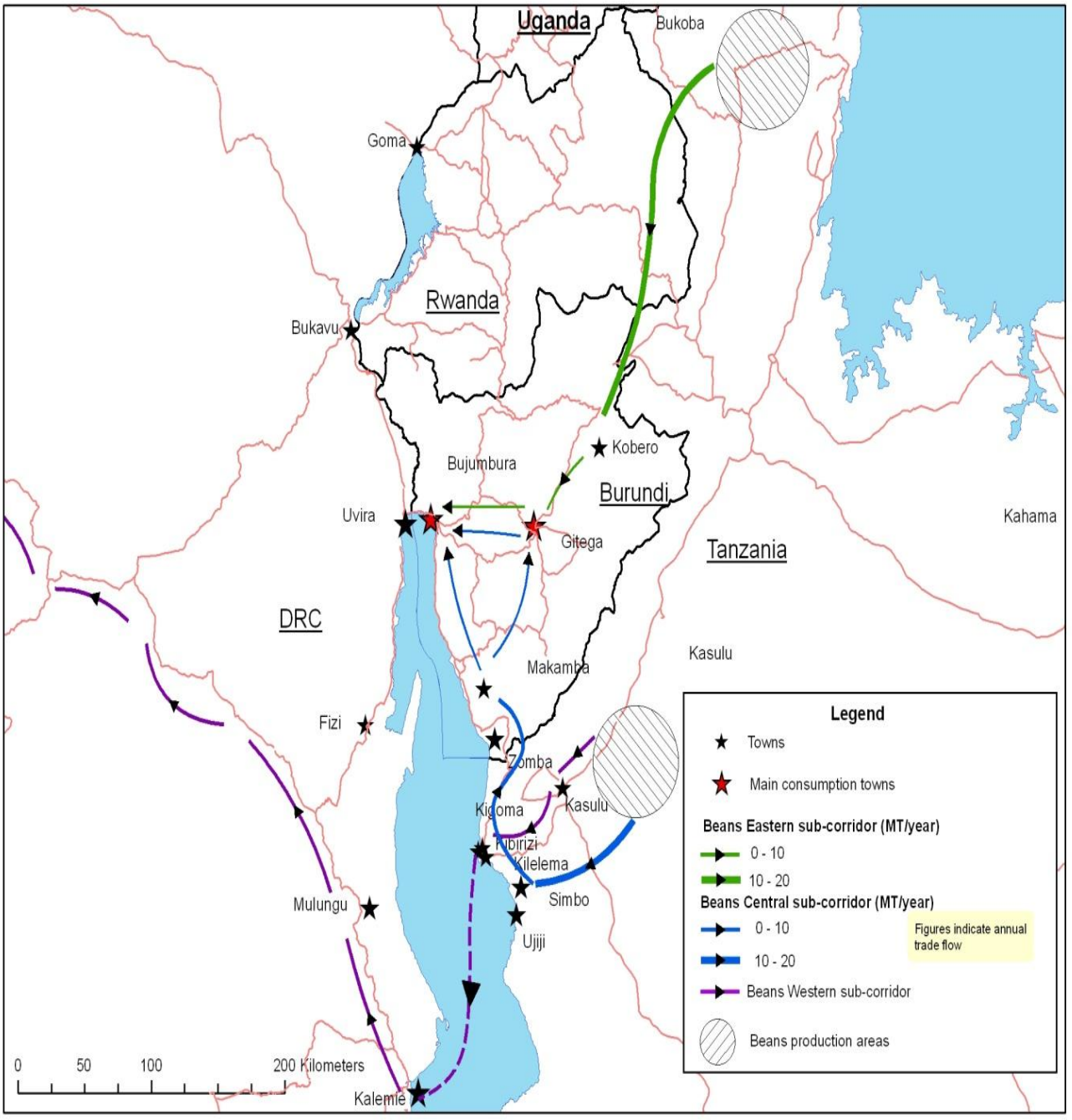
5.1 Western Corridor: Grains and Pulses

5.1.1 Production and trade flows

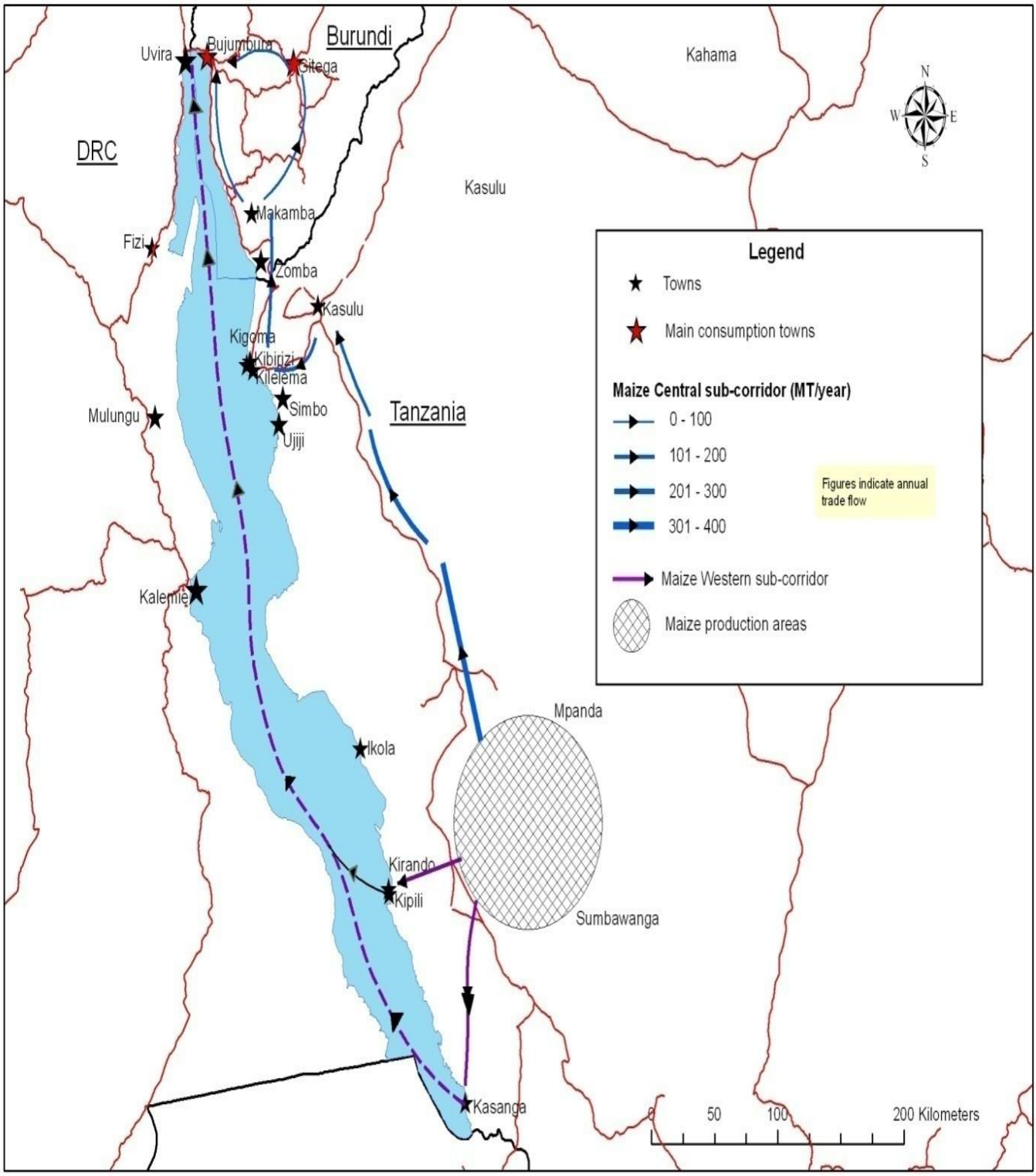
The western corridor is described with regard to the three traded commodities: rice, beans and maize. The corridor had three sub-components as shown in Maps 5.2 – 5.4. Rukwa and Kigoma regions were the main producers and suppliers of traded maize in the Western corridor while rice was supplied mainly by Rukwa region although seasonal production came from the Kigoma region. Beans are produced in almost all areas of Kigoma region particularly in the lowlands. However, the villages with highest concentration of production of beans in the Western Corridor are Nyakitoto, Mgombe, Kusesa, Lunwe Mpya, Muyama, Muhoro, Shunga and Mwali. Bean yield in the highlands averages one bag/acre while in the lowlands the average yield is 5-10 bags/acre (a bag is 120 kg).



Map 5.2: Rice production and consumption areas, and directions and magnitudes of flow in Western corridor



Map 5.3: Bean production and consumption areas, and directions and magnitudes of flow in Western corridor



Map 5.4: Western corridor: maize production and consumption areas, and directions and magnitudes of flow

5.1.2 Production and trade constraints

Most producers and traders in these three commodities face similar production and trade constraints highlighted below:

Low yields to sustain supply: Production is highly dependent on rainfall and the majority of the farmers do not use high yielding seed varieties and fertilizer thus leading to low yields. Although there is demand for the improved technologies, producers complained that their supply is usually low. With the exception of the Sukuma farming community, most of the farmers use hoe/jembe for land preparation and harrowing.

Poor road networks and port facilities: The three are commodities are mainly produced in Tanzania and in particular the southern and western regions of the country which normally realize surpluses that can be traded in Burundi, East DRC and northern parts of Zambia. However, the markets suffer from poor organization as well as underdeveloped roads and agro-processing infrastructure. The rural roads in these regions are poorly constructed murram roads that become impassable during rainy seasons. In addition, the ports in the corridor are in a poor state with no improvements aimed at speeding up trading activities. For example, Soko Maendeleo acts as a market, a landing area and a fishing port. However, like many other informal ports, it has no harbour thus forcing big boats to stop quite a long distance from the port and to use smaller boats to off-load goods. Loading of commodities and boarding is done manually thus leading to increased operational costs and damage of produce by water. Traders complained that the fees collected by the local government were not commensurate with the services provided. There were fears that the poor state of roads and market-related infrastructure in the region will not be able to support the increased business anticipated following actualization of the irrigation schemes.

Lack of storage and market infrastructure: Most of the cross-border markets lacked storage facilities for goods. In general, market infrastructure was either not available or was in relatively poor state. This was more evident particularly in East DRC markets. For example, Soko Maendelo in Uvira lacked storage facilities. Health and sanitary facilities such as wash rooms, clean drinking water and eating places for traders were inadequate and the ones available had dilapidated infrastructure and also lacked electricity (Photo 5.2).

Photo 5.2*: Poorly organized and overcrowded grain market*

High tax rates and poor harmonisation: The issue with taxes was not just their magnitude but also their lack of harmonisation across the borders. For instance, Burundi levied import duties mainly ad valorem, which included a revenue duty averaging 15–35 percent and an import duty averaging 2–5 percent of the value of the merchandize. The Tanzanian government also levied a four percent statistical tax on all imports. Since June 2011, the government of Burundi has been implementing Value Added Tax (VAT) which has increased prices of imported foods. Consequently, traders of cereals and pulses stated that they try to avoid Burundi and instead favor Kalemie and Uvira in East DRC.

G*overnment bans and lengthy procedures at the borders*: The sale of food grains is often disrupted by frequent government trade bans whenever harvests are threatened by drought. Tanzania has often applied this trade policy and invariably this leads to localised gluts and depressed prices. Trade bans interfere with free flow of cross-border trade of commodities and reduces the efficacy of regional integration as a basis for achieving food security. The practice creates unnecessary uncertainty among traders and also aggravates the bureaucracy surrounding the process of obtaining cross-border trade permits even after the bans have been lifted. There were too many regulating institutions operating under different legal and institutional frameworks along the entire corridor and particularly at the borders. The inspections were particularly cumbersome and costly. One of the factors contributing to the delays at the borders is the limited capacity of the regulatory institutions.

Differences in axle load limit requirements: There were differences in axle load requirements among the three countries. For instance, whereas in Rwanda the maximum limit was 7 tonnes per axle, it was 10 tonnes in DRC and 8 tonnes in Tanzania. This has in the process affected timely delivery of products to the destinations. Many traders opted to pay informal charges to avoid delays and inconveniences that arise from off-loading the goods from non-compliant vehicles.

Lack of standard units of measurement: The exchange activities along the corridor did not use a standard unit of measurement. The traders used a 'bakuli' (a tin) as their main instrument for measuring the quantity of cereals and pulses. This measure was very popular in Tanzania, Zambia

and Eastern DRC. The tin weighed about 1.5 kg although it was considered to weigh 1.0 kg. This created a lot of dissatisfaction among farmers and traders in the Western Corridor. There was also no uniform package for cereals and pulses. Bags that were commonly used did not contain a standard quantity: for example, a bag of beans weighed between 120kg and 150kg; a bag of maize weighed 108 kg while that of rice weighed between 140kg and 150kg. Effective standardization is basic to efficient and fair pricing; often, it is the farmer who is exploited by agents and traders.

Inadequate financial resources: Financial capital for small and medium traders was limited in the Western corridor. Most of the traders cited lack of credit and banking system especially for smaller operators. Micro-financial institutions were not readily accessible and the few commercial banks that were available charged exorbitant interest rates and were therefore out of reach of small traders. In East DRC, social capital was well developed and almost every interest group had an association. For example, there was an association for private boat owners, cereals and pulses traders, transporters with large lorries, transporters with small lorries and maize and rice millers.

Communication and information systems: Information and communication systems were also limited in the western corridor. For example, when a boat broke down or there was an attack by pirates, there was no control tower to relay communication. Also, there was no standby rescue boat. This situation was further aggravated by the problem of poor mobile phone connectivity in the region and high interconnection tariffs. Generally, there was lack of market information about prices and regional market opportunities and their respective quality requirements.

Corruption among public officials: Like in any other Nile Basin Country, corruption was a major constraint to the grain traders and transporters in Burundi and informal cross-border traders were feeling it and talking about it feely. In 2011, Burundi was ranked the most bribery prone country in East Africa. Corruption can be defined as “abuse of public power for private gain”. Official corruption takes a variety of forms, including “grand corruption” (mainly in large public procurement or investment projects) and “petty corruption”, i.e., small bribes to government employees to facilitate a service, issue permits, certifications, or licenses, etc. Informal cross-border trade in Burundi was prone to petty corruption and invariably, the police and customs officials propagated the practice. Traders had to pay a ‘soda’ and ‘maji kidogo’ to the police and customs officials to have their goods allowed for passage on the roads. At times they were being coerced to pay some money to avoid trumped up charges by the officers. In some cases, there were established bribery payments by the relatively large traders to secure a constant flow of their goods.

Corruption in informal cross-border trade is a complicated issue. It cannot be tackled successfully by prosecuting a few and small offenders, but must be addressed in the context of a comprehensive reform of the civil service and institutions including customs duties to make them equitable for cross-border traders. The practice of mounting numerous official and unofficial road-blocks along the corridor leads to costly delays that open up opportunities for corruption.

Lack of adequate security: Although markets in the DRC had adequate security apparatus, law enforcement was limited and traders at times experienced commodity losses due theft and/or harassment by armed militias.

5.1.3 The role of different stakeholders in enhancing trade

The governments are the major players in facilitating production and cross-border trade activities with the private sector playing a limited role. However, some farmer movements are emerging in Rukwa region with the help of international development partners. For example, MVIWATA farmer organization is currently promoting access to markets for small-scale farmers through the enhancement of rural markets managed by the main market stakeholders. At the moment, the

organization is implementing "Food Crops Wholesale Markets Development" in Rukwa and Mbeya Regions. The project is mainly funded by the European Commission and is aimed at improving market access for food crops and targets rice and maize from southern highlands regions. The overall objective is to secure sustainable access to locally produced food crops for urban and rural populations at less volatile producer prices.

Farmer groups or associations are working with development partners in various activities of agricultural development. Most of these projects are supported by NGOs, National Agricultural Research Systems (NARS) and micro-finance institutions (MFIs). The NGOs are involved in activities like credit provision, input sourcing, marketing advice, training to improve technologies about agri-business, market information. Examples of specific trade enhancing initiatives in the corridor are summarised below:

- The Tanzanian government has invested in the purchase of power tillers which are distributed at subsidized prices to self-help groups of farmers. Farmers raise financial capital for agricultural activities
- The Tanzanian Ports Authority (TPA) is making some investments in some of the informal ports to enhance trade. For example, Kagunga is a small border port between Tanzania and Burundi. The government of Tanzania is constructing a landing jet at the port town to enhance trade. Other towns where the government is constructing landing areas and go-downs around Lake Tanganyika are Kibirizi, Lagoza and Sumbweza in Kigoma region
- Private sector boat owners in Kigoma Municipality formed an association called "Umoja wa Wenye Maboti wa Kigoma" (UWAMAKI) in 1992. Most of the informal cross-border trade takes place between Rukwa region and East DRC, Burundi and Zambia by use of large boats of 40-60 tons. This organization champions the rights of small boat owners in the Region.
- Boat owners in Uvira – East DRC also have an association known as *Association Cooperative Des Armateurs Du Lac Tanganyika* (ASCOOAT) which champions the rights of their members. The DRC association and UWAMAKI in Kigoma have come together and formed "*Ziwa Tanganyika Muungano wa Wenye Maboti Association*" that also aims at addressing the piracy menace especially in Eastern Congo
- The government of Tanzania provides security at the inland border points between Tanzania and Burundi. At the informal border points of Kilelema and Nyamugali there are army camps which provide a 24 hour surveillance and security. It is however worth noting that this security is not specifically for the trading activities but as part of Tanzania's border policing given the nature of volatility of its border with Burundi.
- Despite limited government presence in Eastern DRC, the inhabitants are business oriented. Social capital is well developed and is oriented towards trade and business activities. All actors in the value chain have formed self help groups for supporting each other and for raising capital through merry-go-rounds. For example, there are three traders' association cereals and pulses depots in Uvira namely Kalimambenge Depot, Depot-2 and Depot Mulongwe. These traders' groups and associations face a number of challenges: poor access to credit; lack of public storage depots; inadequate electricity and water infrastructure; and poor marketing infrastructure
- The Association of Women Entrepreneurs of Burundi [Association des Femmes Entrepreneurs du Burundi (AFAB)] has the mission to promote women's entrepreneurship in Burundi especially in the area of SMEs. The Government of Burundi encourages women's associations so that their members could access credit from microfinance institutions
- Efforts are being made to develop small and medium enterprises, trade and services in terms of trader organizations and provision of credit markets through MFIs in Burundi. However, the systems are still at nascent stage and much more needs to be done by both the public and private sector. For example, the Government of Burundi supports this approach and is already working with women's associations which receive micro-credit through TWITEZIMBERE, a

project funded by the World Bank. Nevertheless, many obstacles hinder progress in SMEs development and trade: absence of a macro-economic policy and development strategies for responding to the needs of small and medium enterprises; lack of training in entrepreneurship; and lack of awareness of the need for savings and credit

- In Kasulu District in Tanzania, there is an association known as *Chakuwaka* belonging to big traders and businessmen. Every member pays Tshs 20,000 per week and has access to several services, including: power tillers for rent at relatively low rates; agricultural inputs; loans to finance business activities. *Chakuwaka* also extends its services such as loans to farmers provided they are able to afford the lending interest rates that are relatively high. It is the only organization in the production area that supports both production and trade for its members

5.1.4 Gender and youth dimensions along the corridor

In the western corridor, production and trade of rice, beans and maize is undertaken by both male and female persons although the majority are male. In DRC, the majority of cross-border traders are women who travel to Rukwa region in Tanzania to purchase the commodities. The majority of women traders in the East DRC are small-scale traders who depend on the modest profits generated from their trade to make ends meet. Most of them rely on agriculture and agricultural commodity trade of cereals and pulses for their livelihood. Women are key stakeholders in most of the consumption markets in the Western corridor. Young women constituted the largest proportion of informal traders in the corridor.

Though trade of agricultural commodities is still dominated by men in Burundi, women have shown the will to participate, especially through the Association of Women Entrepreneurs of Burundi [*Association des Femmes Entrepreneurs du Burundi* (AFAB)] already mentioned in an earlier section of this report.

5.1.5 Implications of informal cross-border trade on employment and food security

Informal cross-border trade of rice contributes to the economies of Tanzania and East DRC at all levels of the value chain. Rukwa region in Tanzania is the major supplier of the three commodities in the Western corridor particularly for East DRC and Burundi. The farmers in this zone produce grains for home consumption as well as for export hence cross-border trade creates employment and generates income for them. Other employment opportunities are highlighted below.

Processing and milling markets and employment: Most of the milling and processing markets of cross-border traded commodities are located at the shores of Lake Tanganyika in Sumbawanga and Mpanda Districts of Rukwa region. Large, medium and small-scale millers especially for rice are concentrated in Kirando and Ikola ports, respectively. This is because most of the harvested rice is transported from the hinterland for processing, milling and packaging. The milling business is largely dominated by small and medium sized enterprises with an installed capacity of up to twenty (20) tons per day during the harvesting period. Although most of the small millers concentrate in milling business, some of them also buy their own paddy, store, mill, brand and sell to their respective marketing channels. While the owner of the mill usually employs only 2-3 people who manage and maintain the mill, there are usually 6-7 other casual laborers/workers paid on commission who are present to help with the other aspects of the milling. During peak season, the number of casual workers can increase to 20 per mill. These include moving the paddy into the mill, taking the rice from the mill, filling the bags and loading the trucks.

Cross-border trade employment: Tanzanian traders purchase paddy at the farm-gate for milling, packaging and storage and is ultimately exported to Eastern DRC and Burundi. Traders from Eastern DRC also travel to Rukwa markets and purchase milled rice which they ship to Kalemie, Uvira and Bukavu markets. Thus, both small and large traders purchase commodities from farmers and trade

them in the informal cross-border markets. As a result, informal cross-border trade features prominently among Tanzanian farmers' and traders' strategies for self employment, poverty reduction and wealth creation because it avails markets for their commodities.

Wholesale and retail employment: Informal cross-border trade is generally an extension of informal trade between neighboring countries and is usually driven by high levels of unemployment and a shortage of essential goods across national borders. Hence it manages to fill the gaps left by an inadequate formal sector. Informal trade is the main source of job creation in the countries covered by the Western corridor and provides an opportunity for employment in the commodities' value chain at wholesale and retail levels locally. The informal cross-border trade between Tanzania and Burundi, Tanzania and East DRC, and Tanzania and Zambia involves both large traders and small scale traders.

Transportation/shipping employment: The transportation sector contributes immensely to the informal cross-border trade process. People with pickups, lorries of 5-7 tons, 8-14 tons, 20 tons and above find employment of their vehicles in this trade. The drivers and the loaders transport produce from farms to millers. Others transport the commodities from mills and stores and distribute them to the local markets or ports for transportation by boats. For instance, in Uvira-DRC, there are both large lorries and small lorries transportation associations. Products landing at Soko Maendeleo are distributed locally by use of lorries or trailers particularly to big towns like Bukavu. Shipping boats of 40-60 tons transport commodities from Kirando and Ikola in Southern part of Lake Tanganyika to Kalemie and Uvira in East DRC.

Youth employment: Informal cross-border trade creates employment for youths at the border markets especially at Ikola, Kirando and Uvira. At Soko Maendeleo in Uvira, for example, youths aged 10 to 25 years off-load rice commodities transported by big boats for transportation to the landing site using smaller boats. They then carry the bags to the open ground in the market for their clients.

Informal cross-border trade provides three types of opportunities: it provides markets for surplus farm produce, and income to the local producers; imports of rice provides food for households that are not able to produce sufficient amounts for themselves whether in the locality of the trade, in the major production markets such as Kirando and Ikola or in the cross-border towns such as Kalemie, Uvira and cities, e.g., Bujumbura; and, generally, cross-border trade serves to ensure food security within the corridor. The employment opportunities highlighted above have significant implications for household food security and regional price stabilization.

5.1.6 Seasonality of production

Most of the grains in the region are seasonal in nature due to dependence on rainfall. Table 5.12 shows seasonality of both Tanzanian rice and local Burundian rice purchase and sales prices at Soko Mjini consumption market in Bujumbura. Production seasons and supply of rice in Burundi and Tanzania are similar due to similarity of rainfall patterns: short rains come in October to December and the long rains in March to May. The Tanzanian rice fetches a higher price than the Burundian rice because of its relatively high quality. In the months of October to December, the supply of Tanzanian rice is depressed and prices (in Tanzania) rise during this period. As a result, most traders avoid Tanzanian rice and instead trade using local rice. Ultimately, due to low demand for Tanzanian rice during this period, its price remains depressed but is still higher than that of Burundi rice.

As in the case of rice, maize trade is also seasonal with the commodity being moved to areas of high demand from surplus production regions. The average yield of maize in Tanzania is 2.5 tons/ha and the major producing regions relevant to the Western corridor were Kigoma and Rukwa. The latter region lies further south of Tanzania but was found to be a year-round maize supplier to the corridor. When the season is normal, only 30 percent of maize from Rukwa comes to Kigoma. Due to lack of

storage facilities, most of the farmers sell their maize immediately after harvest hence the trade flows are closely linked to the rainfall patterns in the producing areas.

Table 5.12: Paddy seasonality, farm gate purchase price and sales price at Soko Maendeleo in Uvira (US$/kg)

		Burundian Rice		Tanzanian Rice	
Month	Production activities in Burundi & Rukwa region	Purchase price Large traders	Sales price of retailers	Purchase price- large traders	Sales price of retailers
October 2010	Land preparation	1.0	1.0	1.1	1.2
November	Land preparation	1.0	1.1	1.3	1.3
December	Planting	1.1	1.2	1.3	1.4
January	Fertilizer/chemicals	1.2	1.3	1.4	1.5
February	Weeding	1.3	1.3	1.4	1.5
March	Fertilizer/chemicals	1.3	1.3	1.4	1.5
April	Harvesting	0.8	0.8	1.3	1.4
May	Harvesting/storage	0.8	0.8	1.2	1.2
June	Marketing/Storage	0.7	0.8	1.1	1.1
July	Marketing	0.7	0.8	1.0	1.1
August	Marketing	0.7	0.8	1.0	1.0
September 2011	Low stocks	0.8	0.9	1.0	1.0

***Source**:* Constructed by the author in consultation with a group of traders in Bujumbura (2011)

Table 5.13 shows the seasonality and farm gate prices (Tshs/bag) of maize in Sumbawanga, Mpanda and Kasulu Districts.

Table 5.13: Seasonality and Farm Gate Prices of Maize in Mpanda and Kasulu District

Month	Farming Activities	Farm Gate Price for a bag of 110 kg		
		Sumawanga	Mpanda	Kasulu
November 2010	Planting	21.9	26.3	24.4
December 2010	Planting/weeding	25.0	26.9	24.4
January	Weeding	25.0	28.1	24.4
February	Harvest/planting	25.0	28.1	24.4
March	Maturity	25.0	28.1	24.4
April	Weeding	21.9	12.5	15.0
May	Harvesting	11.3	12.5	16.9
June	Harvesting	12.5	15.0	16.9
July	Storage/market	15.6	21.9	20.6
August	Storage/market	16.9	16.9	20.6
September	Storage/market	17.5	18.8	25.0
October 2011	Land preparation	18.1	18.8	26.3

***Source**:* Farm interviews with suppliers, October 2011.

The October 2010-December 2011 and March-May rains of the last one year have been poor with low production being experienced in both seasons. As a result, farm gate prices of maize have been abnormally high due low supply. The cause for price volatility is seasonality of production in the year. During periods of relative scarcity in December to February prices are relatively high. They then drop drastically in March after maize harvest to as low as US$ 1.1 per kg in Sumbawanga District. The

system of production is rain-fed hence rainfall amounts and reliability determine the quantities supplied, price levels and annual movements.

5.1.7 Use of water in western grains and pulses corridor

Most of the beans traded in the Western Corridor are mainly produced in Lake Tanganyika basin in Tanzania[11]. The land surface of the basin on the Tanzanian side measures 151,000 km^2 and contributes about 60 percent of the total runoff to Lake Tanganyika. One of the areas in which water could be used efficiently to enhance production and trade of beans in the Western Corridor is irrigation.

Efficient water use through irrigation: The potential for irrigation to produce grains in the lake basin is enormous but it remains untapped. There are plenty of water and lowland-wetland natural resources which can be used for irrigation purposes in the basin to expand the production of beans in the Western corridor. Currently there are only four irrigation schemes mostly for rice. Beans are also produced but in small quantities. Table 5.14 shows the characteristics of these schemes.

Table 5.14: Irrigation Schemes in Lake Tanganyika Basin in Tanzania

Name of scheme	Location	Acreage (Ha	Main crop produced	Minor crop produced	Observations
Titye	Lowlands. Ruchugi River	500	Rice	Beans	Operational
Lungwe Mpya	Lowlands. Ruchigi River	115	Rice	Beans	Operational
Msambara	Lowlands, Ruchigi River	90	Rice	-	Construction is complete
Kabanga	Lowlands. Ruchigi River	400	Rice	-	Under plan

***Source**:* Authors' construction in consultation with Government Office, Kasulu, September 2011

The production zone of the Western corridor has a high potential for irrigation that remains unexploited. Out of 312,000 hectares of irrigable land, only less than 1200 hectares have been irrigated. A wide range of water sources for abstraction of irrigation water (including rivers, reservoirs provided by storage dams) can be promoted. Where appropriate, exploitation of non-conventional sources of energy such as wind power and solar energy can be harnessed to pump irrigation water.

There are enormous opportunities for the development partners and the private sector to actively participate in promoting irrigation, either as service providers or as commercial farmers. Service providers have opportunities to supply equipment and devices for water lifting such as water pumps, windmills, solar power units; equipment and devices for irrigation water conveyance and application including water pipes, drip units and sprinkler systems. Investors have a big opportunity in manufacturing locally the above mentioned equipment and to invest in commercial irrigated agriculture as medium or large scale farmers. The private sector through the public private sector partnership arrangement can also get involved in providing support services and direct investment.

Efficient water use through transportation, port and shipping infrastructure investment: Road infrastructure around Lake Tanganyika is relatively poor. The only partly tarmacked road is the one connecting Kigoma and Bujumbura. The rest of the roads are seasonal, connecting relatively long distances between townships on the Lake. Ultimately, road transport is expensive and costly to commodity actors. This has resulted in water transport in Lake Tanganyika playing a major role in both formal and informal trade. Bujumbura, Kigoma and Mpulungu serve as shipping centers for

[11] The total catchment of Lake Tanganyika basin as a whole is 239.000 km^2 and the area of the lake is 32,000 km^2.

commercial trade between the countries in the lake basin. Shipping lines connect Kigoma (Tanzania), Kalemie and Uvira (East DRC), Bujumbura (Burundi) and other coastal towns as an essential part of inland traffic and trade system in the Western Corridor. Townships on the lake shore such as Ikola and Kirando (Tanzania), Moba and Ubwari Island (East DRC); and Gitaza and Rumonge (Burundi) serve as the main informal trade centers around Lake Tanganyika. Currently, most of these informal ports are used almost in their natural state.

Bujumbura, Uvira and Kigoma are the largest official ports where the respective governments have invested in order to facilitate trade and transportation. Even in some of the well established townships like Kigoma, informal ports such as Kibirizi still have no landing area. However, to enhance efficiency of water transportation and trade, there is need to undertake comprehensive investments on the ports handling informal trade. For example, Tanzania has more than ten (10) informal trade ports where the government is planning to undertake some construction and improvement work.

Rehabilitation of water transport: The African Development Bank (AfDB) is in the process of rehabilitating the Mpulungu port at a cost of over US$600 million to enhance cross-border trade between Zambia and the Nile Basin countries. The project is intended to cover expansion and development construction works for both Mpulungu port in Zambia and Bujumbura in Burundi. The long term plan of the project will involve the construction of a road and railway connecting Mpulungu and Bujumbura. Once it is completed, the road and railway will enhance regional integration and trade. However, there is need to augment the efforts of AfDB as well as tackling new challenges around the lake particularly between Moba, Kalemie and Uvira in Eastern DRC and on the Tanzanian side. These cross-border trade ports lack landing jetties and go-downs for temporary storage of goods, and most of the times loading commodities and boarding is done manually inside the water.

Water infrastructure and distribution to households and markets: The main types of water schemes in the Western corridor include lakes, dams, springs, pumping schemes (diesel, solar, windmill, hand pumps, etc.), gravity schemes, wells (shallow, medium, deep), and rain water harvesting system. Although the Western corridor is endowed with all these sources of water within the Lake Tanganyika basin, rural production areas, production markets, consumption markets, formal and informal cross-border markets, townships and cities lack clean water for domestic use, agricultural production and sanitation.

Efficient distribution of water use in agricultural households, markets, towns and cities in the western corridor would enhance agricultural production and trade for cereals and pulses. The incidence of water-borne diseases is high because people use contaminated water or have little water for daily use. Access to safe water is less than equitable: consumption varies from a low average of 15 liters to over 45 liters per capita per day. Some communities in the rural production areas walk long distances (sometimes for over 10 km) to fetch water. This takes considerable time, energy and over burdens women. This takes considerable time, energy and over burdens women. If adequate water were sufficiently distributed and supplied to the households, it could be used in production and trade activities.

5.1.8 Estimates of marketing costs

STORAGE ACTIVITIES

Storage infrastructure and post-harvest losses

The most popular on-farm forms of maize storage are improved structures (about 46 percent of all the respondents) and rooms in residential houses. Retailers and wholesale traders store predominantly in open holding grounds (42 percent and 71 percent, respectively), suggesting that there are no permanent storage facilities at these levels. However, processors appeared to be using improved

storage structures, because their operations were generally larger compared to those of farmer/traders and retailers and hence risk of storage losses are relatively larger.

The highest storage related post-harvest losses were registered for maize, or about 11 percent of total maize production at the farm level compared to losses for beans that were estimated at only about 5 percent (of total beans produced). In value terms, however, losses for beans (whose unit prices are higher than for maize) were higher at about US$ 44 per tonne compared to US$ 22 per tonne for maize. While these on-farm losses, in the case of maize, were approximately only 5 percent of the value of one ton, the figure may be much higher cumulatively along the value chain hence calling for interventions to minimize such losses. Post-harvest losses for rice are relatively minimal partly due to the fact that the majority of the market actors (over 60 percent) did not store rice. About 29 percent of the producers stored rice in their residential houses while about 40 percent of the manufactures and 20 percent of retailers, the only two groups of actors regularly using formal storage, relied on improved structures that appeared to be relatively effective minimizing losses.

The majority of the market actors did not seem to know precisely the factors that cause damage to their produce, apart from an indication by about 10-15 percent of the respondents that the damage arises from pest infestation during storage. This lack of knowledge about the cause of damage is also interesting and may suggest a need for extension education at the farm level considering that the value of the losses, especially for beans, is quite significant.

Capital Costs

Storage of grains at the market centers and in improved stores is generally more expensive compared to in-house and storage in traditional structures as Table 5.15 shows. Rice storage in improved stores and at holding grounds is much more costly except when compared to storing maize at the market centers which costs about US$ 92 per ton per year.

Table 5.15: Grain storage operating costs (US$ per ton of store capacity per year)

Store Type	Maize	Beans	Rice
Improved	24.12	12.90	68.60
Traditional	2.48	4.70	4.04
Room in the house	13.82	4.94	0.72
Holding ground	5.75	23.52	56.18
Market store	91.94	41.30	16.71

Table 5.16 shows that storage structures in market centers fetch higher premiums due to their scarcity value compared for example to traditional stores and improved structures whose available capacities are much higher. Storing maize in the house is particularly expensive since most of the traders use rented houses hence the high cost of allocating space for storage.

Table 5.16: Capacities of different types of grain stores (tons)

Store Type	Maize	Beans	Rice
Improved	123.0	95.0	16.8
Traditional	200.0	262.0	576.0
Room in the house	12.0	12.0	3.6
Holding ground	12.0	6.0	7.0
Market store	1.0	1.5	8.4

Organization: management and ownership of storage infrastructure

Most of the storage infrastructure was self-owned and managed by men; women managed less than one quarter of the stores with more inequalities showing in case of beans. There was some degree of use of group-owned stores and use of government-owned stores in the case of rice but even here, the most popular strategy was self ownership and management (Table 5.17).

Table 5.17: Rice store types and ownership

	Ownership				
Type of store	**Self**	**Group**	**Rented**	**Government**	**Other**
Improved	5	9	1	1	3
Traditional	1	0	0	0	0
Room in the house	24	0	0	0	0
Holding ground	0	5	0	5	3
Market store	0	1	1	0	0
Other	1	9	4	0	1
Total	**31**	**24**	**6**	**6**	**7**

Analysis of operational costs by marketing channel

Post-harvest losses are generally higher along the informal marketing channels for all the grains largely due to the number of stages goods pass through and lack of proper transportation and storage (Table 5.18)[12].

Table 5.18: Post-harvest loses and value for formal and informal market actors

Crop	**Marketing channel**	**Post-harvest loss (percent of farm level maize production)**	**Value of post-harvest losses (US$/ton)**
Maize	Formal	1.3	3.22
	Informal	15.8	33.97
Beans	Formal	0.2	11.78
	Informal	7.0	60.36
Rice	Formal	0.1	0.72
	Informal	0.2	1.12

As shown in Table 5.19, informal channel operators do not store their goods in holding grounds and in market stores largely due to their high operational costs especially for maize thus making it difficult to make realistic comparisons.

Table 5.19: Stores operating costs for Maize, Beans and Rice in formal and informal channels (US$/ton/year)

Store Type	MAIZE		BEANS		RICE	
	Formal	Informal	Formal	Informal	Formal	Informal
Improved	32.57	7.22	15.82	3.55	73.495	0.11
Traditional	--	2.48	--	4.70	--	4.04
Room in the house	5.75	19.90	0.50	6.84	1.18	0.70
Holding ground	5.75	--	23.52	--	56.18	--
Market store	91.94	--	41.30	--	16.72	--

-- denotes “mode of storage not used”

[12] These post-harvest losses account for all marketing costs as opposed to storage related costs that were discussed at the beginning of this sub-section.

TRANSPORT INFRASTRUCTURE COSTS

Prevalent modes of transport and their costs

The prevalent modes of transport for maize by producers were small and big trucks, which also was the case for beans. However, traders and retailers prefer to use human transport for beans. Use of small trucks and bicycles was common in rice transportation by producers while traders and retailers preferred human transport. The cost of transporting rice on bicycles was the highest, averaging US$ 8 per ton/km compared to use of small trucks (US$ 0.5 per ton/km). But it was found that the small trucks charged much more to transport maize (about US$ 3 per ton/km).

Traders using hired transport along the formal channels pay about US$ 32 per ton/trip for beans and rice but much less for transporting maize (US$ 13 per ton/trip). In the informal channels transporting rice costs about US$ 5 per ton/trip and only about US$ 1.0 per ton/trip for maize and beans.

The highest variable cost during maize transportation that owners or operators of big trucks incurred was the weigh bridge fee (89 USD) followed by costs of other services (22 USD) and parking fee (17 USD). These costs are however not comparable with those of owners of small trucks since traders operated in different routes and distances (Table 5.20). Similarly the disaggregated operating costs of transport in different channels are not comparable due to missing data (Table 5.21).

Table 5.20: Disaggregated operating costs for transport owners/operators using big and small trucks per trip (US$)

Type of cost	Owner/operator using big truck	Owner/operator using small truck
Fuel	0.01	0.29
Loading	4.24	5.26
Customs	0.01	0.70
Parking	16.52	0.41
Security	-	8.26
Other services	22.32	-
Opportunity cost of time	7.03	-
Other costs	39.37	-
Facilitation fee	3.36	3.52
Weigh bridge fee	88.91	-

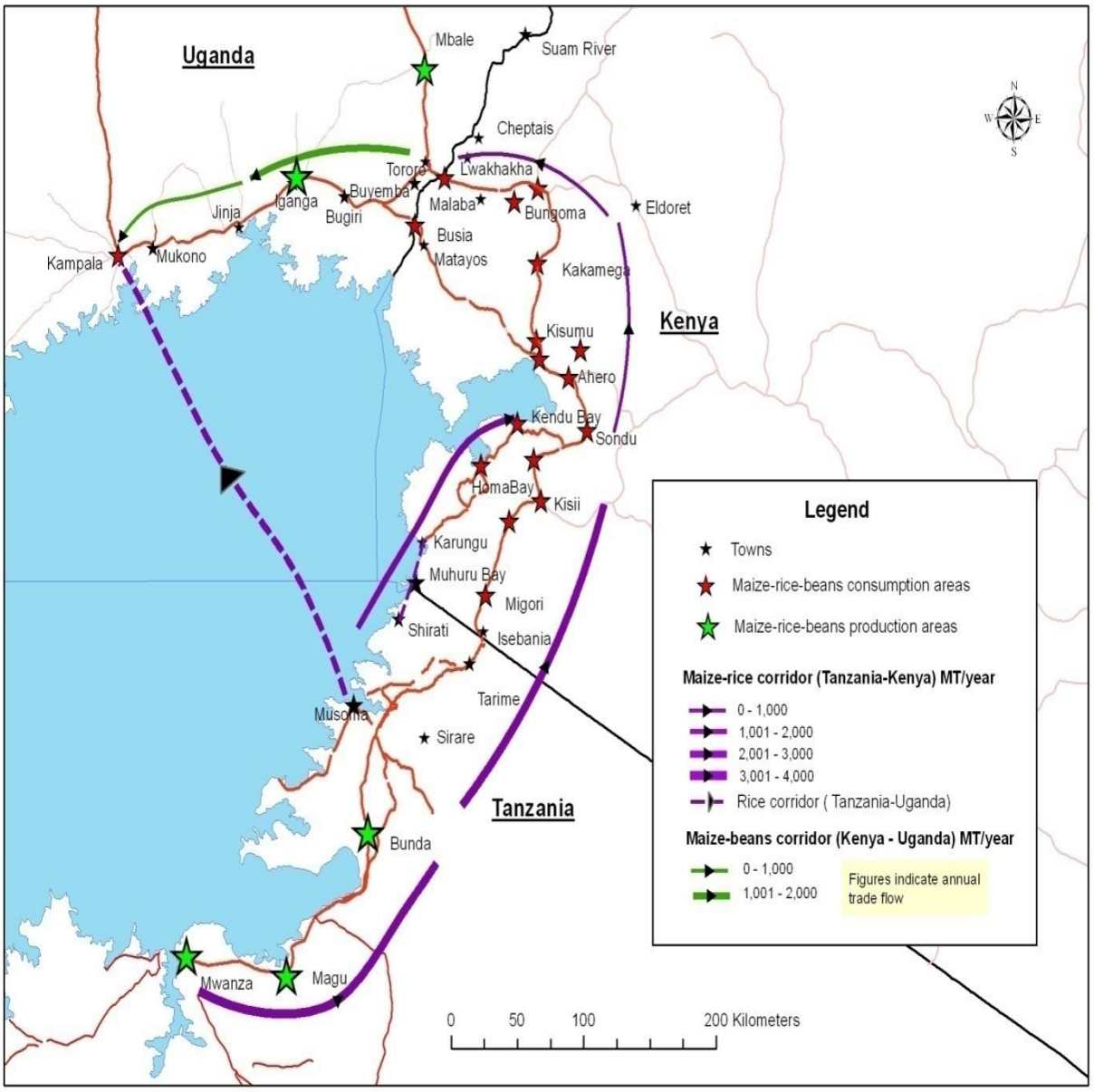
Table 5.21: Disaggregated operating costs for transport using trucks in different channels (US$/ton/km)

Type of cost	Owner/operator of small truck along formal channels	Traders using small hired trucks along formal channels	Traders using hired large trucks along informal channels
Fuel	-	0.29	
Loading	3.20	4.69	5.99
customs	--	--	0.70
Parking	0.41	0.41	--
Security	--	8.26	--
Other services	28.12	--	--
Facilitation	1.41	--	3.52
Other costs	39.37	--	--
Weigh bridge fee	--	--	--

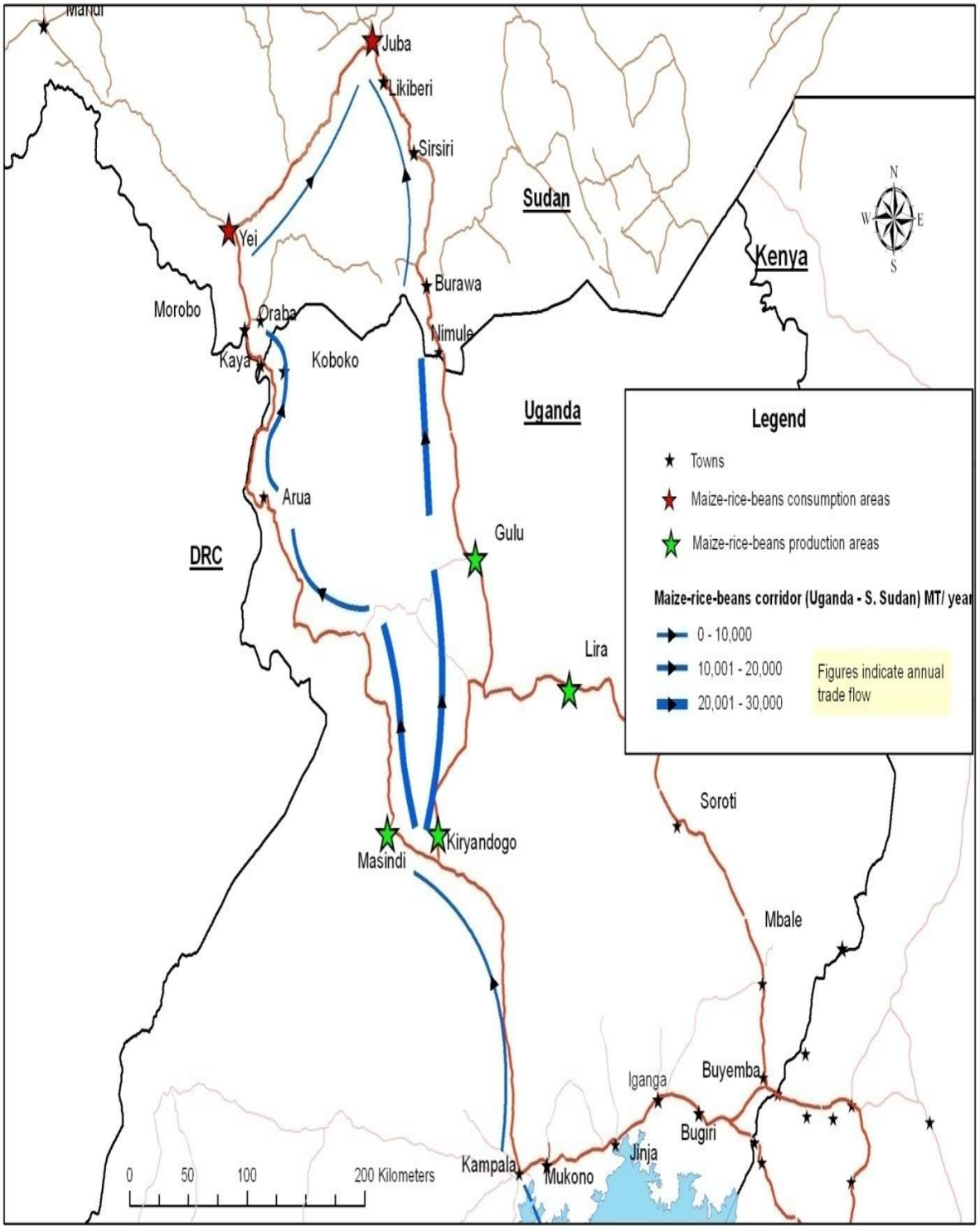
5.2. North-East Corridor: Grains and Pulses

5.2.1 Production and trade flows

The North-East trade corridor for grains and pulses begins in the Shinyanga, Mwanza and Mara regions of Northern Tanzania. The corridor covers 3 main borders: Northern Tanzania/Kenya; Kenya/Uganda; and Uganda/South Sudan. Maps 5.5 and 5.6 show the main production areas and how the commodities flow along the corridors.



Map 5.5: North East corridor: maize, rice and beans production and consumption areas, directions and magnitudes of flow (southern portion)



Map 5.6: North East corridor: maize, rice and beans production and consumption areas, and directions and magnitudes of flow (northern portion)

5.2.2 Production and trade within the rice sub-corridor – Tanzania/Kenya segment

The major production areas are Magu and Bunda Districts in Tanzania. Farmers prefer producing rice to other crops because it is more suited to the weather patterns in these districts. The region receives ample water during the long rainy season and the land is relatively flat and the soils are fertile with a high water holding capacity. There are six (6) irrigation schemes (Table 5.22) which are expected to

boost paddy rice production in Bunda District (in Mara region). The farm gate prices were usually US$ 0.4 per kg at the beginning of the harvesting season and increased as rice became scarce during the off-season period up to US$ 0.6 per kg for unprocessed rice. For processed rice the prices were usually US$ 0.8 per kg at the beginning of the harvesting season and increased to US$ 1.0 per kg during the off-season period.

There is no uniform trading method adopted by farmers in the production region. Some farmers sell the unprocessed rice at the farm gate, others sell at the processing point to traders (both wholesalers and retailers) while other farmers are traders. The probability and the extent to which a producer adopts any of the mentioned trading methods depends on the level of production, the nature of the roads, the mode of transportation available and costs per bag, availability of capital as well as the liquidity status and the distance from the farm/homestead to the processing point or to the immediate market among other factors. The majority of the small-scale producers sold their unprocessed rice at the farm gate to avoid the transaction costs associated with the commodity beyond the farm while the majority of the large-scale farmers sold the processed rice to traders at the processing point.

Table 5.22: Irrigation schemes producing rice in the corridor

Irrigation Scheme	Description and crop irrigated	Area covered (ha)	Water Source
Mariwanda Irrigation Scheme	It was started in 2010 and is targeting to cover over 200 paddy producers. It is expected to start in January 2012.	220	Dam
Kisangwa Irrigation Scheme	It is still under construction. It is meant to irrigate paddy rice	124	Dam
Serengeti Irrigation Scheme	It is meant to irrigate paddy rice	20	Lake Victoria
Namuhula irrigation scheme	It is meant for paddy and horticultural crop production.	40	Dam
Kasunguti Irrigation Scheme	It is expected to irrigate paddy rice production.	210	Lake Victoria
Bwanza irrigation scheme	This scheme is meant for paddy rice production	110	Lake Victoria
Nyatuari Irrigation Scheme	This scheme is meant to irrigate paddy rice prod	120	Lake Victoria

***Source**:* Authors Compilation from the survey, 2011

The common modes of transport were bicycles, motor cycles, pick-up trucks, tractors and lorries. However, some farmers especially those who belonged to a farmer group, pooled their unprocessed rice together in order to minimize cost of transportation to the processing point. Before selling the rice, such a group of farmers usually rents a store for an average period of three months as they wait for better prices.

From Production to local markets

The immediate markets include Magu and Bunda towns which allow sections dedicated for rice traders. The markets consist of both wholesale and retail traders. The majority of the retail traders are found within the municipal markets where the space per trader is limited to store volumes of rice while the wholesalers are found outside the municipal markets due to the large storage capacity they require. The wholesalers obtain rice directly from processors within the same market. Most traders transact on cash basis to avoid trade conflicts such as default or delayed payments. However, a few

traders have developed trust amongst them and occasionally transact on credit basis depending on the demand for rice and prevailing financial constraints.

On average, most rice wholesalers sold the rice packaged in 100 kg gunny bags although a few traders exceed this weight to either 110 kg or 120 kg gunny bags while others packaged to as low as 90 kg gunny bag. All retailers sold their rice to consumers in small quantities (usually less than 5 kg) and this was carried in polythene bags. The mode of transportation varied across traders depending on the number of bags a trader is purchasing. These included human transport, bicycles, motorcycle, tri-cycle, pick-up (one tonne), tractor, canter (local term for 3 tonne truck) , lorry and big tracks of varying tonnage.

The price of rice varied across the year depending on demand and supply forces. However, at each point in time the prices were almost equal from one trader to the other. During the harvesting season in June, the prices went as low as Tsh 720 per kg and increased to Tsh 2000 per kg during the off-season period. The prices also changed annually due to the quantity of rice harvested which is highly dependent of the amount of rainfall received. Producers who are financially constrained sell their rice immediately after harvesting whereas those with large storage capacities wait and sell in the off-season period when the prices are high.

From Tanzania to Kenya: much faster through informal channels

The commodity crosses the border at Sirari/Isebania point. Most of the rice crosses the border formally through the customs records while some went through the border informally through panya (informal) routes such as Solo Set next to the Masafa primary school, Kipimo, Supersonic and Nyametaburo. Traders transported their rice through *panya* routes in order to avoid delays and the high costs involved in clearing the goods formerly at the Customs.

There are established middlemen (brokers) who specialize in coordinating motorbikes to ferry rice through the '*panya*' routes. The brokers minimize the cost of passage of goods at Customs area by mobilizing bicycles and motorbikes whose charges are relatively low. For example, a trailer load of rice carries approximately 300 bags and to clear it the total charge is about Ksh 24,850. Passing the same quantity using bicycles/motor bikes costs approximately Ksh 12,000. Formally, it takes roughly 1 to 2 days to clear a truckload depending on the number of trailers queuing, whereas informally it would take thirty minutes to one hour to pass through the border the equivalent of a 27 ton truck.

The mode of transport across the border both formally and informally was by use of bicycles, motorcycle and trucks of varying tonnage. In addition to these modes of transport, other informal modes were employed including human transport, one ton pick-up trucks, tractor and animal transport (donkeys), the latter being used before 9.00 am, possibly because the animals are used for other farm activities or because during the day other faster modes of transport become more easily available. All informal transporters of rice who use bicycles, motorcycles and vehicles are adult males and young males while most transporters who use animal transport are adult females. Young females hardly participate in trade across this particular border, perhaps due to the risks involved.

The major consumption markets for rice are in Kenya

Migori, Homa Bay, Kisii, Kisumu, Eldoret, Kakamega, Webuye, Kiminini, and Kitale were the main destinations for rice from Tanzania. The retailers in these markets either travel to the border or they organize with the brokers on how rice will be transported up to their premises. Due to financial constraints, retail traders buy (usually on a cash basis) only a few bags of rice that can last for a period of one to two weeks. The price of rice (for the popular packages of 90kg or 100kg bags) varied by season and also increased as the commodity moved far away from the border due increased transaction costs such as transportation, loading and off-loading. The direction of trade flow was

mainly from the Tanzania border to the Kenyan towns mentioned above. However, these markets also received rice from other sources including Pakistan and Mwea and Ahero in Kenya.

Production and trade challenges for rice

Producers cited constraints relating to over-reliance on rainfall that impacts adversely on yields and makes it difficult to schedule supply according to market demand changes. Other challenges mentioned were: High energy costs; poor dam construction; lack of land tenure security (most of the land in the rice producing areas of Tanzania is communally owned); and, high cost of farm inputs (including irrigation equipment, fertilizer, certified seeds and farm credit).

Rice producers and traders also suffer from poor road networks and lack of storage infrastructure all of which lead to that lead to high post-harvest losses and transport costs that in turn make them uncompetitive compared to imported rice. Photo 5.3 shows how rice is stored and handled at local markets along the corridor.

Trade constraints at the immediate and border markets include:

- Information asymmetry works against small informal traders
- High transportation costs due to the high fuel prices
- Low capital to run the businesses
- Low storage capacity and poor storage facilities (Photo 5.3)
- High charges at the municipal authority markets
- Harassment of informal traders by policemen especially when traders refuse to bribe them
- High level of insecurity at night especially on the 'panya' route roads

Photo 5.3: Lack of storage facilities in grain markets

5.2.3 Production of rice and beans in the north east corridor–Uganda/South Sudan

Production and trade characteristics

Rice and beans that are traded along this corridor are produced from Soroti, Mbale, Iganga and Lira districts: the major collection towns are, respectively, Soroti, Mbale, Iganga and Lira. The production areas have two seasons; first season is between March and June while the second one is between August and November. Soroti, Mbale, Lira and Gulu markets are the corresponding intermediary markets for the corridor before the commodity crosses the border to South Sudan at Elegu/Nimule through both informal and formal means. The consumption markets in South Sudan include Juba and Yei.

Fifty per cent of the farmers plant both upland and Nerica rice while the rest plant the upland variety. The farm gate prices are usually US$ 1.0 per kg at the beginning of the harvesting season and increases up to US$ 1.3 per kg as rice becomes scarce during the off-season period. There is no uniform trading method adopted by farmers in the production region. The mode of transportation varies across the farmers depending on the volume produced as well as the distance to the processing point.

At Elegu on Ugandan side of the border (between Bibia and Nimule) there is an open market that is held on the last four days of every month. Most buyers at Elegu are consumers from South Sudan (mainly Juba) although a few traders buy to re-sell at Nimule. There are no weighing scales in this market and therefore traders use cups and small containers. Similarly, there are no large storage facilities at this point but some are available at Nimule.

Trade characteristics of the consumption markets

The major consumption markets for rice in South Sudan include Juba and Yei towns. Juba town consists of three markets namely freedom market, Konyokonyo market and Jebel market. Yei town has two main markets - Dar-El-Salam and Jigomoni. The Jigomoni market has a market day on Thursday while Dar-El- Salam market operates on a daily basis. The markets in both towns are organized in such a way that there are produce lines around the market walls while the retailers are inside the market. The majority of the sellers in these markets are retailers and they obtain rice from wholesalers in the same markets. Rice sold in South Sudan comes from both Uganda and Pakistan. Wholesalers from Juba order rice from their counterparts in Uganda. Consumers in Juba prefer rice from Pakistan because it is clean and does not have a high proportion of broken pieces. All rice transactions are made on a cash basis. Rice from Uganda is packaged in bags of either 100 kg or 120 kg and the modes of transport include lorries (7 tonne trucks) and canters (3 tonne trucks) which carry rice in addition to other commodities. Rice from Pakistan is packaged in bags of 50 kg. The prices of rice in South Sudan are relatively high due to high demand and increased transaction costs such as transportation, loading/off-loading and security risks along the corridor.

Production and trade constraints

The key constraints to production include:

- ✓ Low adoption of improved seed varieties due unavailability, inaccessibility and lack of affordability
- ✓ Low application of chemical fertilizer due to high costs and limited access to credit
- ✓ Poor storage facilities at household level
- ✓ Pests and diseases (rice blast)

Trade constraints include:

- High transportation costs due to the high fuel prices and poor road infrastructure
- High municipal charges at the markets
- Lack of storage facilities and poor waste disposal (Photo 5.4)
- Lack of standard weighing scales
- High cost of clearing the goods formally at the Customs
- High level of insecurity at night especially on South Sudan side
- Problems to do with immigration requirements (especially to South Sudan)
- Corruption among public officials

Roles of different stakeholders in the sub-corridor

The Uganda government, through NAADS, plays an important role in promoting rice production and trade, including:

- Offering financial (provision of start-up farm inputs to poor farmers under NAADs program) and advisory services to farmers
- Regulation of seed quality through investigation and certification
- Building farmers' capacity through promoting production of high quality seeds
- Encouraging seed companies to extend their services (e.g. agro-vets) to rural areas
- Promoting micro-finance institutions so as to provide credit to farmers
- Sensitization of farmers to use certified seeds and fertilizers through the Ministry and NAADS

Photo 5.4 Poor waste disposal in grain markets

In addition to services offered by government, there are various stakeholders on both sides of the border which help in facilitating trade: police and customs officials; and National Chamber of Commerce that issues large scale traders with certificates of origin to reduce delays at the border. The National Chamber of Commerce also arbitrates and conducts trade promotions for the traders through trade shows, radio programs, market research and business forums.

Finally, COMESA offers trade related services to small scale traders (those dealing with goods worth US$ 500 and below) for example by acting as the clearing agent for the traders in order to minimize delays. Traders are required to register for membership and by paying annual fees in order to get a certificate of origin. Secondly, traders are advised on their legal rights before proceeding to a foreign country. COMESA also gives traders business skills through capacity building and it provides price bulletins/listing.

5.2.4: Production and trade of maize in the North East corridor

5.2.4.1 Description of the Tanzania-Kenya-Uganda-South Sudan maize corridor

The North East corridor starts from Tanzania in Mwanza region, passes through Kenya and Uganda and ends in South Sudan. The corridor is characterized by seasonality differences. Kenya and Sudan act as the major consumption countries while Tanzania and Uganda regions are the major production areas. Border markets include Sirare-Isebania, Busia and Nimule. Other maize inactive trade borders include Malaba border market and Kaya-Oraba market that borders Sudan and Uganda. The main corridor can be subdivided into three active sub-corridors as shown in Table 5.23.

Table 5.23: Maize sub Corridors from the main North Eastern corridors

Sub-Corridor	Production area	Immediate markets	Border markets	Main Consumption markets
Tanzania to Kenya Sub corridor	Mara region especially Tarime	Tarime market	Isbania border point	Migori, Kisii, Nairobi, Machakos
Uganda to Kenya Sub-corridor	Mbale region and Iganga region	Mbale town and Iganga	Busia border point	Kisumu, Nairobi, Kitale, Eldoret,
Uganda to Sout Sudan Sub-corridor	Larger Masindi region especially Kiryandongo District	Bweyale and Masindi towns	Bibia-Nimule border point	Juba, Yei

Maize production areas in Tanzania include Mwanza and Mara regions Busoga and Bugisu regions supply maize to Kenya markets through the Busia border. South Sudan was being supplied by the Northern districts in Uganda notably Kiryandongo District. Seasonality differences among Kenya, Uganda and Tanzania are a major determinant of maize trade.

5.2.4.2 Production and trade characteristics

Despite the large production volumes and increased demands for maize in the neighboring countries along the commodity corridor, maize markets are poorly organized and the institutional structures are inefficient. At the time of the field survey for the study, Tanzania had in place a ban on export of cereals to the neighboring countries. According to Temu (2007), Tanzania maize production is done on an average of 2 million hectares corresponding to approximately 45 percent of the total cultivated land. Some of the country's maize producing zones include Kigoma, Arusha, Mwanza, Mara, Kagera and Shinyanga regions. The survey established Mara region as the main supplier for the cross-border trade along the Tanzania-Kenya sub-corridor. Land in the region is not a limiting factor both in terms of fertility and size but it is communally owned. On average, households have access to more than five acres but only a third of it is under maize production.

Tanzanian farmers purchase most of their maize planting seeds from Kenya. The farmers prefer the 600 series varieties of maize that usually take six (6) months to mature compared to the Tanzanian bred maize seeds that have a gestation period of 3 months and are not preferred due to their smaller size. Farmers in Tarime District bordering Kenya also purchase fertilizer inputs such as DAP and CAN for maize and NPK for tobacco from Kenya. Although Tanzania produces its own fertilizers, farmers prefer Kenyan imported fertilizers.

In Uganda, maize is widely produced around all the districts in the country. The crop is the third most important cash crop, following bananas and beans. In Mbale, Kapchorwa, Iganga and Masindi regions which are along the North Eastern corridor, maize is considered as the major income earning activity. Production levels have increased over the years due to the increased demand in the neighboring countries. Unlike Tanzania, maize production levels have increased although the farmers are not motivated by the current export ban by the government. Production levels along the corridors differ from one sub-corridor to the other. Variation is mainly caused by the seasonality and other production factors. Crop husbandry methods are still basic with limited use of hybrid seeds and fertilizer.

The Mbale District in Uganda can be divided into three production regions. These are the highland areas, low land areas and the mid-altitude areas. Highland areas produce coffee, bananas, beans, maize, climbing beans, horticultural such as onions, carrots, tomatoes, etc. Mid altitude crops include coffee, bananas, millets, maize, beans, ground nuts, horticultural crops, cassava, and sweet potatoes. The lowland belt produces root crops, millets, maize, beans, ground nuts, paddy rice, and upland rice. The area is well known for supplying Kenya, Rwanda and South Sudan with beans and maize and the increasing demand has led to a surge in producer prices in the district.

The Kiryandongo District in Uganda has a total of 3,609 square km of land under cultivation and maize is now the dominant crop. Other crops grown include cassava, beans, sweet potatoes, ground nuts, sunflower, tobacco, cotton and bananas. Cash crops include maize, cassava, tobacco, sunflower, cotton and beans. The district recorded about 52 tons of maize in the previous growing season (March-August), reaffirming the fact that average yields in the country are still quite low . It is self-reliant in terms of food security and most surpluses are exported to other regions such Kampala city, Arua, South Sudan and Kenya. However, the district experiences scarcity of beans in some periods and often import from Hoima, Masindi and Lira.

5.2.4.3 Trade characteristics of the border markets

Border markets along the corridor include Isebania-Sirare, Busia and the Nimule points. All these borders are active maize trade with the Busia border point being one of the busiest along the corridor. Nimule border market is busy only during the last few days of the month.

Maize Informal and formal Cross-Border trade at Isebania-Sirare border point

Maize trade along this border point is done both officially and unofficially. The border is under restriction of maize export from Tanzania. Unofficial border points (panya routes) include Kipimo, Kumumwamu, Ntimaru, Nyamutiro, Nyamaharaka panya route, Mutimurabu, Kumbitalele, Kehancha junction, Mali Ngumu and Supersonic areas. As earlier noted, production areas in Tanzania include Mwanza, Musoma and Tarime neighboring Kenyas Kuria-Suba District. According to the traders, some of the maize destined for Kenya from Tanzania comes all the way from Burundi and Malawi. During the months of June and July most of the maize is sourced from Tanzania. From August onwards it is sourced from Burundi and mostly comes under transit. In addition, all maize traded informally across this border finds its way to markets in Kenya.

The informal trade transactions at the border are characterized by numerous cases of bribery: traders pay between US$ 0.3 and US$ 0.6 to pass one bag of maize across the border. Most informal traders use mobile phones to complete trade transactions. They use unofficial clearing agents who assemble (bulk) maize for sale. Most of the maize from Kipimo is destined to Nairobi and Eldoret (because of the presence of big millers), especially when the maize around the Eldoret production area is out of season.

Trade at Busia border point

During the period of the data collection for this study (September-November 2011) all the maize traded at the border moved from Uganda to Kenya. It was however observed that when there are deficits in Uganda, the maize is sourced from Kenya. No duty is paid when importing cereals from Uganda to Kenya except for import permits and phyto-sanitary certification. The importation process entails purchasing a certificate of origin and completing C17b depending on the amount of goods (both certificates cost US$ 56), paying US$ 6.7 per consignment for importation certificate, phyto-sanitary certification cost US$ 3.3 for trucks and US$ 1.3-1.5 for canters. No regulation policies exist which could hinder Uganda from exporting agricultural commodities such as maize to Kenya.

Although the role of the Kenya Revenue Authority (KRA) is to verify certificate issuance and levy official taxes, a *facilitation fee* (a bribe) of Ksh 200 is normally demanded by some corrupt officers. Cereals importation to Kenya is largely controlled by brokers on both border sites and in this regard, they charge Ksh 1,500 for clearance. Informal trade exists across the border where traders try to evade Municipal Council payments at both border points. The payment is Ksh 10 to the Kenyan Municipal Council and Ush 2000 to the Ugandan Municipal Council per bag of imported and exported maize respectively. For informal trade, it costs Ush60 per bag to transport maize from Ugandan to Kenyan border site. This trade occurs along Malachi and Sophia routes. An informal market is well established at the no-man's land along the Malachi *panya* route. Cereals traded in the market are maize, beans, green grams, millet, sorghum, ground nuts and finger millet.

The main mode of transportation is bicycle for trade within 10 km and trucks for long distances such as to Nairobi and Mombasa. Most of the transporters are based in Uganda where there are both individuals and companies. Some of the challenges that transporters face are dishonesty among customers and poor road conditions.

Nimule-Elegu border point

At the Nimule-Elegu Border markets, a border river currently blocks the *panya* routes when it rains. Most trade is informal and the market takes place only during the last three days of the month. During the market days, over 38 trucks of maize originating from Uganda are traded, mostly destined for South Sudan.

5.2.4.4 Production and trade constraints

Maize production levels in the region depend on rainfall and the trends show that productivity has generally stagnated largely due to poor crop husbandry and sub-optimal use of improved technologies. Both producers and traders face a myriad of constraints among them: poor farm-gate prices, population pressure on arable land especially in Kenya and declining soil fertility, poor harmonisation of regional trade policies and high cost of transports that raise input costs. The corridor also faces marketing problems relating to poor road and communication infrastructure, lack of storage facilities, price volatility and lack of integrated marketing structures and systems. In addition, there are increased transaction costs and poor post-harvest handling; poor sanitation; lack of electricity and insecurity risks in some sections of the corridor.

5.2.5 Analysis of storage and marketing costs

Storage infrastructure and post-harvest losses

Among the producers, traditional storage structures and rooms within residential houses were the predominant forms of storage for maize (52 percent and 25 percent of the respondents, respectively). The same trend was evident in the case of beans but more farmers stored their rice in modern structures (41 percent) and in houses (35 percent). The traders, on the other hand, mainly used improved storage structures for all the three commodities (Table 5.24).

Table 5.24: Type of storage infrastructures used along the corridor

Type of store	Percentage							
	Producers				Traders			
	Maize	Beans	Rice	Overall	Maize	Beans	Rice	Overall
Improved	23.3	25.0	41.4	29.7	71.7	80.9	77.9	76.9
Traditional	52.1	22.5	24.1	32.9	5.6	4.5	5.2	5.1
Room in the house	24.6	52.5	34.5	37.4	5.7	0.0	1.3	2.3
Holding ground	0.0	0.0	0.0	0.0	9.4	10.9	9.1	9.8
Stall in the market	0.0	0.0	0.0	0.0	7.6	3.7	6.5	5.9

Producers reported relatively higher post-harvest losses ranging from about 2.6 percent for rice and maize to 4 percent for beans compared to traders whose losses were highest for maize at about 2.2 percent. Table 5.25 shows the corresponding values of these losses by producers and traders. On average, formal traders registered higher losses (US$ 2.5 per ton) compared to informal traders (US$ 1.8 per ton) and the value of beans lost was the highest across the board (Tables 5.26 and 5.27). However, in all cases the value of losses to the value of the commodity seems significantly low. The low operating costs by informal traders could be attributed to the fact that they stored the commodities for a shorter period hence they reducing the costs associated with storing the commodities for a longer period of time (Table 5.27). It was also noted that, the holding ground and market stalls were not used by informal traders as storage infrastructures. Perhaps this is because these traders were mostly found along the borders where such storage infrastructures were never organized or would be illegal if found. In all cases, pests were the main cause of damage in storage (Table 5.28).

Table 5.25: The value of post-harvest storage-related loses

Type of crop	Producers		Traders	
	Mean loss (US $ per ton)	% loss to the value of commodity	Mean loss (US $ per ton)	% loss to the value of commodity
Maize	3.32	1.4	2.06	0.6
Beans	2.04	0.5	3.30	0.4
Rice	1.96	0.2	1.06	0.1