

Tokyo University of Agriculture

PhD Thesis

Developing the Rice markets in Uganda: A Value Chain Analysis

Advisory Committee

Takayanagi Nagatada (Chair), Kanada Norikazu,
Tateiwa Toshikazu, Takane Tsutomu

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Department of Agricultural Economics

Makosa Dan

Abstract

Since NERICA introduction, Uganda's rice production has tremendously improved to almost double figures and is expected to do so in the near future. Much as production takes place in rural areas, most of the rice is consumed in urban areas. However, there is weak linkage between rural producers and urban consumers. This thesis uses a value chain approach to assess trade policies, quality aspects and distribution systems to identify constraints and upgrading opportunities in Ugandan rice markets. Whereas one chapter was written using secondary data sources, the thesis mainly uses primary data which was collected from Eastern Uganda.

Developing the rice markets in Uganda requires multifaceted approach including enhancement in policies, governance, quality, infrastructure and improvement of all the processes along the entire marketing channel. The current rice import tariff policy is less helpful in protecting Ugandan rice sector due to less commitment to its implementation by member countries. Improving competitiveness of Ugandan rice by developing the processes across the entire value chain remains a viable option. Competitiveness is however hampered by poor drying and milling technology, high milling and transport costs, and lack of horizontal and vertical coordination within and between different rice value chain actors. Lack of coordination among farmers together with small quantities of rice supplied by individual farmers have tilted market power in favor of village assemblers. Additionally, mistrust between farmers and millers has blocked the potential source of agricultural finance to farmers for investing in quality improving technologies.

The following interventions are worth considering. First, efforts towards strengthening the coordination among actors at the same chain node should be

considered for the benefits of economies of scale and enhancing the internal functioning of the groups. Second, improving relationships between actors at different nodes should be facilitated to build trust and enable intra-chain financing. Third, improvement in public services such as rural electrification to reduce milling costs and rural roads to allow sellers access many buyers is another viable option.

Key words: Uganda, Rice, Marketing, Value chain analysis, East African Integration, Quality management

Dedication

To

My wife Christine

Our children Cherry and Inde

My parents Alice and Francis (RIP)

Acknowledgement

First and foremost I would like to extend my thanks to almighty GOD for keeping me and my family safe and healthy throughout the entire course of study.

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Chapter One

Introduction

1.1 Background

Uganda's rice production has tremendously improved to double amounts in the period 2000–2010 with another doubling expected to occur by 2018. Thanks to a countrywide promotion drive, following NERICA introduction, which involved government agencies, nonprofit organizations particularly Sasakawa Africa Association, bilateral agencies like JICA and the donor community. Under the guidance of the Coalition for Africa Rice Development (CARD), the Government of Uganda formulated a national rice development strategy in 2009 as a tool towards the realization of its rice self-sufficiency. Unlike most of the food crops grown to satisfy household consumption and food security requirements in Uganda, rice is consumed more in urban areas, where it is one of the major foodstuffs. As a result, most of the rice produced by rural farmers enters the marketing system. Unfortunately, there is a problem of market access due to poor linkages between the rural producers and urban consumers (McKinney, 2009). Also, postharvest handling practices of Ugandan rice farmers are generally poor. The resultant rice from such postharvest practices is always of low quality characterized by presence of foreign matter and high percentages of broken (Candia and Masette (2012). Given that imported rice of superior quality also enters the market, the competitiveness of locally produced rice is at stake. A clear understanding of the marketing channels, the constraints and upgrading opportunities for different marketing actors and the policies influencing the rice markets is of paramount importance.

Most literature on rice markets concentrate on mapping the marketing system and assessing the profits without highlighting the upgrading strategies. Odogola (2006)

for example focuses on generating basic information as guidelines for future development initiatives. The study by USAID (2008) in northern Uganda concentrates on identifying several marketing channels and the profits by different actors. The rest of the studies (Trias, 2012; Kilimo Trust, 2012; Action Against Hunger (ACF), 2014) use the same approach as USAID (2008) by first tracing the marketing channels then identifying the key actors and end by conducting the gross margin analysis. The literature on policies is scarce and tends to focus on market liberalization (Hill, 2010), save for Ahmed (2012) who studies incentives and disincentives of import tariff.

Using a value chain approach, this study fills the gap in literature by: delving into trade policies, quality aspects and distribution systems while identifying the importance of various chain actors as well as constraints encountered along the distribution system and upgrading opportunities. According to Kaplinsky and Morris (2000), value chain refers to a full range of activities required to bring a product or service from conception, through different stages of production, delivery to final consumers and final disposal after use. Global Value Chain approach, which emphasizes vertical integration, has become central to market studies (Riisgaard, 2009; Tran, et al 2013). However, it has focused on international markets leaving behind many smallholder farmers who depend on local and regional markets (Mitchell and Coles, 2011; Trienekens, 2011). Integrating horizontal and vertical coordination is a requirement for developing the value chains of rural farmers (Mitchell and Coles, 2011). This study adopts the value chain methodology developed by Trienekens (2011). According to this methodology value chains comprise of several actors who are embedded in a complex horizontal, vertical and business support relationships. The analysis begins with assessing the constraints to the value chain under study before proceeding to opportunities and ends

with defining the upgrading options.

Uganda adopted a maximum common external tariff (CET) of 75% ad valorem or \$200/ton, whichever is higher on rice imports. The aim was to raise the price of locally produced rice by preventing cheaper rice from foreign countries from entering local markets. It was then believed that higher prices will act as an incentive for increased production. Is the above policy being properly implemented? Has the intended purpose of reducing rice imports been achieved? What impacts have occurred to rice market in Uganda due to that policy? These are some of the questions answered in the first section of my study. I use a range of databases to ensure the above questions are thoroughly answered.

The remaining sections of this study use the field survey data I collected between August and October in both 2013 and 2014. The 2013 data concentrated on marketing channels, constraints and opportunities. The data was captured from farmers, small scale millers and large scale processors. Collection method was through focus group discussions, individual semi-structured interviews, personal observations and key informant interviews. The major topics of interviews included major clients and suppliers, prices and pricing mechanism, support organizations, marketing challenges and upgrading opportunities. Using the same collection procedure as in 2013, the 2014 survey focused on quality enhancement and the main respondents were the Uganda National Bureau of Standards (UNBS), rice distributors specifically retailers and farmers. The major topics of the study included postharvest handling mainly drying, quality management procedures and skills, price premium and standards awareness. The study area for both surveys was Eastern Uganda which is the major rice producing region of the country.

1.2 The concept of value chain analysis

The concept of value chain can be traced back to the 1960s when French scientists developed the *filiere* approach for studying contract farming and vertical integration in agriculture (Mitchell et al, 2009; UNIDO, 2009). They later applied it on export commodity production of cotton, rubber, coffee and cocoa in France's former African colonies. The emphasis of this approach was analyzing how local production system was linked to processing industry, trade, export and final consumption (Nang'ole et al 2011). At the time, the focus of *filiere* approach was on production and commercialization without the elements of governance, transformation and value addition (UNIDO, 2009).

In the 1970s a related concept 'sub-sector analysis' was developed by Shaffer which involved studying the networks and relationships linking suppliers, processors, transporters and traders in ways that connect producers and enterprises to final consumers of goods and services (Nang'ole et al 2011). A sub-sector thus involves a set of activities, actors and rules governing those activities.

The term value chain was first used and popularized by Michael Porter (1985) where he sought to assess the contributions of various primary and supportive firm activities to the overall added value of its business. The primary activities include inbound logistics, operations, out-bound logistics, marketing, sales and service which can directly add value to the production of goods and services (Nang'ole et al, 2009). On the other hand, support activities include procurement, human resources management, technology development and firm infrastructure which are necessary for the effectiveness and success of the firm (UNIDO, 2009). Porter's approach was aimed at highlighting actual and potential areas of competitive advantage and the interdependences and linkages between

vertically arrayed actors in the creation of value for the firm (Rich et al, 2009). The weakness of Porter's approach to value chain is that it restricts analysis to firm level without considering upstream and downstream activities beyond the company (Fasse et al, 2009).

The concept of Global Commodity Chain was developed by Gereffi and Korzeniewicz (1994) who applied it to development issues. Whereas Porter's approach focused on within firm linkages of several activities, the Global Commodity Chain was modified and the focus was on inter-firm linkages while emphasizing the governance structure between several actors. Gereffi identified four elements: (i) input-output structure, (ii) territorial (international) structure, (iii) institutional framework and (iv) governance structure (Nang'ole et al, 2009; Fasse et al 2009).

Another modification of Global Commodity Chain, "Global Value Chain" was coined in the early 2000s by Kaplinsky and Morris (2000). They defined a value chain as a full range of activities required to bring a product or service from conception, through different stages of production, delivery to final consumers and final disposal after use. Kaplinsky and Morris, distinguish the value chain from supply chain by emphasizing the relationships and linkages both within and between actors at each stage of production. According to Rich et al (2009), this has considerable merit of highlighting the constraints and opportunities at and between stages of the chain and can thus be used to develop integrative policy recommendations that target chain inefficiencies and address distributional issues. More recently, the concept of value chain analysis seems to have become synonymous to market analysis as it involves the role of policies, institutions and laws in shaping markets (Nang'ole et al, 2011). However, the relevance of Global Value Chain approach in developing countries is questionable as it emphasizes vertical

integration with emphasis on international markets leaving behind many smallholder farmers who depend on local and regional markets (Riisgaard, 2009; Tran, et al 2013; Mitchell and Coles, 2011; Trienekens, 2011). Integrating horizontal and vertical coordination is a requirement for developing the value chains of rural farmers (Mitchell and Coles, 2011). Also, agricultural value chains are buyer-driven, meaning buyers have more powers in deciding what to produce (Mitchell et al, 2009). To reduce the power of buyers, developing country chain actors need to upgrade by building technological and managerial capacity that allows them to participate effectively in value chains (UNIDO, 2009). Value chain upgrading is therefore one of the main focus in developing countries (Trienekens, 2011).

1.3 Topics of relevance to African value chain studies.

According to Webber and Labaste (2010) value chain guide, there are about five topics of interest to African agricultural value chains: trust and cooperation, market power, governance, innovation and knowledge, and focus/intervention points.

Trust is considered to exist if one party believes that the other party is honest or benevolent (Doney et al, 1998). It is the expectation that reduces the suspicion that one party in the transaction will behave opportunistically. Building trust by rewarding collective action among stakeholder participants is crucial for upgrading a value chain as it requires establishing relationships in order for all participants to gain (Webber and Labaste, 2010). When trust, learning, and benefits are shared among firms (vertically and/or horizontally), there is a greater likelihood of generating collective efficiency and scale. Increased trust leads to greater specialization by the value chain, as well as eventual outsourcing that provides cost advantages. High levels of trust reduce the need for buyers

and suppliers to spend long periods of time and effort during meetings to negotiate and write complex contracts in order to safeguard their investments in the relationship. By reducing the time and effort required to negotiate and monitor the relationship, buyers and suppliers can focus on information exchange that mostly contributes to new product development (Vieira et al, 2012). As a result, a relationship founded on trust and mutual respect is more likely to succeed than a relationship of convenience supported by legal contracts (Masuku and Kirsten, 2003).

Value chain cooperation starts with communicating objectives, plans, and forecasts to working closely with partners to create efficient flows of products to end customers. In any cooperative efforts, open communication to other chain members means taking a risk of vulnerability to the actions of another party. Cooperation not only relates to operational and technical matters but also relates to a solid foundation of trust as it involves human beings working with each other (Sridharan and Simatupang, 2013).

Market power refers to the idea that one firm in the market may be able to exert significant influence over the goods and services traded or the price at which they are traded. The economic actor with greater bargaining power has the greater decision-making freedom (Webber and Labaste, 2010). The bargaining power may either be producer-driven for high barrier to entry chains like automobiles and computers or buyer-driven for low barrier to entry chains like agriculture and furniture. Whereas agricultural value chains in developing countries are buyer-driven, bargaining power of suppliers can be enhanced by increasing their capabilities and de-commoditization of value chains through product differentiation. Additionally, horizontal relationships, in particular farmers' cooperatives or associations can increase bargaining power of smallholder farmers and at the same time lower the transaction costs of traders who purchase from

them (Trienekens, 2011). Power and trust serve as a basis for cooperation to share certain productive behaviors in a value chain. Trust moderates the relationship between power and collaboration characterized by information sharing and know-how learning (Sridharan and Simatupang, 2013).

Governance is a description of the dynamic distribution of power, learning, and leadership in standards and strategy setting among different market actors (Webber and Labaste, 2010). It is concerned with the coordination function which allows agents to reduce costs and risks in production, transport and storage and permits timely production in response to the demands of buyers and consumers (UNIDO, 2009). This is possible through efficient sharing of information and promotion of systematic standards by the governing entity. In Sub-Saharan Africa, the governing entity which is often a lead firm has power and capability to define and set the parameters of contracts and subcontracts in their supply chains (Webber and Labaste, 2010). When analyzing governance structures, most influential agents and interest groups in the chain are scrutinized with regard to how far they set the rules and keep the rules and to what extent they influence existing structures and contractual arrangements. Sometimes the government can and should involve itself in chain governance and deal with issues of price policy, subsidies, research and development, quality standards, and infrastructure (UNIDO, 2009).

According to Yale Information Technology Services (Yale-ITS), innovation can be defined as the process of implementing new ideas to create value for a firm. This may mean creating a new service, system, or process, or enhancing existing ones. Innovation can also take the form of discontinuing an inefficient or out-of-date service, system, or process. In competitive markets, innovation helps maintain or grow market share or profits and can be a route to competitiveness and the development of competitive

advantage. Innovative production and processing can create cost efficiencies and improved services that translate into higher margins or more competitive pricing. Such innovations that improve competitiveness in value chains are referred to as upgrading (Webber and Labaste, 2010). In terms of agricultural value chains in developing countries, Upgrading means acquiring the technological, institutional and market capabilities that allow resource-poor rural communities to improve their competitiveness and move into higher-value activities (Mitchell et al, 2009). Upgrading assumes various forms: improving production efficiency (process upgrading), enhancing quality and standards (product upgrading), changing the mix of functions performed (functional upgrading), using skills and experience developed in one value chain to productively engage with more profitable other chains (inter-chain upgrading), moving away from spot markets to long-term relationships with other value chain actors at different nodes (vertical coordination), working together with other actors at the same node to enjoy scale of economies (horizontal coordination), and strengthening the external governance (enabling environment). Upgrading approaches emphasizes issues of knowledge creation, transfer, and appropriation. The way that knowledge is transferred is determined by the information flows or linkages between firms within a value chain. Market knowledge and market orientation are pre-conditions for market access (Webber and Labaste, 2010; Trienekens, 2011; Mitchell et al, 2009).

Entry point refers to the elements of the value chain structure, relationships, market linkages, or strategic or operational objectives that provide effective leverage points for working with or influencing the value chain actors. Entry point enables government and development agencies to identify the areas of focus during the implementation of development programs and allows improvement in functioning of the

chain and the benefits it renders to its actual and potential members. The choice of an initiative's entry points, partners, tools, and approaches strongly depends on the characteristics of the value chain, its participants, the business environment, and many other factors (UNIDO, 2009; Webber and Labaste, 2010)

1.4 Rationale and limitations of value chain approach

African production systems struggle to develop relationships with local and global markets, small-scale producers and processors miss out on opportunities to produce and market their products. Consequently, globalization and the opening-up of their domestic markets have made African food industries further vulnerable to the interventions of global players and competition from abroad. Value chain approach helps businesses and related organizations in identifying alternative ways of remaining competitive as they guide in product and process innovations. This is possible through collaborations and linkages to improve efficiency and competitiveness within and among firms to come up with win-win relationships. Value chain analysis sheds light on the size of the firms participating in each link, how they are participating or could be participating in the chain, and opportunities to facilitate or improve those linkages. This is particularly crucial in agriculture, where governments and development partners are confronted with the challenge of including smallholder farmers in modern agricultural markets. By emphasizing the linkages between producers, processors and consumers; value chain approach is a market oriented tool. It facilitates participation of the poor by identifying the opportunities and constraints to entry into a particular chain. As such, value chain analysis is relatively evidence based and action oriented as it involves collection of data and understanding reality. In terms of policy, value chain approach provides a logical

framework to formulate concrete intervention strategies to change the circumstances of the poor. (UNIDO, 2009; Webber and Labaste, 2010; Mitchell and Coles et al, 2009; Mitchell and Coles, 2011).

Whereas value chain approach is useful in several ways as described above, it has its own limitations. As a methodological tool, value chain approach is not standardized in terms of composition, relationships or market positioning and requires adapting to a particular business situation. Also, the findings of a particular analysis may not be generalized across several sectors as value chain approach is sector, firm and time specific. This makes monitoring of development interventions difficult. Since no assumption on agents is made, value chain analysis can be considered more of an accounting framework than a behavioral model (Webber and Labaste, 2010; Mitchell and Coles, 2011; Lorenzo, 2013).

1.5 Uganda rice marketing system and research framework

Ugandan rice is produced by many smallholder farmers who are based in rural areas. Rice from rural producers is delivered to urban areas where rice is mostly consumed due to its ease in preparation compared to other staples. Between the rural producers and urban consumers, there are many other players who make up the distribution system. This makes farmers to receive less value since each of the player has to get a share of the premium. The returns are also constrained by transaction costs arising from high energy costs, inadequate information flow and poor roads network. The value is further lowered by the low quality of rice which is supplied by farmers to the market. The competitiveness of locally produced rice is checked by high inflow of foreign rice which joins the distribution system as imports. Some of the rice leave the distribution system in form of exports to

neighboring countries although it is not much relative to imported rice. Figure 1 summarizes the Ugandan rice market model. This model is typical of developing country marketing systems as illustrated by (Trienekens, 2011) except that instead of rice ending in local rural markets, it enters the urban markets. In such a marketing system, market access is dependent on technological capabilities of producers, available infrastructures, bargaining power and market knowledge and orientation.

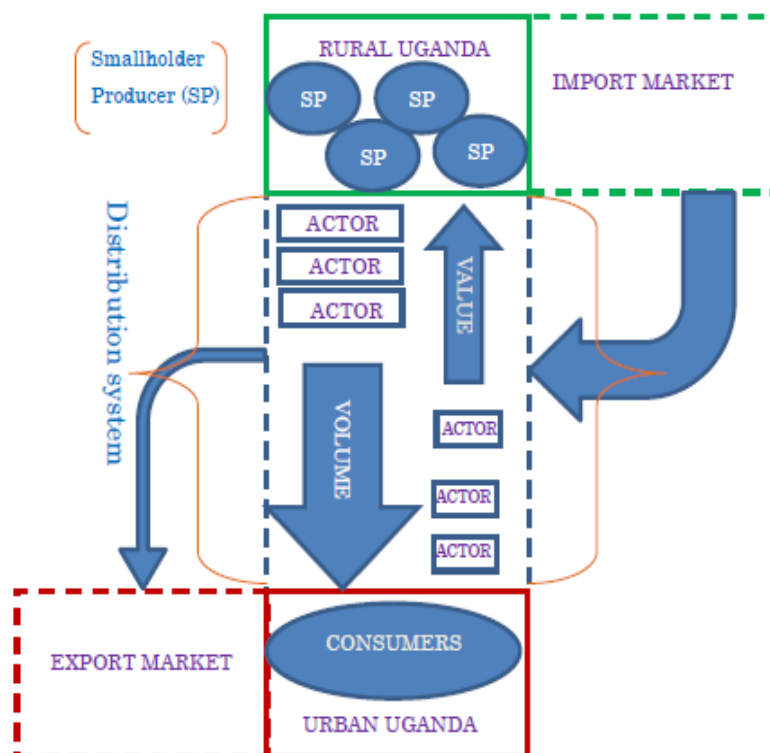


Figure 1 Ugandan rice marketing model (modified from Trienekens, 2011)

To study the rice marketing system in detail, this study uses the value chain approach designed by Trienekens (2011) with modifications from Mitchell and Cole (2011) as illustrated in figure 2. There is no lead firm in Uganda rice industry due to market liberalization with minimum entry and exit barriers. The industry is highly competitive with many uncoordinated smallholder farmers and many uncooperative rice traders. Value chain governance is in the form of trade policies and rice standards

formulated by the government. Assessment of the role of such policies to the rice sector forms the first section of this research. Through mapping of the marketing channels, identification of constraints and upgrading options; the network structure is revealed in the second section of the study. To assess the competitiveness of the sector, the study ends by analyzing the quality of rice in the market and the possibilities of improving it. All these processes are however inter-linked as indicated by the arrow. Government legislation, regulations and policies can constrain value chain upgrading by imposing unfavorable taxes and by denying infrastructural investments that would benefit value chains. Also, network structures which are well coordinated can reduce transaction costs and create more value to coordinating actors. By working together, value chain actors may be motivated to improve their position in the chain through quality improvement for example.

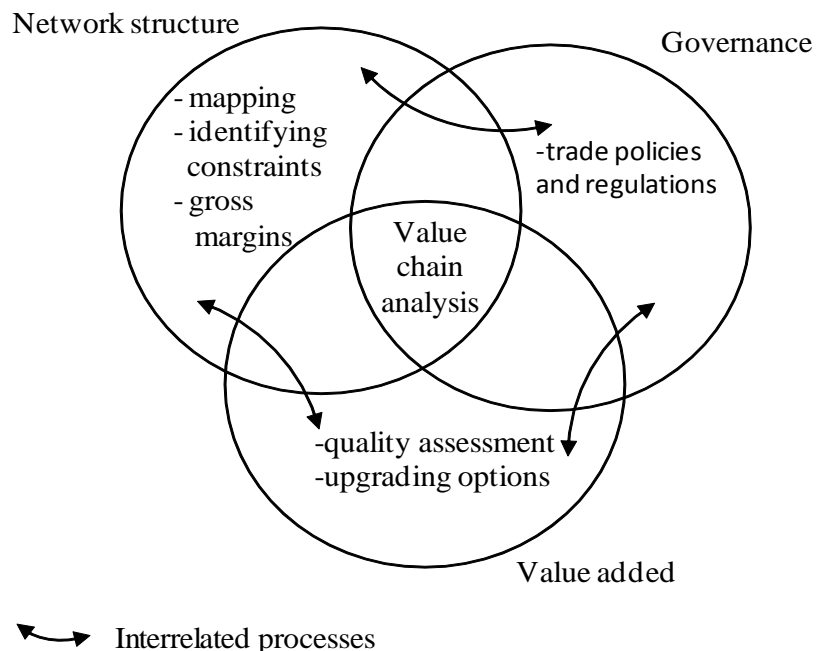


Figure 2 Value chain analysis (modified from Trienekens, 2011; Mitchell and Coles, 2011).

Chapter Two:

Analysis of Uganda's Rice Markets in the context of East African Integration

2.1 Introduction

Through expansion of land under rice cultivation, Uganda's rice production has tremendously improved to double amounts in the period 2000–2010 with another doubling expected to occur by 2018. Thanks to a countrywide promotion drive, following NERICA introduction, which involved government agencies, nonprofit organizations particularly Sasakawa Africa Association, bilateral agencies like JICA and the donor community. Under the guidance of the Coalition for Africa Rice Development (CARD), the Government of Uganda formulated a national rice development strategy in 2009 as a tool towards the realization of its rice self-sufficiency (NRDS, Uganda 2009). A rice secretariat was also established to oversee the implementation of this strategy. In Sub-Saharan Africa, rice is considered a sensitive product because it is a substitute for locally grown staples and has high production expansion potential (Vitale et al, 2013). To motivate rice farmers, Uganda adopted a maximum common external tariff (CET) of 75% ad valorem or \$200/ton, whichever is higher on rice imports as stipulated in the East Africa Community Customs Union Protocol (CUP, EAC 2005). The aim was to raise the price of locally produced rice by preventing cheaper rice from foreign countries from entering local markets. It was then believed that higher prices will act as an incentive for increased production. The same protocol, however, allows free entry of rice from regional countries which has enabled inflow of Tanzanian rice into Ugandan markets. Despite the high import tariffs on international rice, Pakistan and Viet Nam rice has continued to enter the country. This implies local farmers will have to withstand competition pressure from both regional and foreign farmers. Understanding the dynamics of rice markets in depth

by local farmers is a necessary requirement for their success.

The purpose of this study is therefore to analyze the current status of rice markets in Uganda with a focus on East African Integration by: (i) assessing the progress of rice markets since CET inception (ii) describing the concept of CET and its impacts on rice imports (iii) assessing the interconnectedness of regional rice markets through price analysis.

There is limited literature focusing on the relevance of common external tariff on rice sub-sector development within the East African region. For example a FAO policy document, MAFAP (2013), argues that the tariff-related incentives to rice farmers are decreasing due to rapid increase in domestic production and declining rice imports. The same argument is held by Vitale et al (2013). The Global Agricultural Information Network (GAIN) report prepared by Foreign Agricultural Service (FAS-Nairobi) also concurs with these findings and adds that the tariff appears to be also protecting the middlemen who pay low price to farmers and demand higher prices from retailers. Jayne (2012) refuted such trade policies of import tariffs as unpredictable and discretionary which lead to price instability and called for more open, predictable and free trade policies. Detailed papers that assess the impact to local rice industry as a result of high import tariffs are still lacking. The current paper therefore is expected to fill this gap.

In addition to a range of databases such as FAOSTAT, UN COMTRADE, and the East African Grain Council's Regional Agricultural Trade Intelligence Network (EAGC RATIN), media information published in local and regional newspapers have been used as data source for this paper. FAOSTAT data were used in constructing balance sheets and developing key indicators such as self-sufficiency and import dependency ratios, COMTRADE data were employed in analyzing changes in trade directions and

RATIN data were used for price trend analysis and market integration. Local and regional newspaper information was necessary for capturing the actual events as they occur in relation to the CET implementation.

2.2 Rice markets in the world and African context

World production of rice is concentrated in a few regions with Asia contributing to over 90% in 2012. Table 1 summarizes the leading producers, exporters and importers in the world. Even within Asia, the four main producers China, India, Indonesia and Bangladesh have been contributing to over 65% of world rice production for the past three years. Apart from India, none of the leading producers is a top exporter. This implies that rice is produced with a primary goal of local consumption for which only the surplus is traded. Because of its staple nature, rice as a food security crop is central in public policies of most producing countries. Rice trade, especially export, is even more concentrated. The top four exporters India, Thailand, Viet Nam and Pakistan have been contributing to over 72% of the total rice traded in the world market for the past three years. India's progress as a global leader in rice trade has been steadfast. It has moved from the 3rd in 2010 to the 2nd in 2011 and finally the 1st in 2012. Whereas world production and export are concentrated in a few countries, leading importers are spread worldwide and keep rotating depending on the prevailing conditions in a particular country. Even the leading producers have ended up as the leading importers, for example Indonesia in 2011 and China in 2012. Because of this dynamism, the top four importers have been contributing to less than 32% of the world rice imports.

Figure 3 summarizes the world rice importers in 2012 by value. Semi-milled or wholly milled rice (HS100630), hereafter referred to as whole² rice, was used in this

analysis since it represents 92% of traded rice. Almost every country imports rice, with the Arab world being the most importing region followed by West Africa. At country level, Nigeria is the leading rice importer with a value of US\$1.1 billion in 2012. Together with Cote d'Ivoire, Cameroon, Benin and other neighbors, they make West Africa the number one destination of international rice in Africa.

Table 1 Leading world rice producers, exporters and importers

Year	Rank	Top producers		Top exporters		Top importers	
		country	Volume*	Country	Value**	Country	Value**
2010		World	701100	World	17064188	World	15891080
	1	China	197200	Thailand	4723866	Phillipines	1639149
	2	India	144000	Viet Nam	3180099	S. Arabia	1248219
	3	Indonesia	66500	India	2282450	UAE	1021958
	4	Bangladesh	50100	Pakistan	2028251	Iran	941368
		% of world	65	% of world	72	% of world	31
2011		World	727600	World	20191391	World	18540765
	1	China	202700	Thailand	5732154	Nigeria	1552149
	2	India	158000	India	3983311	Indonesia	1339513
	3	Indonesia	65800	Viet Nam	3536202	UAE	1160154
	4	Bangladesh	50700	Pakistan	1892503	S. Arabia	1084427
		% of world	66	% of world	75	% of world	28
2012		World	731200	World	18448839	World	17612484
	1	China	205900	India	5710316	Nigeria	1132813
	2	India	152700	Thailand	4063027	China	1006679
	3	Indonesia	69000	Viet Nam	2227072	Iran	980416
	4	Bangladesh	50600	Pakistan	1622309	S. Arabia	965020
		% of world	65	% of world	74	% of world	23

* thousand tons of paddy rice, ** thousands US dollars of milled rice

Source: Own calculations using FAO, 2013

Uganda, like other East African counterparts, is a small player in world rice imports. However, the region's annual rice import growth has averaged 26% since 2008 with Tanzania leading at 34% followed by Uganda at 24%. It can be concluded that international rice trade is characterized by many buyers and few sellers. This scenario makes depending on world market for domestic rice supply a risky venture.

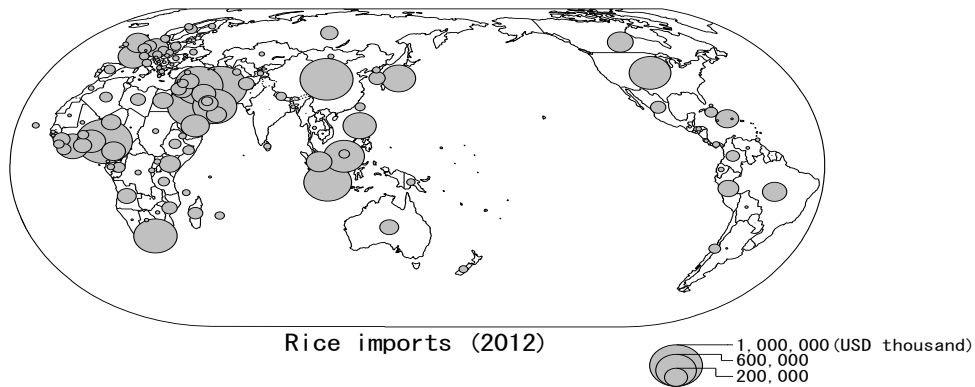


Figure 3 World rice imports, 2012

Source: Own illustration with the help of Mandara tool and data from UN COMTRADE

2.3 A paradox of Uganda's rice sector development

With reference to the rice balance sheet (table 2), it can be noticed that in the period 2001-2009, milled equivalent of rice production increased by 59% from 76038 tons to 120727 tons. This can be attributed to a mixture of policy and technological developments. First, NERICA's introduction played a big role as shown by a big jump in production in 2004-2005, a year of its massive dissemination to the farmers. Second, a heavy promotion drive, led by the Office¹ of Vice President in conjunction with a multitude of development agencies, ensured that the 2005 production gain was not temporary but sustainable. Third, the 75% import tariff which was slapped on rice imports was meant to motivate farmers to increase their production capacity to march the steadily increasing demand. Worth noting however, is that the increase in production was achieved through area expansion. This can be witnessed by change in amount of seed used. It increased by 75% from 5336

tons in 2001 to 9338 tons in 2009. It is justifiable to use seed tonnage to estimate cultivation area since it is the method used by statistics office in Uganda.

Table 2 Uganda's rice balance sheet

year	Domestic supply (TON)				Domestic utilization (TON)				net food balance (ton) supply - utilization
	production	import	export	total	Food	seed	waste	total	
2001	76038	22559	894	97703	88438	5336	3810	97584	119
2002	80040	43109	807	122342	112509	5736	4021	122266	76
2003	88044	48445	955	135534	124867	6203	4405	135475	59
2004	80707	61582	7077	135212	124347	6803	5236	136386	-1179
2005	102051	66200	13262	154989	142228	7537	5236	155001	-12
2006	102718	50440	14872	138286	125125	7937	5139	138201	85
2007	108054	74417	24244	158227	144236	8538	5407	158181	46
2008	114057	63530	25020	152567	137582	9205	5704	152491	76
2009	120727	79955	37814	162868	147371	9338	6042	162751	117

Source: FAOSTAT

Note: the values in table 2 are milled equivalent

The question here is not whether the production is increasing but is whether the production is meeting demand. In other words, is Uganda's policy tool of protecting the producer working? To answer this question, let us first look at the demand side of the rice balance sheet. Considering the overall demand and supply, the net rice balance has remained the same throughout this period. However, it deteriorated to minimum levels in 2004 to 2005 when a supply shortage of 1179 tons was registered.

The rapid growth in rice demand is attributed to a surging urban population which is accompanied with a change in life style. This can be witnessed by a twining consumption curve around the urban population trend line as illustrated in figure 4. The end result is that the country has continued importing more rice year by year. Table 3 captures two key indicators required in assessing the performance of rice sector in Uganda. Import Dependence Ratio (IDR) compares imports to the total rice supply. Overall, this ratio has deteriorated from only 23% in 2001 to 49% in 2009. It decimally improved in the period 2004 to 2006 possibly due to the high import tariff following the East Africa

Customs Union, after which it started to worsen. Self Sufficiency Ratio (SSR), which shows the percentage of rice produced locally to the total supply, has not improved either. It has instead remained fluctuating between 66.8% and 74.8% since 2005.

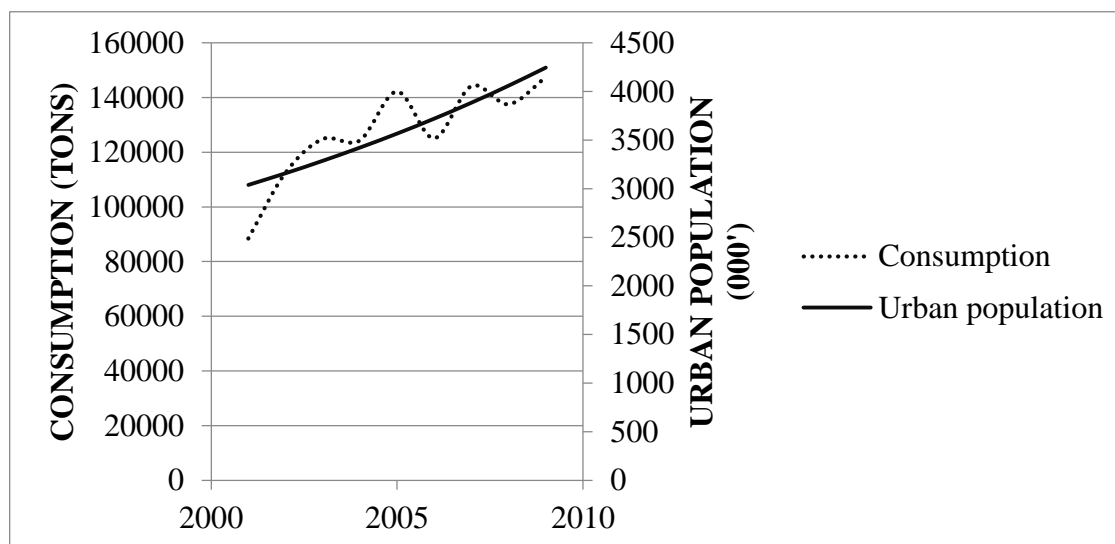


Figure 4 Relationship between national rice consumption and urbanization

Source: FAOSTAT

Table 3 Food per capita, import dependency and self-sufficiency ratios for rice

Year	Consumption per capita (Kg)	IDR (%)	SSR (%)
2001	3.5	23.1	77.8
2002	4.4	35.2	65.0
2003	4.7	35.7	65.0
2004	4.5	45.5	59.7
2005	5.0	42.7	65.8
2006	4.2	36.5	74.3
2007	4.8	47.0	68.3
2008	4.4	41.6	74.8
2009	4.5	49.1	74.1

Source: own calculation using FAOSTAT

It is difficult to observe development in rice sub-sector because the basic performance indicators such as the IDR and SSR have deteriorated or remained

unchanged. If these ratios are not improved, it is quite unlikely that Uganda's dream of rice self-sufficiency by 2018, as indicated in the National Rice Development Strategy, will be achieved. There is need to focus more on productivity and postharvest handling to reduce marketing losses.

2.4 The East African Community Common External Tariff (CET): Uganda's key rice policy

Uganda's rice subsector is influenced by two policies: National Rice Development Strategy (NRDS) focused on improved quality rice production and East African Common External Tariff (CET) aimed at improved market access. According to Ahmed (2012), the CET is the most important rice policy affecting rice markets in Uganda. It can be traced back to 2005 when the East African Community Customs Union (EAC, CU) implementation was effected. The main two objectives of this customs union are liberalizing intra-regional trade and promoting efficiency in production within the community. These were to be achieved by eliminating internal tariffs and removing non-tariff barriers within member countries, adopting a Common External Tariff (CET), formulating and administering the rules of origin, among other trading rules. With regard to the rules of origin, agricultural crops must be harvested in that country to be qualified as their origin. Therefore, postharvest activities such as drying, sorting, storing, packaging, branding and marketing do not qualify a product as an origin of that particular country. The EAC has particular items of interest which they aim to develop within the region. They refer to such items as sensitive products and attach a very high import tariff ranging from 35% to 100% to protect the local industry. There are 58 such items and the following are a few examples with their tax rates: wheat or meslin grain – 35%, wheat or

meslin flour – 60%, maize – 50%, rice – 75% or US\$200/MT whichever is higher, cane or beet sugar – 100%. There are cases when these tariff rates can be exempted, for example Kenya was allowed an import tariff rate of 35% on rice from Pakistan due to its inability to domestically supply the demanded quantity. This was however for the first two years of implementation as it was expected that it would improve its own rice production.

Table 4 shows the change in rice import tariff rates before and after the customs union. Before 2005, when the CET implementation was enforced, the East African countries were charging the World Trade Organization's (WTO's) Most Favored Nations (MFN) tariff rates on rice imports from outside East Africa. Kenya had the highest rates (35%) followed by Tanzania (25%) and Uganda (15%). Following the enforcement of CET (75% or US\$200/MT, whichever is higher), Uganda's rice import tariff rates increased fivefold from 15% to 75%, the biggest amongst the three partner states. Although Tanzania's rates increased threefold from 25% to 75%, Kenya's rates remained constant at 35% for at least 2 years after which it would increase twofold.

Also worth noting is the implementation on Uganda's side was immediate. This led to supply shortage as many importers dropped out of the business. Tanzania, whose production levels were near self-sufficiency, was not affected much although it also had immediate implementation. For Kenya, it did not only enjoy the low import rates for two years, but also defied the terms of the protocol afterwards.

Table 5 illustrates the implementation process of CET since its inception. After Kenya's grace period of 2 years, it lowered import tariff rates to 25% on Pakistan rice in the period 2007-2009, a figure which was its pre-CET rate. There exists a mutual trade benefit between Kenya and Pakistan as the latter is the main importer (25%) of the

former's tea. However, this brings CET implementation in a dilemma. Kenya, further exhibited its defiance by setting rice import tariff at 35% for all non-regional countries

Table 4 Import tariffs before and after EAC Customs Union

East African Customs Union	tariff name	Region of origin	Official Import tariff rates by c'try (%)		
			Kenya*	Tanzania	Uganda
BEFORE	Most Favored Nations (MFN) Tariff	Within EAC	3.5	5	6
		Outside EAC	35	25	15
AFTER	Common External Tariff (CET)	Within EAC	←—————0—————→		
		Outside EAC	75% or \$200/MT, whichever is higher		

*Due to Kenya's inadequate rice supply, it was allowed 35% ad volarem on rice imported from Pakistan

Source: Vitale et al (2013)

Table 5 Implementation of CET after its enactment

Period	Import Tariff Rates		Uganda	Tanzania
	Kenya			
2005-2007	35% on Pakistan rice, CET elsewhere		↑	↑
2007-2009	25% on Pakistan rice, CET elsewhere		CET	CET
2009-2010	35% on Pakistan rice, CET, elewhere		↓	↓
2010-2012	←————— 35% —————→		↓	↓

Source: Vitale et al (2013)

2.5 Effects of EAC common external tariff on Uganda's rice imports

Table 6 shows leading import partners for broken and whole rice pre and post CET enactment. Uganda's key trade partner prior to the CET policy was Viet Nam in both whole rice and broken rice. Closely following Viet Nam was Pakistan in both items. Since

2005, when the CET came into effect, this trend has gradually changed in favor of Tanzania in particular. The East African neighbor is now a leading supplier of whole rice since 2007. Viet Nam and Pakistan, however, have retained their status as major sources of broken³ rice (HS 100640) to Uganda. Because the world market for broken rice is smaller relative to that of wholly milled rice, a change in tariff in a particular market does not affect supply in the same market by a big margin. On the other hand world market for wholly milled rice is larger; therefore a change in tariffs in one market will affect the supply by a big margin since suppliers will sell to alternative markets. This explains why the broken rice suppliers to Uganda have remained the same despite the high import tariffs introduced after CET enactment. Since the volume of Uganda's rice import is more than Tanzania's rice export, latter's capability as a consistent supplier of rice is questionable. Also, given that Tanzania does not only periodically lift import bans, but also execute export bans to address its own food security, relying on their rice is a risky venture. Such policies are contrary to CET and exhibit weakness in its implementation. The end result has been the suffering of Uganda rice importers, farmers and consumers. The middleman has become king of rice markets in Uganda and therefore exercises his power by underpaying farmers and overpricing consumers. To cope with their regional counterparts, some Ugandan traders have opted for the black market through smuggling. This hurts genuine traders and shuts any prospects of competitive industrial development. Table 7 is about various forms of trade misconduct within the regional partners which are affecting the Uganda rice industry. These are just a few of the many headlines which are in local and regional newspapers. For example in 2012, Kenya's traders repackaged cheaply imported rice and smuggled it into Uganda tax-free. Also, following tax exemption on rice imports by Tanzania between January and March 2013, excess rice was

imported and later dumped into Ugandan rice market.

Table 6 Leading rice trade partners for Uganda imports

Period		Wholly milled rice		Broken rice	
	Year	Country	Value*	Country	Value*
Before CET	2001	Viet Nam	5557	Viet Nam	1604
	2002	Viet Nam	3332	Pakistan	1969
	2003	Pakistan	1275	Pakistan	4981
	2004	Viet Nam	2381	Viet Nam	7110
	2005	Viet Nam	4792	Viet Nam	8237
After CET	2006	Italy	2455	Viet Nam	8532
	2007	Tanzania	11452	Pakistan	9609
	2008	Tanzania	13021	Pakistan	6481
	2009	Tanzania	14031	Viet Nam	12300
	2010	Tanzania	23742	Pakistan	12023

*US\$(thousand)

Source: UN COMTRADE

Table 7 Trade misconduct within regional partners

Period	misconduct (as in newspaper headline)	Faulting partner	affected partner	source
June 29, 2012	Smuggling stifles rice farmers	Kenya	Uganda	NewVision*
January 5, 2013	Dar forced to import rice to stabilize price of local harvest	Tanzania	Uganda Kenya	The East African**
April 22, 2013	City traders fault Tanzania over rice dumping	Tanzania	Uganda	Daily Monitor***

* <http://www.newvision.co.ug/news/632482-smuggling-stifles-local-rice-farmers.html>

**<http://www.theeastafrican.co.ke/news/Dar-forced-to-import-rice-to-stabilise-price-of-local-harvest/-/2558/1658328/-/euv83z/-/index.html>

***<http://www.monitor.co.ug/Business/Commodities/City-traders-fault-Tanzania-over-rice-dumping/-/688610/1754558/-/869rb1/-/index.html>

Source: Various local and regional newspapers

2.6 East African rice markets integration in the context of the CET implementation

Two markets are said to be integrated if price changes in one market are consistently related to price changes in the other, and market agents are able to interact between either markets. If markets are integrated, traders will bring food from surplus market to deficit market, which in turn lowers the price in the deficit market until the price difference is equal to the transport cost. There are three main methods used in testing integration: price spreads analysis, price correlation analysis and co-integration analysis. This paper uses price correlation analysis to capture the co-variation between two sets of rice wholesale prices across three East African capital cities: Kampala, Nairobi and Dar es Salaam. A rule of thumb often used in interpreting the correlation coefficient is that coefficients of 0.6 or higher are evidence of integration.

Analysis of prices in these three markets will help to reveal the existence of trade among them and show that any policy which affects price in one market will affect the prices in another if these markets are integrated. This is necessary since some of the features of the East African Customs Union are elimination of internal tariffs and non-trade barriers with the objective of facilitating the formation of a common market. The implication is that traders are able to move rice anywhere within the region without any barrier from member countries. Tanzania being the main supplier of rice to Uganda, it is assumed Tanzanian traders will export rice when Kampala prices are higher than Dar es Salaam prices and the transport costs. In this case, Kampala rice price will depend on Dar es Salaam price and follow similar trends. In other words, there will be price transmission from Dar es Salaam to Kampala if these two markets are integrated. Meanwhile small amount of rice from Nairobi reach Kampala and therefore the prices are not expected to take similar trends.

Use of price in market analysis is convenient when market information is limited. In Uganda, information about volume of rice in the local market at a particular time is unavailable. Only production and import data is available and on annual basis. Since only part of what is produced is marketed, estimating market quantities for specific markets say Kampala is quite difficult and may lead to unreliable conclusions. For this reason, the researcher opted for market integration analysis which only requires price data instead of more detailed analyses such as price formation functions which require volume data.

Figure 5 shows the price trend in East African rice wholesale prices. Whereas there has been a strong upward movement of rice prices in Kampala and Dar es Salaam, it has been a weak upward trend for Nairobi. Prices have been fluctuating, with peaks observed between the months of February and May due to supply shortages after the local harvest has been exhausted. Due to high CET, Kampala and Dar es Salaam prices have been generally above Nairobi prices. Because Kenya imports most of its rice from beyond East Africa, Nairobi price trend has not been in tandem with Kampala and Dar es Salaam price. The results of correlation analysis (table 8), also confirms this price co-movement. A strong correlation coefficient of 0.85 between Kampala and Dar es Salaam prices implies that there exists trade between these two markets and they are integrated. On the other hand, Nairobi is not integrated to the other two markets as witnessed by low correlation coefficients of 0.38 with Kampala and 0.46 with Dar es Salaam.

Table 8 Wholesale price correlation coefficients

	Kampala	Nairobi	Dar es salaam
Kampala	1		
Nairobi	0.38	1	
Dar es salaam	0.85	0.46	1

Source: own calculation using data from RATIN

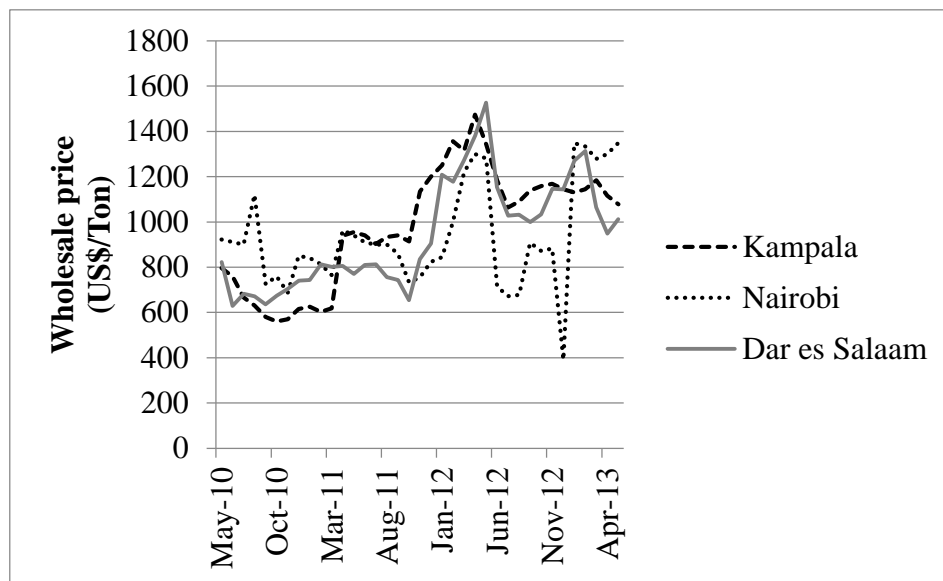


Figure 5 Rice wholesale prices within regional markets

Source: EAGC RATIN, 2013

2.7 Conclusion

This chapter has analyzed the role of high regional rice import tariff in developing Ugandan's rice subsector with a focus on markets. Uganda adopted a maximum common external tariff of 75% ad valorem or \$200/ton whichever is higher on rice imports, with the aim of raising the price of locally produced rice by preventing cheaper rice from international markets in order to motivate local farmers. Since its (CET) enactment, however, rice imports have continued to grow faster than local production as witnessed by the change in import dependency ratio from 43% in 2005 to 49% in 2009.

Weakness in the implementation of the common external tariff policy by regional partners has allowed cheap rice within the East African region. As a result, Uganda's effort to enforce the same policy has not succeeded due to smuggling of foreign rice from regional partners into local markets. Unfortunately, neither the consumer nor the farmer

has benefited from this scenario. Whereas the consumer has continued to pay higher prices, the farmer has continued to receive lower prices due to the wastage along the value chain.

In terms of price and trade direction, whole rice was affected by high import tariffs more than broken rice whose niche market is Africa. Tanzania became the main supplier of whole rice while Pakistan and Viet Nam maintained their dominance in the supply of broken. The high import tariff lowered the profit on whole rice in Uganda and prompted Pakistan and Viet Nam exporters to redirect their exports to more profitable markets elsewhere. However, less profit on broken rice was tolerated due to limited number of alternative markets and hence the continued dominance of Pakistan and Viet Nam rice in the country.

Because most rice imported into Uganda comes from Tanzania, Dar es Salaam wholesale price is integrated with Kampala wholesale price. On the other hand, Kampala price is not in tandem with Nairobi price since there is less trade between these two markets. Any change in Dar es Salaam market will be transmitted to Kampala rice markets. Thus any policy change such as lifting import tariff by one Government needs to be carried out in consultation with other member countries. Also, Kenya's lower import tariff on Pakistan rice has enabled lower rice prices to prevail in Kenyan markets compared to the prices in Uganda and Tanzania. Consequently, some Ugandan rice traders have been tempted to smuggle cheap Pakistan rice from Kenya into Uganda, thereby distorting market price. It is therefore necessary that the CET is set at lower rate and uniform across all member countries to avoid intra-regional trade malpractices.

In summary, the protection to local farmers which was intended by the high import tariff has not been successful. Poor implementation by regional partners led to

smuggling which has ruined and discouraged genuine traders from business. At the same time, Tanzania has become the main supplier of rice to Uganda. Since East African rice import is tariff free, the benefits of high price to Ugandan farmers have not been realized. Also, high transaction costs from village farmer to urban consumer due to poor infrastructure leaves farmers with low earnings and consumers with high price. For CET policy to succeed there is need for lowering the import tariff and making it uniform across all member countries and strengthening its implementation. Even if this recommendation is taken, developing the entire rice value chain through infrastructure improvement should be prioritized.

Chapter Three

Upgrading Uganda's rice markets: constraints and opportunities

3.1 Introduction

Unlike most of the food crops grown to satisfy household consumption and food security requirements, rice is consumed more in urban areas, where it is one of the major foodstuffs at homes, schools, hospitals and prisons (Ahmed, 2012). Rice is grown almost throughout the country but mainly in the Eastern and Western Uganda due to availability of lowlands with high moisture contents throughout the growing season. However, these (Eastern and Western) regions' lack of market access is the most significant explanation to their food insecurity (McKinney, 2009). In the same regard, Odogola (2006) precisely observed that 70% of the rice farmers in Kamwenge district (Western Uganda) and 48% of their counterparts in Iganga district (Eastern Uganda) have poor marketing systems. The main problems cited as constituents of poor market access include: lack of market information, poor road network, small paddy quantities, low quality paddy and inadequate postharvest handling skills (Odogola, 2006).

With the larger share of locally produced rice ending up in domestic markets, it is imperative that access to a well-functioning market will be required to improve the livelihood of smallholder farmers who are the majority rice producers in the country. There is need for an efficient and effective linkage between the rural producers and the urban consumers. This linkage can be well understood through the concept of value chain. Kaplinsky and Morris (2000) refers to value chain as a full range of activities required to bring a product or service from conception, through different stages of production, delivery to final consumers and final disposal after use. There are many rice value chain studies which have been conducted in Uganda by government agencies such as Ministry

of Agriculture Animal Industry and Fisheries (MAAIF, 2009) and Plan for Modernization of Agriculture (PMA, 2009) plus several bilateral and donor organizations either directly or through consulting agencies (Trias, 2012; USAID, 2008; Kilimo Trust, 2012; Action Against Hunger (ACF), 2014). In most of the above studies, the emphasis has been placed on market structure mapping and gross margin analysis with less focus on upgrading opportunities and yet it is mandatory for market access by rice producers. Mitchell et al (2011) defines upgrading as a means of acquiring the technological, institutional and market capabilities that allow resource-poor rural communities to improve their competitiveness and move into higher-value activities.

The purpose of this study was to assess the rice value chains in Uganda in the context of upgrading by: (i) studying various marketing channels, (ii) identifying constraints and opportunities along the marketing channels and (iii) analyzing the upgrading strategies. Upgrading of rice value chains enables farmers earn higher prices as well as helping consumers access high quality rice at a relatively lower price (JICA, 2013).

3.2 Upgrading in value chains

Upgrading is a key contribution of value chain analysis with regard to understanding how incomes of poor people can be augmented. It refers to acquiring technological, institutional and market capabilities that allow firms or communities to improve their competitiveness and move into higher-value activities (Mitchell et al, 2009). The purpose of upgrading is to enhance the rewards and or reduce the risks to actors in production and marketing. If the anticipated rewards gain or risk reduction is not realized, the actor may choose to revert to previous or less functions. Such a scenario is referred to

as downgrading (Khiem et al, 2010). Different upgrading strategies have been suggested in various studies (see (Kaplinsky and Morris, 2002; Mitchell et al, 2009; Mitchell and Coles, 2011; Trienekens, 2011) to help in development of developing countries' value chains. Such strategies are briefly explained as follows:

Horizontal coordination: one of the main obstacles facing small-scale enterprises in developing countries is the very fact that they are small-scale. Horizontal coordination is the process of firms (which can be as small as individual actors) collaborating within a functional node (for example input supplies, production, processing, trading or retailing) to achieve a strategic balance between competition and collaboration (Mitchell and Coles, 2011). The purpose of horizontal coordination is to address shared constraints, interests and entry barriers associated with scale. These include high transaction costs, low and poor quality output, weak negotiating power and lack of capital and management of common property resources. According to Mitchell et al (2009), horizontal coordination is often the first step in a sequence of interventions that ultimately result in access to the market, and is a prerequisite for other forms of upgrading. In developing countries, horizontal coordination takes the form of producer associations or cooperatives (Trienekens, 2011).

Vertical coordination: the process of strengthening relationships between functional nodes of the value chain, involving the shift away from one-off spot transactions toward developing longer-term business connections for instance contract farming (Mitchell et al, 2009, Mitchell and Coles, 2011). In practice, vertical coordination is often a slow and difficult process because it involves the building of trust relations between the buyer and the seller. As such, it rarely takes place in isolation from other upgrading strategies. More formal contracts are often associated with higher performance

requirements, such as higher-quality products, larger volumes and delivery schedules that are more frequent and reliable. Overcoming the barriers associated with these requirements may necessitate a preliminary step of horizontal coordination (Mitchell and Coles, 2011).

Functional upgrading: also referred to as vertical integration, it involves changing the mix of functions performed by actors in the value chain. This can be through adding new activities by an individual or firm, for instance agricultural producers starting to process some of their output to add value or starting to produce the inputs by themselves. In some instances, the individual or firm may decide to delete some activities (downgrading) if deemed necessary. The resulting distribution of functions among actors in the chain should maximize its efficiency and competitiveness by attaining the optimal level of specialization versus integration (Mitchell et al, 2009, Mitchell and Coles, 2011). Integrating functions vertically offers the possibility of transforming raw materials into new products and thereby increasing the proportion of value captured. Trienekens (2011) identifies functional upgrading as a key issue in developing country value chains as most exports are in raw material form.

Process upgrading: involves improving value chain efficiency by increasing output volumes or reducing costs for a unit of output. Examples of this include improving agronomy to enhance yields that result in higher sales or own consumption, or both. This may be the result of improved planting techniques, planting materials or investments such as irrigation infrastructure and technologies which reduce postharvest losses (Mitchell et al, 2009). Process upgrading focuses on the one hand on upgrading the product and on the other hand on optimization of production and distribution processes. The latter includes introduction of new technologies such as automated production and packaging

lines, cooling installations and modern transportation technology as well as improved communication facilities in the supply chain such as internet connection, GPS systems or the intense use of mobile phones in production and transportation planning (Trienekens, 2011).

Product upgrading: introducing new products or improving old products faster than rivals. This involves changing new product development processes both within individual links in the value chain and in the relationship between different chain links (Kaplinsky and Morris, 2000). Along the same line, Mitchell and Coles (2011) defines product upgrading as making better products that hold greater value and fetch higher prices. One of the most common and intransigent barriers for the rural poor is that their output fails to meet market specifications, both in terms of quality and volume. Raising product quality and increasing the efficiency of production are critical prerequisites to accessing and competing successfully and beneficially in markets (Mitchell and Coles, 2011). Process and product upgrading are closely related because improving product quality often involves improvements to the production process (Mitchell et al 2009).

Inter-chain upgrading: is where chain actors introduce value adding processes from other chains to offer new products or services, for instance a farmer who enters into tourism activities (Trienekens, 2011). The new value chain is usually more profitable than the previous one for example shifting from growing traditional commodities to high quality export horticulture. Unfortunately, the upgrading process often has significant barriers to entry for the poor and vulnerable to access the more lucrative value chain (Mitchell et al 2009).

Upgrading of the enabling environment: although not an upgrading strategy in a strict sense, competitiveness of the enabling environment for value chains is a major

contributing factor in the success of the operations of a value chain. Improvements to the support services, institutional, legal and policy frameworks in which value chains operate are often a productive area in which development agencies can intervene to improve the functioning of a chain (Mitchell et al, 2009, Mitchell and Coles, 2011). Such things as standards and certification, rules and regulations regarding contracts, etc. must be in place for successful upgrading in value chains to take place.

3.3 Methodology

The study was carried out in the eastern district of Namutumba. Carved out of Iganga district in 2006, Namutumba is located at coordinates 00 51N, 34 41E along Tirinyi road (Mbale-Iganga highway). It occupies a total area of 802 square kilometers of which 138 square kilometers is covered by water bodies. Administratively, the district is divided into six subcounties of: Namutumba, Magada, Bulange, Nsinze, Ivukula and Kibale. Given its abundant swamps and proximity to Lake Victoria, climate is tropical with small seasonal variations in temperature (22-27°C) and rainfall (900-1150mm). As of 2011, the population estimate was 213,000 people of whom 51.5% were females. Smallholder subsistence farmers comprise 84% of the population. They engage in rearing livestock such chicken, cattle, goats, etc and growing crops such as rice, cassava, groundnuts, millet and coffee. Namutumba, together with the nearby districts of Iganga, Pallisa, Tororo, Butaleja, Bugiri and Busia form the main rice growing region of Uganda. The district is easily accessible due to its location along the highway.

Nsinze subcounty was purposively selected since it has most of the rice value chain activities taking place there. It has many rice farmers and rural millers and the nearby Busembatya trading center has a lot of rice milling and trading transactions which

makes it to act as a link between rice farmers and urban traders. The researchers first conducted a desktop research to have basic idea about rice farming as a business in the study area. This was followed by discussions with key informants who included the chairperson farmers' forum, representative from National Agricultural Advisory Services (NAADS), local council leaders and farmer group leaders. Focus group discussions were then carried out with 3 farmer groups each containing 10 people. Each group was a representative of a single parish. In addition, discussions with 3 groups of rice millers were conducted. One group of rice millers was in the rural farming area of Nsinze subcounty while the other two groups were in Busembatya trading center. This was necessary since millers from the rural village had different characteristics to those of town millers. For the purpose of cross checking the information got from group discussions, 15 farmers and 5 rice millers were selected for individual interviews. The major processing company in the region which is involved in purchasing the rice paddy from farmers and traders was interviewed to gather data on processing.

Analysis was done in the context of value chain upgrading as suggested by Trienekens (2011) with the help of descriptive statistics, tables, figures and gross margins.

3.4 Overview of value chain actors

According to the group discussions, rice farmers own about 2 hectares per household. Table 9 is a summary of landholding and land under rice cultivation which was captured from the individual household interviews. The average land holding is 2.2 hectares which is the same as reported in group discussions. The actual landholding, however, varied significantly from 0.8 ha for the smallest farmer to 4.0 ha for the largest. In contrast, the average land holding in region as reported in the agricultural census of

2008 is about 0.8 hectares per household. This implies that rice farmers own on average more land than their non-rice farming counterparts. Average cultivated land was 2.0 ha of which 36.7% was under rice. The average rice yield was 2.7 tons/ha. This yield was achieved using seed from the previous harvest and without fertilizer application or irrigation. Chemical herbicide for *striga* weed was however applied.

Table 9 Household landholding and rice cultivation

farmer	total land owned (ha)	total land cultivated (ha)	land under rice (ha)	rice area as % of cultivated	yield (tons/ha)
1	0.8	0.8	0.3	40.0	1.6
2	1.2	0.8	0.4	50.0	2.5
3	1.2	1.0	0.4	40.0	3.0
4	1.4	1.4	0.4	28.6	3.3
5	1.6	1.4	0.8	57.1	3.8
6	1.6	1.4	0.6	42.9	3.0
7	1.6	1.6	0.6	37.5	2.0
8	2.0	2.0	0.6	30.0	2.5
9	2.0	2.0	0.8	40.0	2.5
10	2.4	1.6	0.8	50.0	2.8
11	2.4	2.4	0.6	25.0	3.8
12	2.4	2.4	0.4	16.7	1.5
13	4.0	3.2	0.8	25.0	2.5
14	4.0	3.6	1.0	27.8	3.3
15	4.0	4.0	1.6	40.0	3.0
Mean	2.2	2.0	0.7	36.7	2.7

Source: Survey interview (Sep-Oct, 2013)

Rice millers in the survey area can be categorized into two: (i) rural village millers (hereafter referred to as ‘village millers’) who are located in deeper villages where rice farming mostly takes place and (ii) rural town millers (hereafter referred to as ‘town millers’) who operate from the trading centers. Using the results of group discussion, table 10 compares these two categories of rice millers. The village millers are relatively new (2 years old) in business and use diesel as power source. The milling capacity of their machines is low (3.2 tons/day). Despite their proximity to farms, they receive relatively low volumes of paddy ranging from 0.3 tons/day to 1.3 tons/day depending on the season.

Due to high diesel price, they charge a relatively higher milling fee (100000 Ush/ton). On the other hand, the town millers have accumulated relatively more experience as they have spent 5 years on average in milling business. They use electricity as a source of power and the milling capacity of their machines is quite large (18 tons/day). Although the quantity of paddy received is larger, it's well below the amount required by their milling machines. Because they are far from farmers and electricity is cheaper than diesel, their milling charges are relatively low.

Table 10 Characteristics of rice millers

indicator	rural village millers	rural town millers
power source	diesel	electricity
years in business	2.0	5.0
daily paddy supply (tons) -on-season	1.3	2.5
daily paddy supply (tons) -off-season	0.3	0.5
milling capacity (tons/day)	3.2	18.0
milling fee (shillings/ton)	100000	80000

Source: Survey interview (Sep-Oct, 2013)

Interviews with the manager of processing company revealed that it was started by individual entrepreneur with the support of government and other donors in Jinja town (in 2006). The company has a large milling machine with a milling capacity of 2 tons per hour and a mechanical dryer with a capacity of 5 tons per hour. It currently supports 10000 clients across the country with some as far as Western Kenya. The clients are mainly

smallholder farmers who bring paddy by themselves when from Busoga sub-region (where the company is located) or offered transport service (when from elsewhere). Besides farmers, there are some 300 traders who bring paddy. At the company premises there are several services which include drying, milling, branding, storing and marketing. Milling is of high quality as all foreign matter and unfilled grains are separated from paddy before milling. Commission is charged for these services on the clients after selling milled rice.

3.5 Rice market structure

Figure 6 illustrates the rice market structure in the study area. Most of the dried paddy is taken by individual farmers to rural rice millers for milling. The remaining paddy is either taken by individual farmers to medium scale processor (Upland Rice Millers) or sold to paddy traders who in turn take it to the processing company. The processing company works with up to 300 traders who source paddy from all parts of Uganda and other East African regions such as western Kenya and Northern Tanzania. The paddy taken to the rural rice millers is sold immediately after milling to the waiting buyers. The buyers are mostly village assemblers who bulk the rice before selling to wholesaling traders from urban areas such as Iganga, Jinja and Kampala.

The paddy taken to processing company is dried to required standards (14% moisture content), milled, graded and branded before it is sold. Grading is based on the percentage of broken rice as all foreign matter is removed by the machine during milling. The graded rice is then branded according to varietal features of milled rice: (i) 'Kayiso' for lowland long and narrow grains (ii) 'Upland' for NERICA varieties and (iii) 'Super' for lowland short, thick, sticky and aromatic grains. These brands have some meaning

attached to them. For example ‘Kayiso’ literally means needle shaped and comes from indigenous Ugandan varieties. Due to their promotion since 2003, NERICA cultivars are the most popular upland rice varieties in Uganda. To this end, the words ‘NERICA’ and ‘Upland’ are often used interchangeably by farmers and consumers. ‘Super’ brand is associated with its superior cooking qualities. The branded rice is either sold to the distributors (wholesalers, retailers or exporters) or to final consumers (individuals, public and private institutions).

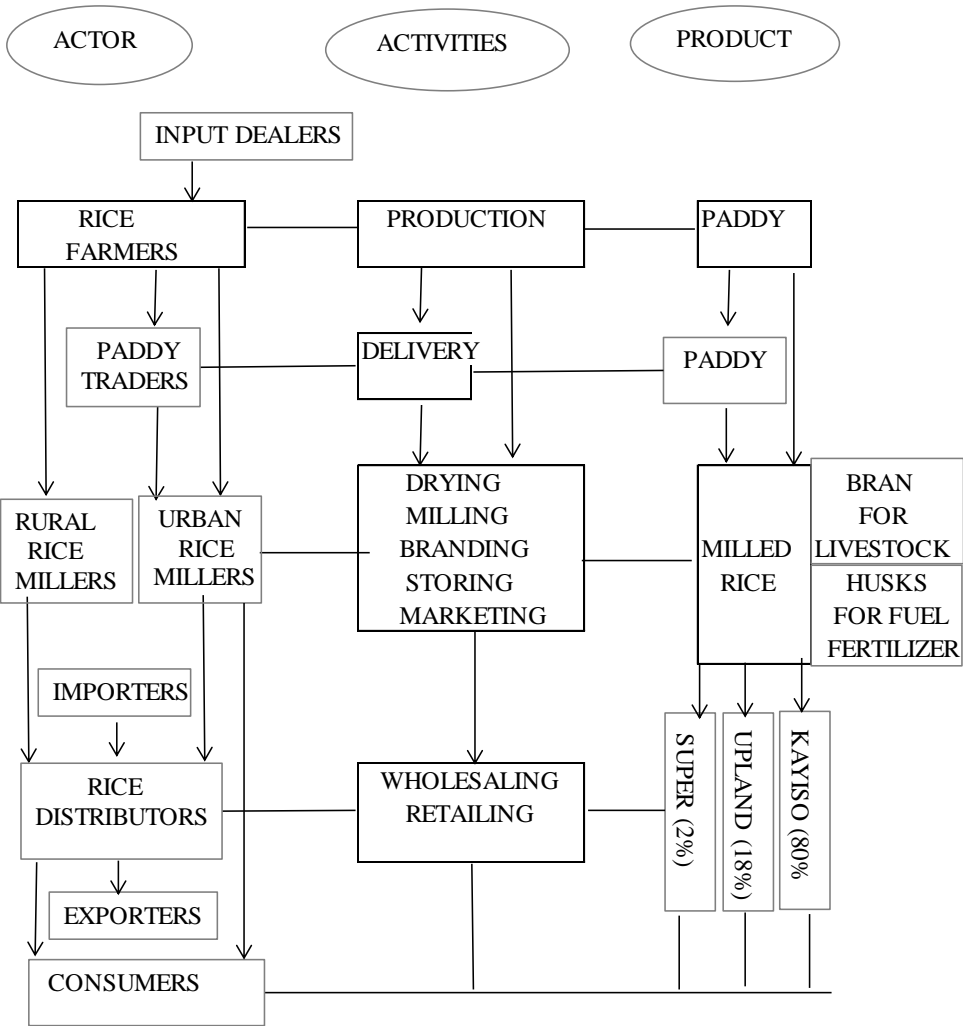


Figure 6 Structure of rice marketing Source: Survey interview (Sep-Oct, 2013)

Besides rice, the processing company also produces other byproducts such as

bran (for livestock and poultry feed) and husks which are currently being used as organic fertilizers in maize fields but plans are underway to be used for fuel supply.

3.6 Limited market support

Rice sector in Namutumba district boasts of a good network of governmental and non-governmental organizations. Table 11 indicates different organizations rendering support to farmers. With the help from Japan International Cooperation Agency (JICA), the Uganda National Agricultural Research Organization (NARO) is constantly engaged in development of new rice cultivars and agricultural technologies. Organizations such as Sasakawa Africa Association (SAA), Africa 2000 Network (A2N), National Agricultural Advisory Services (NAADS) and Japan Overseas Cooperative Volunteer Program (JICA Volunteers) are putting great efforts in rice farming technology dissemination and extension. The support however does not go beyond the farm level.

Table 11 Organizations participating in rice promotion

farmer	source of training				
	Sasakawa Africa Association	Africa 2000 Network	NAADS	NARO	JICA volunteer
1	✓	✓	✓		
2	✓	✓			
3	✓			✓	
4	✓				✓
5	✓		✓		✓
6	✓		✓		
7	✓				
8	✓				
9	✓		✓		
10	✓	✓	✓		
11	✓	✓	✓		
12	✓	✓			
13	✓			✓	✓
14	✓		✓	✓	✓
15	✓	✓	✓	✓	✓

Source: Survey (Sep-Oct, 2013)

Table 12 summarizes interventions by various support organizations in the survey area. Besides the East African regional organization “Kilimo Trust”, which supports marketing initiatives through its private partnerships, there is minimum assistance in the area. Through the program ‘Development of Inclusive Markets in Agriculture and Trade (DIMAT)’, which is a partnership with upland Rice Millers, Kilimo Trust is expected to reach 3000 rice farmers in the area of rice marketing. The outcome of the aforementioned rice marketing partnership is yet to be seen, however, as the program is still new and not yet rolled out. Bulk marketing which was promoted by SAA could not be sustained after the closure of the project although it was positively viewed by farmers. The above organizations have concentrated on production with little assistance in postharvest handling and marketing. This is contributing to low quality rice produced by farmers. More support which is focused on quality improvement is required.

Table 12 Interventions by support organizations

Organization	support activity			
	Research	Inputs	Production	Marketing
Sasakawa Africa Association*	✓	✓	✓	✓
Africa 2000 Network			✓	
NAADS		✓	✓	
NARO	✓			
JICA	✓	✓	✓	
Kilimo Trust**				✓
* Project activities in the survey area completed				
** Still in pilot phase				

Source: farmers survey (Sep-Oct, 2013)

3.7 Mistrust between farmers and millers

In terms of financial credit, only one rice miller (former carpenter) was able to access credit from a microfinance institution (Pride Microfinance Ltd). Most millers used their own savings or borrowed from friends for their startup capital. Limited financial support is one of the reasons for low quality rice due to poor drying facilities. Efforts by millers to give financial credit to farmers have been futile due to failure in recovering. This has created mistrust between millers and farmers thereby derailing future hopes of credit offer.

Table 13 Credit recovery by millers

millers	credit to farmers*	amount recovered*	recovery rate (%)	lending modality
1	500000	300000	60	individual
2	300000	200000	67	individual
3	1200000	1200000	100	group
4	1000000	700000	70	individual
5	0	N/A	N/A	N/A

* unit of measurement is Uganda Shilling
(1US\$= 2500 Ush, as of Oct, 2013)

Source: Survey (Sep-Oct, 2013)

Table 13 highlights credit recovery success by millers. All the millers who advanced financial credit to individual farmers recovered at most 70% of the total amount with the rest being defaulted. Since the buying and selling of rice takes place at the milling machine, informal agreement is formulated where farmers are supposed to mill their rice from the lender's premises and credit be repaid after milling either in cash or in-kind. If applied appropriately, this arrangement is fair to farmers since sometimes interest rates are not factored into the recovery amount as millers anticipate a steady supply of paddy for the smooth flow of their business. Unfortunately, more often the farmers fail to honor the agreement after harvesting and mill their rice from elsewhere due to misallocation of

credit funds. However, one miller who gave credit to a group of farmers was successful and recovered 100% of the amount. In addition, this miller did not offer financial credit but rather provided tarpaulins in-kind which were valued in cash for the purpose of repayment. Based on this model, it is recommended that credit be offered in form of tarpaulins to farmer groups through their leaders.

3.8 Price formation mechanism

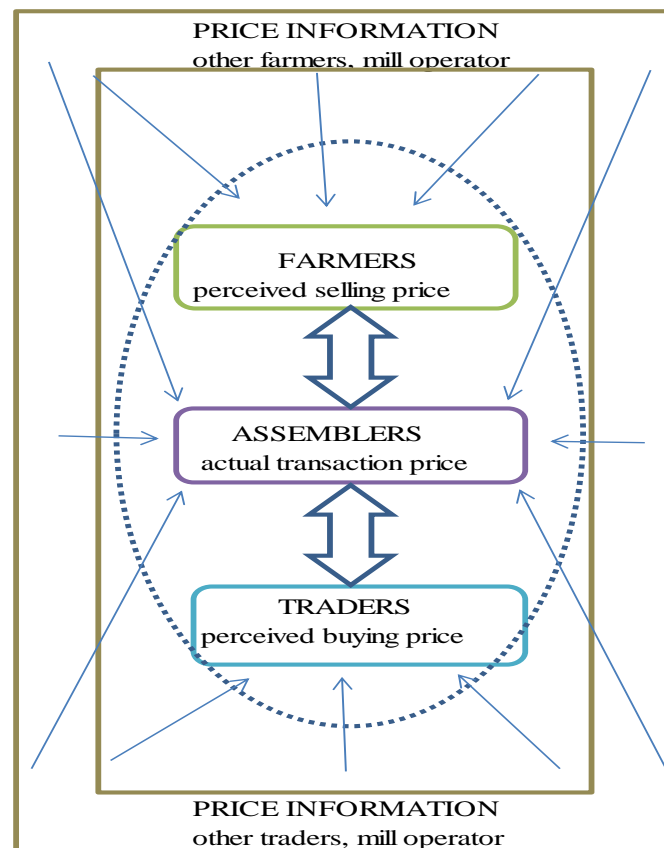


Figure 7 Price forming mechanism

Source: Survey interview (Sep-Oct, 2013)

Figure 7 is a sketch of price forming mechanism. Through interactions with other farmers or rice millers over phone or face-to-face, farmers get to know the possible rice

price range for a particular day before taking it for milling. On the other hand, village assemblers also come to the miller with fair knowledge of the prevailing price after consultations with other buyers through phone. Price is determined through negotiations between the farmer and the village assemblers. It depends on the perceived quality as determined by the amount of broken rice and presence of foreign matter. Since there are no quality standards, the perceptions are done in comparison to other available rice. Other factors which influence price on a given day include: number of traders, volume of rice and bargaining power of a particular farmer.

3.9 Village assemblers hold the market power

Farmers in the survey area engage in growing various varieties of rice which can be branded either as Super, Kayiso or Upland in the wholesale and retail markets. Unfortunately, at farm gate it is sold as single category irrespective of how distinct it may appear. During drying, different varieties are usually mixed either voluntarily by farmers due to limited space or involuntarily by birds when spread separately but adjacent to each other. Because the rice offered by farmers to the market is mixed, village assemblers pay the price for the lowest quality brand even if it constitutes a minor share of the farmer's rice. Farmers in the survey area grow mainly NERICA as a result of previous assistance by Sasakawa Africa Association. However, their rice has been bought at a price comparable to that of Kayiso instead of Upland which is the true brand for NERICA rice varieties. After reaching the wholesale market, traders sell it as Upland without adding any value. Given that prices for various brands are different, farmers lose a lot of money in this process. Table 14 gives rice prices at different marketing levels. 'Kayiso rice' is the cheapest, followed by 'Upland rice' with Super brand being the most expensive at

wholesale and retail price. This shows village assemblers hold excess power and influence in rice markets at the expense of farmers. The assemblers are relatively more coordinated compared to farmers which helps them in distorting the market price. In addition, there are several other reasons which force farmers to sell to village assemblers. First, farmers individually supply small quantities and yet wholesalers and other institutional buyers are interested in bulk purchases. Second, farmers are always dependent on crop harvests for their livelihood and therefore prefer immediate sales and cash payments which institutional buyers cannot provide. Third, farmers lack adequate and quality storage facilities which can enable them to wait for price increase before selling. Farmers will need to be more coordinated and practice appropriate postharvest procedures if they are to benefit from high price of their rice. Worth noting however is whereas the wholesale and retail prices are quoted from the nearby market, it's important to note that most of rice produced in survey area is procured and taken by Kampala traders.

Table 14 Monthly rice prices (Uganda shillings, Ush)

distribution point	brand	average monthly price (Ush/kg)				
		Jun-13	Jul-13	Aug-13	Sep-13	Oct-13
farmgate	kayiso	1700	1800	1900	1900	1800
	upland					
	super					
wholesale	kayiso	1750	2000	2050	2000	1950
	upland	2400	2400	2400	2450	2450
	super	2850	2850	2850	2850	2750
retail	kayiso	2100	2300	2300	2200	2200
	upland	2700	2700	2700	2700	2700
	super	3200	3200	3200	3200	3000

Source: Survey (Sep-Oct, 2013), Infotrade Uganda database

3.10 Market constraints and opportunities

3.10.1 Constraints to farmers

Table 15 is about challenges faced by smallholder farmers and the possibilities of solving them. *Striga* weed is the most severe problem at the production stage. The weed causes many unfilled grains and consequently a low milling recovery. It also increases labor costs as it is cumbersome to eradicate and thus necessitates agricultural chemicals. The weed is more destructive to certain rice cultivars than to others. NERICA 4, the mostly grown cultivar in the survey area is so susceptible and can result into significant crop losses. However, NERICA 10, a newly introduced variety in Uganda is resistant to *striga* weed (Rodenburg *et al*, 2015). Given that it gives higher yields, switching from growing NERICA 4 to NERICA 10 is a viable consideration.

Table 15 Constraints to rice farming

General challenges	specific challenge	possible solutions
Yield losses due to uncontrollable weeds	<i>Striga</i> weed is causing high losses	switching from NERICA 4 to NERICA 10
physical losses during drying	paddy is dried on bare ground leading to spillage or washed away by rains	training on post harvest handling
low quality paddy during drying	paddy mixes with foreign matter during drying. moisture control is also difficult which facilitates mould growth	advancing in-kind credit in the form of tarpaulins through groups
inability to separate different varieties	farmers either practice mixed cropping or dry different varieties on the same yard.	training on the income benefits of drying separately

Source: Survey (Sep-Oct, 2013)

The most market related challenge to rice farmers is lack of drying facilities. Paddy is dried on bare ground and as a result it ends up mixing with a lot of foreign matter.

Coupled with poor moisture control, this leads to low milling quality.

3.10.2 Constraints to small scale millers

Small scale rice milling is done by diesel operated machines in villages and electricity operated machines in towns. To minimize on defaulters by the power company, rice millers were advised to form clusters through which they were to be connected to electricity. However, the initiative was not successful as several members were operating without paying the fees. The end result was frequent disconnection from the electric power grid due to defaulting cluster members. The faithful members who committed themselves to paying their fees have not been spared. They are suffering to service the debt of their defaulting counterparts so that they can sustain their business. Since clusters seem to have failed, allocating each miller individual electric meter is worth trying. The power cost is also high as it constitutes 69% and 86% of total costs to town millers and village millers respectively. Table 16 summarizes the challenges facing rural rice millers. Besides the aforementioned power related challenges, the amount of paddy available keeps fluctuating. During off season this problem worsens forcing some millers out of business. Low paddy quality also affects the milling machine thereby necessitating frequent servicing. With all the above challenges, small scale rice milling is still worth conducting due to its profitability. Table 17 shows daily profits accrued by village and town rural millers as calculated by the difference between income and operating costs. It is 54800 and 90400 Ush per day for village and town millers respectively. On monthly basis the average profit of village millers translates into 1.6 million Ush which is more than tenfold the average household income in eastern Uganda (155500 Ush).

Table 16 Constraints to rice milling

general challenge	specific problem	possible solution
cluster power supply	frequent disconnection due to poor payment of bills by cluster members	each individual should be allocated a separate meter
low milling quality	paddy usually contains foreign matters such as stones and dirt	training of farmers in post harvest handling
lack of trust between millers and farmers	recovery of credit advanced to individual farmers by millers has been unsuccessful	credit should be advanced to a group of farmers for easy monitoring
unstable paddy supply	available paddy is far below the milling capacity, this worsens during off-season	productivity and market improvement should be emphasized

Source: Survey (Sep-Oct, 2013)

Table 17: Daily gross margin by rice millers

Item	rural village millers	rural town millers
Revenue (Ush/day)		
1.3 tons @ 100000	130000	
2.5 tons @ 80000		200000
Total revenue-A	130000	200000
Operating costs (Ush/day)		
Labor	7000	20000
energy (electricity)		75000
energy (diesel)	65000	
oil @ 3200/litre	3200	6400
rent		8000
Total operating costs -B	75200	109400
energy (% total cost)	86	69
Profit (A-B)	54800	90400

Source: Survey (Sep-Oct, 2013)

3.10.3 Constraints to processing company

The company regularly evaluates its activities and designs new strategies to overcome current and future challenges. Table 18 shows such innovations according to different processing functions. Originally paddy was sun dried on tarpaulins. Due to a number of challenges associated with sun drying, a high capacity mechanical dryer was purchased. Shortage of power supply due to load shedding, however, emerged as a fresh challenge. The company is now planning to start power generation from rice hulls as a backup source. Economic viability of such option needs to be assessed before the company starts the initiative. Since many sugar companies in the country are now producing their electricity from bagasse, there is genuine optimism. The increasing number of paddy supplying clients had put pressure on available storage place. This meant that many paddy and rice bags were crammed which in turn resulted into conducive environment for disease and pests outbreak. In response to this challenge, the company set up a modern and spacious (3000 tons) warehouse which has significantly improved storage quality. There is periodic shortage (15%) in the amount of paddy received especially in period of February to May each year. The company tried to overcome this challenge by importing from Kenya for the short term. Partnerships with other organizations are being signed to increase local rice production to stop paddy importation. It is believed, such arrangement with no doubt will avail more paddy than the milling capacity of the current machine. To prepare for this anticipated challenge, the plans are underway to install a higher capacity milling machine. Currently, milling results into four grades of rice: (i) A (100% wholly milled rice), (ii) B (up to 30% broken rice), (iii) C (31-70% broken rice) and (iv) D (more than 70% broken rice). Rice price decreases with grades from A to D, with A being the most expensive. Due to poor postharvest handling,

farmers' rice is always dominated by grade C which commands lower price in the market and consequently low income. To help farmers earn more, the company has been marketing three grades (A, B-C and D) by mixing grades B and C. However, this has been done at the compromise of product quality which deteriorates consumer trust. The company is now encouraging farmers to bring freshly harvested paddy so that it can be dried from the premises. At the same time it is equipping the laboratory with chemicals and other instruments for various quality tests to reduce percentage of broken rice and improve milling quality. Super rice, the most demanded brand, is in limited supply since its varieties do not grow well in most Ugandan soils. Most of the paddy for Super rice is currently imported from Tanzania. This has resulted into higher prices which average consumers cannot sustain. Countrywide soil testing has been carried out and Soroti area soils been identified as ideal for Super rice cultivars. Through public-private partnerships, efforts to promote production of Super rice in Soroti are under consideration.

Table 18 Constraints to rice processing

Value chain function	Previous challenge	solution/ upgrading opportunity	New/potential challenge	planned solution/ upgrading opportunity
Drying	drying was mostly by sun on tarpaulines: moisture content difficult to control, paddy spillage and some consumed by birds, crashed by workers during spreading, washed away by rains	High capacity mechanical dryer (5 tons/hr) installed	power shortage as a result of biweekly loadshedding	contemplating production of power from rice husks to avoid power disruptions
storing	limited storage space which encourage pests and diseases to emerge	modern warehouse (3000 tons) has been constructed where farmers' rice is stored freely before and after milling		
Milling	unstable supply of paddy necessitating imports from Kenya	partnership with other stakeholders to increase local production (e.g 3000 new farmers will be supported by KILIMO TRUST)	milling capacity of currently used machine (2 tons/hr) may not be enough during peak hours	a higher capacity milling machine is in the plans of being installed
sorting & grading	four grades produced: A, B,C D A (no broken), B (less broken), C (more broken) and D (all broken). C grade comprises highest proportion due to poor drying	mixing grades B & C to allow farmers get high income	quality compromised and consumer trust lost	plans are underway to equip the laboratory with various testing capabilities to minimise broken and foreign matter
branding & marketing	three brands are produced: kayiso (80%), upland (18%) and super (2%). Super is highly demanded but low supply due to unsuitable soils	paddy for super brand imported	Higher pricer (27%) compared to locally produced varieties	suitable soils have been identified in Soroti area and through several partnerships, local production is to be intensified

Source: Survey (Sep-Oct, 2013)

3.11 An appraisal of Upgrading practices in the study area

Horizontal coordination: To a small extent the farmers were organized into farmers groups. In reality however the groups seemed non-existent as no activity was carried out in group apart from trainings. Initially, input purchase and paddy marketing were done collectively through groups with the help of Sasakawa Africa Association. Trucks, often coordinated by Sasakawa, would move from member to member gathering the paddy after weighing, take it for milling before selling to major buyers. Members would then be paid depending on the proportion of their paddy. This process ensured higher selling prices and lower marketing (mainly transportation) costs. In this way, farmers would earn more than if they sold individually. Since members played a passive role in marketing activities, they did not acquire the skills required for sustainability of the initiative. Consequently, collective marketing collapsed after the completion of Sasakawa project in the area. For the rural town millers, the only coordination they had was sharing the power through clusters. Failure by some members to meet their obligation of contributing to the utility charges has led to accumulated debt thereby resulting into frequent disconnection from the power grid. A lot of training on cluster benefits and management should be conducted by the electricity company. Meanwhile, downgrading to individual electricity meters in the short term is worth considering.

Vertical coordination: Even though there is no formal relationship between different chain actors, they occasionally coordinate. Rural rice millers have been trying to lend money to famers to help in rice production. Because they do it in an informal way, recovery of credit has been difficult. As a result, they have cut off such arrangements due to the loss of trust in farmers. The medium scale processing company has contracted traders to help in collecting paddy from farmers. In collaboration with other development

partners, the company is also hiring agricultural specialists to train farmers in modern rice production and postharvest technologies. In addition, farmers are provided with drying and storage services on the company premises.

Functional upgrading: Previously farmers would sell their paddy to village collectors who would move from farmer to farmer. This trend has recently changed as most of the paddy is currently taken by farmers for milling before selling. This can be viewed as a form of functional upgrading as farmers are taking up the role of paddy traders. The processing company, which used to sell rice bran to livestock and poultry feed manufacturers, has started making feeds itself before selling. The company is also in the process of turning the rice husks into power supply source which will be used as a backup in case of electricity load shedding. Plans to add diversified products like chips, cakes, flour and wholegrain cereals are underway.

Process upgrading: To improve productivity in rain-fed rice farming system, farmers in the survey area adopted the cultivation of NERICA 4 which requires less amount of water. Unfortunately, the cultivar is susceptible to *striga* weed which is causing significant yield losses. Switching to NERICA 10 which is more yielding and resistant to the weed will be a worthwhile venture. Poor drying of paddy results into poor milling quality. Some rural millers have tarpaulins at their premises to help drying the rice to required moisture content before milling. However, they do not possess the moisture meters for observing the recommended moisture contents. To obtain optimally dried paddy, they will need to purchase moisture meters. The medium scale processing company has installed a mechanical drier which is more efficient in paddy drying.

Product upgrading: This form of upgrading is still the most challenging to rural farmers and millers. Paddy is usually sun dried on bare ground leading to quality

deterioration of milled rice. In some cases paddy mixes with metals such as nails which keep damaging the milling machines. The viable solution is drying on tarpaulins but rural rice millers do not have enough financial credit to support the farmers. To dry 2.0 tons of paddy (average output per farmer), 4 pieces of tarpaulin worth 200000 Uganda shillings are required. This implies that rice millers would need considerable investment beyond their capability to support farmers. The medium scale processing company has a mechanical dryer which ensures optimum moisture content and minimizes foreign matter in the paddy. It also has a de-stoner incorporated into the milling machine which removes stones and other foreign matter from the paddy before milling. The newly constructed spacious warehouse provides good aeration which prevents diseases and pest infestation during storage. The quality standard of the rice, however, is still questionable as it is not yet certified by the national certification body.

Inter-chain upgrading: During paddy shortage, rural rice millers always divert to milling of maize into flour. In that way, they are able to smooth their income throughout the year. In the same way, paddy traders always venture into maize and coffee trading during paddy shortage.

Upgrading of business environment: This has been observed by agreements and partnerships between the processing company and other development agencies in the area. One such partner is Kilimo Trust which aims at improved market opportunities for smallholder farmers.

3.12 Conclusion

This chapter has looked at the constraints and upgrading opportunities of rice markets in Uganda. Whereas rice farming is supported by several local, national and

international organizations, farmers and millers still encounter a number of challenges.

Much as low efficiency of milling machines play some role in quality deterioration, poor postharvest handling of paddy by farmers more especially during drying is a major contributor to poor rice quality. In addition, rice varieties which are susceptible to parasitic weeds have had a detrimental effect on rice quality. Presence of foreign matter in paddy attributed to poor drying facilities is a major challenge faced by both farmers and rural millers. To farmers, it reduces quality and marketability of their rice while to millers it reduces the effectiveness of the milling machine as it necessitates regular servicing. Upgrading the drying facilities has not been possible as rural millers have limited financial credit for advancing to farmers. If offered, full recovery of such credit is not guaranteed either. Strengthening the horizontal coordination within farmer groups and vertical coordination between farmer groups and millers is worth considering. This is crucial since market power of their produce lies in the hands of traders who purchase at a single price and sell at differentiated prices in the market. For this to happen there is need for more market support from government and the development partners.

Besides low quality, power cost as a percentage of total operating costs is extremely high for rice millers regardless of whether they use electricity and diesel. Instead of reducing power costs, meter sharing has instead worsened the problem through defaulting members. Before cluster governance is addressed, chain downgrading through individual metering is recommended.

Although this chapter identifies low quality as a major problem affecting rice markets, it does not delve into how to improve it. A comprehensive paper on enhancing the quality of rice in Uganda is recommended for future researchers to improve the competitiveness of locally produced rice in the domestic markets.

Chapter Four

Enhancing the Quality of Locally Produced Rice in Ugandan Markets

4.1 Introduction

Like in many other Sub-Saharan countries, postharvest handling practices of Ugandan rice farmers are generally poor. Paddy is manually cut and heaped for some days before being threshed and dried on bare ground. After several days of long hours of drying, the paddy is milled using small Mill-top and Engelberg⁴ machines from where it is traded in an unbranded form. In addition, farmers often use a mixture of local varieties and paddy is usually inhomogeneous (Kilimo Trust, 2014). The resultant rice from such postharvest practices is always of low quality characterized by presence of foreign matter and high percentages of broken. Many studies (Rickman et al, 2013; EUCORD, 2012; Kilimo Trust, 2014; PMA, 2012) report that delayed threshing and over-drying increase internal cracking (fissuring) and consequently makes the grain more susceptible to breaking during husking and whitening, thereby reducing white-rice and head-rice (wholly milled) yields. As explained by Rickman et al (2013), when very dry rice is stored it can absorb moisture from the surrounding humid air which increases fissuring.

In the same vein, rice milling is done by less efficient and outdated mill-top and engelberg milling machines which increases the percentage of broken rice. The low quality problem is compounded by the fact that the above machines lack de-stoners and the grading capacity. Candia and Masette (2012) elaborates that the resultant effect of these factors is that the locally grown rice by smallholder farmers and processed by cottage milling companies does not compete well with imported brands in the liberalized market of Uganda. This is particularly true for the top segment market such as supermarkets where locally produced rice has failed to penetrate at the expense of high

quality imported rice (PMA, 2009; Kikuchi et al, 2013).

With increasing urbanization and number of middle class consumers who prefer convenience in terms of quality, supermarkets are rapidly gaining importance as a marketing channel. Low quality rice has many impurities which necessitates considerable time on sorting and thus viewed as an inconvenience to middle class consumers. One of the major challenges for Uganda is therefore to produce sufficient and affordable rice that meets the preferences of its fast-growing and increasingly urbanized population; and which can compete with imported rice both in terms of price and quality (EUCORD, 2012).

The purpose of this study is to understand the competitiveness of locally produced rice in the market through quality enhancement by: (i) assessing the current quality of rice in domestic market, (ii) analyzing the quality management practices at various marketing stages and (iii) profiling consumer choice between price and quality.

Improving the market competitiveness of locally produced rice is crucial for reducing the amount of imported rice and contributing to food security in Uganda. The competitiveness of locally produced rice against imported rice in the market depends primarily on its acceptance by the consumer (Stryker, 2013). Consumers tend to set minimum quality standards of rice they purchase and therefore any effort of enhancing grain quality of locally produced rice needs to consider quality targets based on a good understanding of consumer preferences (Futakuchi et al, 2013). If Africa (including Uganda) wants to reduce import dependency, it will have to invest in value-adding by tailoring quality of its domestically produced rice to urban consumer standards (Demont et al, 2012).

Unlike in other parts of Africa where urban consumers prefer imported rice as a

status symbol, Ugandan consumers prefer local rice due to its good aroma and taste given the same quality (Kilimo Trust, 2014). There is therefore a huge market for local quality rice into which rice farmers can exploit if varietal and postharvest quality characteristics are tailored to urban consumer preferences (Demont and Ndour, 2014). Consequently, the country would save on the value of rice imports. Also, national welfare would increase as the consumers express their preferences for rice quality by paying a premium for rice with the desired characteristics. If these retail price premiums are transmitted back to the farmer through the marketing system, then market participants have the incentive to further improve quality (Unnevehr et al, 1992).

If quality is not improved however, there is an unpleasant future for locally produced rice. In the long term as consumer standards rise and the retail sector becomes more sophisticated, greater value is placed on packaging and branding. Such changes will inevitably impact the rice market. Consumers will become less tolerant of local low quality rice and this could increase rice imports (Kilimo Trust, 2014).

In the short term, branding and packaging is not a priority for Ugandan consumers. Kikuchi et al (2013) reports that the quality of rice that matters in the rice market in Uganda is not so sophisticated yet as only three criteria are employed to determine quality. These include cleanliness (without stones and other odd materials), whiteness (color) and brokenness (degree of broken rice). Similarly, JAICAF (2010) reports presence of foreign matter and percentage of broken rice as the two most important price determining factors for locally produced rice in Uganda. As such the above two factors have given Vietnam and Pakistan rice a competitive advantage to local price (Kilimo Trust, 2014). However, if postharvest quality is improved, Super rice has the potential to outcompete the imported rice due to its good aroma.

4.2 Methodology

The research was conducted in Eastern Uganda in the districts of Namutumba and Jinja. Namutumba is one of the major rice growing districts and the nearby Busembatya town is the primary transaction center where rice from farmers is purchased by trader agents and brokers before entering the regional and national wholesale and retail markets. Jinja is the major town and wholesale and retail market for Eastern Uganda.

Before the actual survey in August and September 2014, the researcher first conducted a desktop research through literature review to assess the general quality of rice in Uganda. This was followed by visiting the Uganda National Bureau of Standards (UNBS) and conducting semi-structural interviews with representatives from departments of quality and standards. The purpose was to establish whether rice standards existed and implementation criteria.

Thereafter, the researcher spent about two weeks in Jinja conducting personal observation and interviews with fifteen rice retailers. The questions were both structured and semi-structured and covered a wide range of topics including rice brands, sales, quality management, suppliers and clients. Retailer interviews were therefore useful in estimating their profitability, quality improvement procedures and consumer preferences. Since the researcher was interested in 15 respondents and from literature review (Kikuchi et al, 2013) it was established that Jinja market had about 45 rice retailers, systematic sampling of every third rice retailer was selected for interview.

For every retailer who was interviewed, rice samples (0.5 kg) were purchased for each rice category (brand) traded which formed a basis for personal quality observations. A total of 75 samples were collected from 15 retailers implying an average of 5 brands per trader. Subsamples of 100g were drawn from each sample and analyzed for important

attributes of physical quality such as stones and broken rice through manual sorting, weighing and calculating their respective percentages.

Because most of the rice in the market was coming from Busembatya and the quality of rice from the same place was relatively lower than rice from other places, the researcher visited that area and conducted interviews with rice farmers. Since Busembatya is a trading town, the nearby rice growing villages in Nsiize Sub County of Namutumba district were purposively selected. A focus group discussion with 12 representative stakeholders followed by individual interviews with 20 randomly chosen rice farmers were conducted. The topics ranged from postharvest handling methods and quality improvement practices to benefits and challenges.

The findings were summarized using flow charts, graphs and tables with the help of descriptive statistics like frequency, average and percentages. In addition, economic measures like profits were also analyzed.

4.3 Rice quality and East African Standards

With respect to Ugandan consumers, rice quality is grouped into cooking and physical qualities. Regarding cooking qualities, consumers prefer aromatic to non-aromatic, sticky to non-sticky and bulging to non-bulging rice varieties (UNRDS, 2009). These qualities can only be influenced through breeding and are not regulated by national rice standards. The physical quality of milled rice is characterized by a combination of desirable and measureable characteristics. Such characteristics include milling degree, whiteness, head rice, chalkiness, colored kernels, moisture content, foreign matter, and etcetera. In line with market requirements (standards), physical quality characteristics are used to classify rice into grades.

Due to the integration of rice marketing policies among the East African member countries (Makosa, 2014), quality standards have also been harmonized. Even though the East African Standards (EAS, 2013) has detailed criteria for grading rice, only two characteristics (cleanliness and brokenness) are capable of influencing the choice of a Ugandan consumer. Together with moisture content, these two characteristics are briefly defined as follows:

Cleanliness is determined by the presence or absence of foreign matter (organic and inorganic impurities). The more the foreign matter, the less the quality. Organic impurities include such substances as rice husks, straws, livestock and poultry excreta, and etcetera. On the other hand inorganic impurities include lumps of earth, sand, stones, dust and small metals such as nails.

Brokenness refers to the percentage of broken kernels in rice. The less the broken percentage, the higher the quality. According to EAS (2013), rice is said to be broken when the kernel length is less than 75% of the length of wholly milled grain. The same standards also define milled rice as whole or broken kernel from which the hulls and at least the outer bran layers have been removed. In relation to brokenness is *head rice* which refers to milled rice with length of 75% of whole kernel or more. The more the head rice, the more the quality.

Moisture content defined as the quantity of water contained in the rice grain is another important quality measure. It is usually determined by the moisture meter for accurate figures in modern farming and agribusiness as opposed to estimating quality through biting which is a characteristic of smallholder farmers in Uganda. The optimum and recommended moisture content for rice is 13-14%. Low moisture content as a result of over drying reduces quality by increasing brokenness. Similarly, high moisture content as

a result of under drying reduces quality by increasing rotting and toxic compounds on the rice grain.

The harmonization of Uganda national standards with the East African standards has relaxed the quality requirements for Ugandan rice. Table 19 compares selected quality attributes of rice standards before harmonization using the example of year 2011 versus the standards after harmonization (2013). Moisture content was raised from 13% (in 2011) to 14% (2013) for all rice grades. In addition, the percentage of broken for grade 2 rice was raised from 7% (2011) to more than double (15%) in 2013. Similarly, broken percentage for grade 3 rice was relaxed to 25%. Although the above standards are in place, their implementation is similar to non-existent.

Table 19 Selected standards characteristics for Uganda

Period	Characteristic	Maximum limits (%)		
		Grade 1	Grade 2	Grade 3
2011 (Before Harmonization)	Broken	5	7	15
	Inorganic matter	0.1	0.1	0.1
	Organic matter	0.1	0.2	0.5
	Moisture content	13	13	13
2013 (After Harmonization)	Broken	5	15	25
	Inorganic matter	0.1	0.1	0.1
	Organic matter	0.1	0.2	0.5
	Moisture content	14	14	14

Source: UNBS (2011), EAS (2013)

A big advantage of ‘Pakistan’ and ‘Vietnam’ rice brands, which are imported from Asia where the rice milling process is with a perfect de-stoning function, is their cleanliness that does not necessitate rice retailers to make any cleaning of milled rice before selling (Kilimo Trust, 2014).

Although the above standard is for both locally produced and imported rice, in

practice it is applicable only on imported rice. An interview with representatives from Uganda National Bureau of Standards (UNBS) revealed that implementation is usually at the border posts and to small extent large scale producers since they don't have the capacity in terms of personnel to monitor the many small scale producers who are the majority. In case the rice does not meet the required quality standards, it's either destroyed or not allowed into the country. The respondents also reported that there is no streamline policy on quality and standards which make implementation difficult. The cost of attending a three day general course on quality management is 360,000Ush (140US\$) per person which is beyond most small scale farmers, millers and traders. Training also takes place at the UNBS headquarters in in Kampala which significantly increases costs for rural stakeholders. This has kept away key players in the rice value chains from accessing the skills on quality. As a result, local rice market actors have little knowledge about rice standards in Uganda.

4.4 The quality of rice on the market

4.4.1 Market share of rice brands.

The information used in this section was captured from rice retailers in Jinja central market. The volume of rice stocked by retailers was recorded according to brand and the percentage calculated. Brand as used in this context is a loose name given to rice with respect to the variety and place of purchase, for instance 'Super Mbale' refers to Super rice from Mbale town. There are two main types of locally produced rice, Kayiso and Super. Kayiso (or Kaiso) literally meaning needle (Lusoga language) refers to long and thin shaped grain lowland rice varieties especially the old K-series (K-5, K-9, K-85...) developed by IRRI and introduced in Uganda by Kibimba rice scheme. Their

desired characteristic is enlargement of the grain on cooking. On the other hand, Super (or Supa) varieties are lowland thick aromatic grains which originated from Surinam. These two are further categorized as Busembatya or Mbale depending on their place of purchase. Pakistani rice from Pakistan and Basmati from India are the only imported rice brands on the market. Figure 8 shows the market share of rice brands on the market.

Kayiso Busembatya is the most prevalent brand on the market with 40% share, followed by Super Mbale (26%) with Basmati (1%) the least prevalent. Generally, locally produced rice constituted 91% of the total rice on the market. A combined share of Kayiso (that is Kayiso Busembatya and Kayiso Mbale) is 58% while that of Super is 33%.

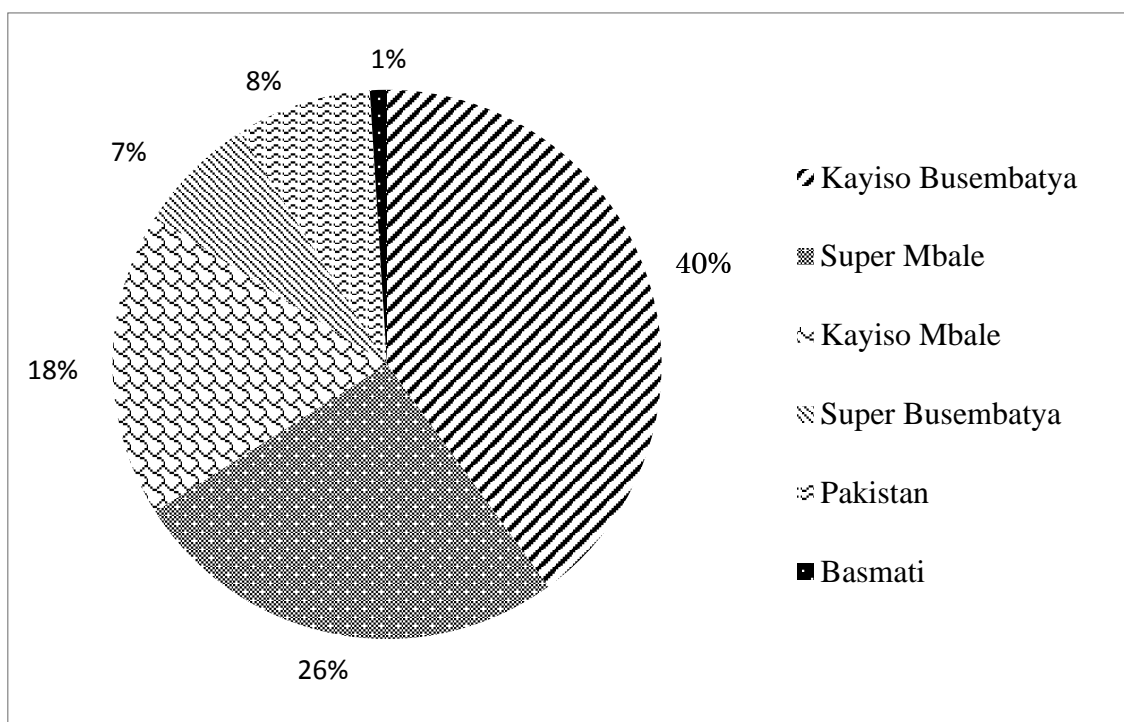


Figure 8 Market share by rice brands

Source: Retailer survey (Aug-Sep, 2014)

In their survey report, Kikuchi et al (2013) quote closely similar findings for ‘East Near’ which includes Jinja and other districts of Busoga sub region. Whereas they (Kikuchi et al, 2013) had ‘Upland rice’ as one of the local brands on the market, this

survey did not identify any. There is a possibility that Upland rice has been integrated into Super and Kayiso brands since farmers usually grow different rice varieties but fail to separate them during drying and milling. Consequently, they sell undifferentiated rice to traders who brand it depending on the perceived majority of a particular variety. Most often, traders disguise such rice as Super due to its high price. The same findings were pointed out by Kikuchi et al (2013).

4.4.2 Physical quality of rice brands

Personal observational results of physical quality by brand are shown in table 20. The quality of imported rice is generally higher than that of locally produced rice. Basmati is the cleanest without any stones and any broken rice. The local rice is of varying quality with Super Mbale which contains 0.1% stones and 25% broken the highest. On the other hand, Kayiso Busembatya represents the lowest quality of rice on the market with 1% stones and 45% broken. Based on variety irrespective of place of purchase, Super (Mbale and Busembatya) is of higher quality (0.15% stones and 25% broken) compared to Kayiso which is 0.9% stones and 40% broken on average. This could be due to the fact that grains of Kayiso are long and narrow which creates a higher possibility of breaking compared to Super rice grains which are relatively shorter and thicker.

The above figures seem alarming for broken but there is a marked improvement of quality since Candia and Masette (2012) reported 52.7% as the least broken. This improvement can be attributed to continued adoption of mill-top machines which produce relatively better quality rice than the Engelburg machines which were previously predominant (Kijima et al, 2013).

Worryingly however, the quantity of foreign matter is deteriorating. Candia and

Masette (2012) recorded 0.8% as the highest share of foreign matter in their samples. In contrast we are reporting 1% share of stones in Kayiso Busembatya which is the most prevalent brand in the market. The reason for this quality deterioration is not clear. One possible reason could be the increased demand and competition for paddy by high number of new entrants to milling business who penetrate deep into the villages in search of paddy (Kikuchi et al, 2013; Kijima et al, 2013). In this case farmers become complacent about the quality of their rice thereby leading to deterioration. To improve this situation, implementation of institutional rules and regulations concerned with quality and standard need to be strengthened.

Table 20 Physical quality of rice brands in comparison to UNBS* requirements

Type	Brand	Stones (%)	Broken (%)
Local	Kayiso Busembatya	1.0	45
	Kayiso Mbale	0.8	35
	Super Busembatya	0.2	25
	Super Mbale	0.1	25
Imported	Pakistan	0.0	20
	Basmati	0.0	0
UNBS*	Grade 3	0.1	25
Maximum limits	Grade 2	0.1	15
	Grade 1	0.1	5

* Uganda National Bureau of Standards

Source: Personal analysis from retailer rice samples (Aug-Sep, 2014), UNBS

Another observation worth noting was that rice from Mbale (both Super and Kayiso) is of higher quality compared to rice from Busembatya. This could be due to the fact that Mbale is more urbanized than Busembatya. According to Kijima et al (2013), Mill-top machines which produce better quality rice than their Engelburg counterparts tend to concentrate in urban areas.

Generally the quality of locally produced rice is poor. Using the criteria of this

research, only Super Mbale meets the minimum quality as set by the Uganda National Bureau of Standards (UNBS) in collaboration with the East African Standard (EAS). At 0.1% stones and 25% broken it qualifies as grade 3 which is the lowest grade of milled rice. It is more likely that if full quality assessment criteria as indicated in EAS (2013) was undertaken, none of the locally produced rice would be graded. Also, many policies including quality standards in member countries have been harmonized due to East African integration. As a result there have been relaxation and tightening of some guidelines to allow market access for many goods and services in member countries. This has enabled Super Mbale to meet minimum standards which would have otherwise not qualified.

4.5 Quality management practices

4.5.1 Farmers' perspective

Even though UNBS has a detailed guideline to quality standards, the population has simplified criteria for determining quality. Table 21 shows different views of farmers regarding rice quality. Each question had several responses and the respondent was required to choose the most important. 80% of farmers consider presence of foreign matter such as stones and poultry droppings as the main factor which affects quality. Following foreign matter was brokenness (12%). This implies that if the rice has no foreign matter and has low percentage broken, it is considered to be of high quality by farmers irrespective of other characteristics outlined in EAS (2013).

Actually presence of foreign matter and brokenness are the only criteria used by traders while procuring rice from farmers. Consequently, farmers' efforts to improve quality are concerned with clean drying. They do this by sweeping the drying yard and

monitoring the paddy by keeping away poultry from contaminating it by their excreta. Unfortunately, they dry on bare ground and sweeping exacerbates the problem by bringing the stones to the surface. Monitoring of paddy during drying is a difficult task and in most cases farmers are usually overwhelmed by poultry. Use of tarpaulins for drying is not common as smallholder farmers are more concerned with minimizing costs. Most of the farmers (60%) are aware that good quality rice is readily marketable but they do not have the motivation of investing in quality control items like tarpaulins and moisture meters due to less price premium. A big percentage of farmers (45%) cited low price premium as the major obstacle to improving quality. They believe that the premium for high quality is always taken up by the rural brokers who collect rice before selling to wholesalers.

Table 21 Quality management practices and perceptions by farmers

Probing question	Most common response	Frequency	Second common response	Frequency
Drying period	4-5 days	70%	5-7 days	30%
Testing for dry paddy	Biting	90%	crashing in hand	10%
Considerations for quality	Foreign matter	80%	Broken rice	12%
Activities for improving quality	Sweeping the drying yard	50%	Keeping away poultry	40%
Benefits to selling quality rice	Readily marketable	60%	None	30%
Constraints to quality improvement	Less price premium	45%	Lack of quality control skills	40%

Source: Farmer survey (Aug-Sep, 2014).

Whereas some effort is put in controlling foreign matter, nothing is being done to minimize brokenness. Farmers assume the quality of the milling machine is solely

responsible for the amount of broken rice. According to Odogola (2006), the drying length affects the moisture content of paddy and increases the development of internal cracks which raises the possibility of breaking during milling. Unknowingly, farmers have a tendency of over drying their paddy before milling due to lack of moisture meters. To assess moisture, 90% of respondents said they bite the paddy while the rest crash it between their palms. As this method is not accurate and the optimum moisture range is narrow (12-14%), there is a high possibility of drying to below or above optimum. However, the risks associated with under drying paddy (more than 14% moisture content) such as fermentation and rotting are more costly to the farmer as all the rice may be rejected. On the other hand, the risks associated with over drying such as broken rice are less costly since there is market for such rice. For this reason, most farmers (70%) dry for 4-5 days or more compared to the recommended duration of 2-3 days for proper moisture content. This finding is consistent with the results of the group discussions (table 22).

Table 22: Conventional versus recommended paddy drying

	study area	recommended*
Drying period in days	4-7	2-3
Hours of sunshine exposure per day	8	4
Depth of paddy spread (cm)	1-2	5-10
Hours between subsequent stirring	2-3	0.5-1

*Recommended sun drying for paddy rice by USAID-East Africa

Source: Farmer survey (Aug-Sep, 2014)

Farmers actually dry paddy for 8 hours per day in contrast to 4 hours per day as recommended in the crop conditioning handbook (USAID East Africa, 2011). Also, they

spread a thinner layer of 1-2 cm deep instead of the recommended 5-10 cm. All these drying procedures lead to over dried paddy with moisture content of about 10% and internal cracks of above 41% as reported by Candia and Masette (2012). Consequently, higher percentages of broken rice are obtained on milling.

4.5.2 Retailers' approach

There was no retailer who participated in rice improving procedures like cleaning and sorting. This is contrary to the findings of Kikuchi et al (2013) who reported some traders in Kampala who engaged in sorting their rice before selling. Although they did not directly impact on the quality of rice they sold, retailers influenced quality by demanding good rice from their suppliers. With the help of a bag trier, retailers always draw samples and check for the presence of foreign matter and broken percentage to estimate the quality of rice in the supplying market. Figure 9 shows how retailers get the desired quality of rice. In case the supplier provides lower quality rice than required, the retailer will communicate his desires for quality improvement. Some retailers do not communicate however; they instead change the supplier without any notice since there are no formal contractual agreements. For those who communicate, some suppliers comply and improve the quality without further intervention by the retailer. In most cases suppliers do not immediately comply, this prompts the retailer to react by either changing the supplier or negotiating for a lower price. More often, a compromise is always reached where low quality rice is transacted at a lower price. In some instances when an agreement for lower price is not reached, the retailer changes the supplier.

Therefore 'changing the supplier' and 'bargaining for lower price' are the two quality management tools used by retailers. If the marketing system was efficient, the

quality would improve due to market forces. Unfortunately, this is not true as farmers continue receiving less premium as cited earlier in table 21. This implies that the price premium is lost along the chain before reaching farmers. By accepting less price from retailers for low quality rice as illustrated in figure 9, wholesalers (retailers' suppliers) remit the premium to rural brokers (wholesalers' suppliers).

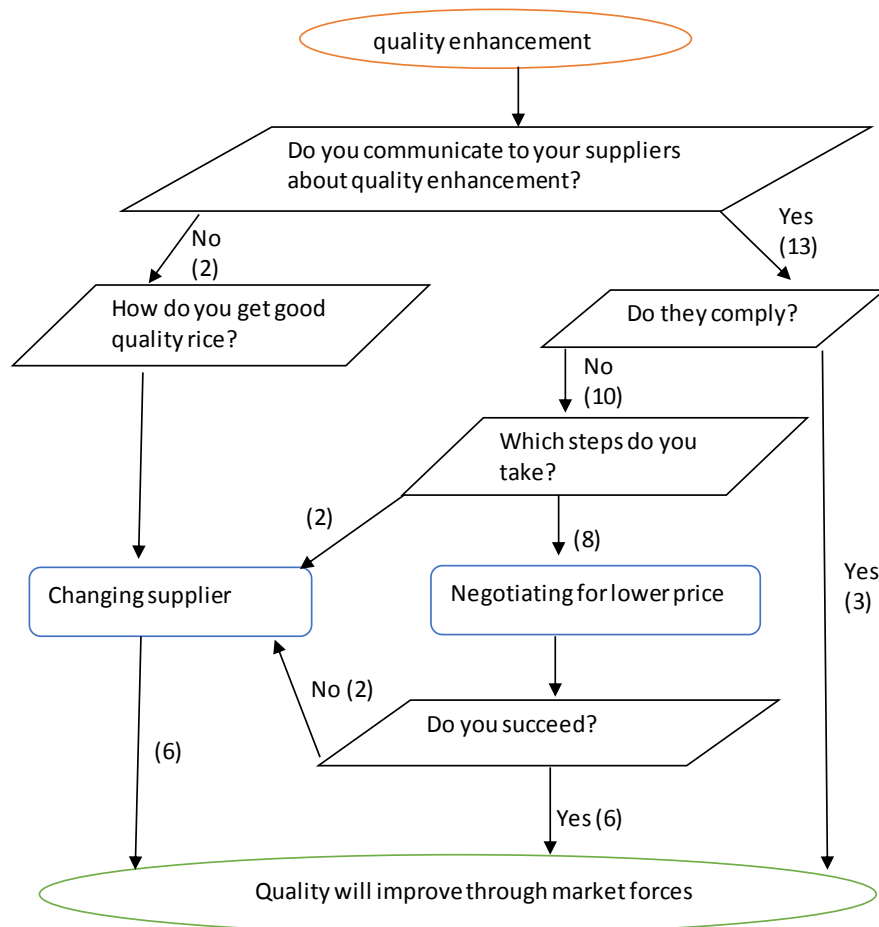


Figure 9 Quality management by retailers (figures in brackets represent the number of retailers for a particular response)

Source: Retailer survey (Aug-Sep, 2014)

Since farmers sell their rice after milling directly to rural brokers, mill operators do not interfere with the price premium. It is therefore logical to conclude that the quality premium is taken by village assemblers as they form the link between farmers and

wholesalers. This view is supported by Kikuchi et al (2013) who report that village assemblers make the highest returns (95% per year) compared to other rice value chain actors such as millers, Kampala brokers, wholesalers, and retailers. However, these returns are consistent with the risks involved in their business and the high transport costs. Namazzi (2008) concurs that the high transport costs for agricultural commodities in rural Uganda are responsible for poor price transmission from consumers to farmers.

4.6 Consumer demand for quality

Since the rice on the market is differentiated according to brands and each brand is of single quality, consumer choice was estimated as the daily retail sales for each brand. Table 23 indicates the demand or amount of retail sales by brand. Despite Kayiso Busembatya having the lowest quality, it commands the greatest demand. On average each retailer sales 91kg of Kayiso Busembatya daily which is almost double the sales of the closest brand Kayiso Mbale (47kg). The amount sold of Basmati was negligible and was left out of the analysis. For the brands included in the analysis, Pakistan was the least sold at 10kg per day despite being of the highest quality. The relatively quality local brand Super was the third in sales amount (40kg). The above observation implies that consumer choice is influenced by other factors besides quality.

A look at price (table 24) reveals that Kayiso Busembatya is the cheapest as it retails at 2000Ush/kg while Super Mbale most expensive at 3000Ush/kg. Pakistan, the only foreign brand is of the better quality and lower price (2800Ush/kg) than Super but has very little daily sales. This implies that locally produced rice is more demanded than imported rice. Amongst the locally produced rice, price is important for Kayiso varieties as consumers choose Kayiso Busembatya over Kayiso Mbale due to its lower price even

though the former has inferior quality. The same cannot be said of Super varieties however as more priced Super Mbale is chosen over Super Busembatya. Therefore for Super varieties, quality is the main determinant of demand. A further look at the extreme right of table 24 explains the market segments for these rice brands. Kayiso brands are mostly consumed at home where each household sorts the rice before cooking.

Table 23 Retailer daily sales by rice brand

Retailer	Daily Sales (kg)				
	Kayiso Busembatya	Kayiso Mbale	Super Busembatya	Super Mbale	Pakistan
1	96	35	–	45	8
2	82	60	30	42	12
3	100	–	35	–	10
4	95	45	-	38	13
5	85	40	-	40	6
6	90	50	38	42	9
7	88	48	33	50	11
8	80	52	-	35	10
9	96	45	30	40	12
10	110	55	35	45	15
11	85	40	28	35	5
12	86	-	-	36	8
13	90	46	30	43	7
14	92	-	35	40	10
15	90	50	-	35	8
Average	91	47	29	40	10

Source: Retailer survey (Aug-Sep, 2014)

Table 24: Rice demand by brand

Brand	Average daily sales (kg)	Sales price (Ush/kg)	Purchase price (Ush/kg)	Daily markup (Ush)	Main consumption point
Kayiso Busembatya	91	2000	1800	18200	Home
Kayiso Mbale	47	2200	1950	11750	Home
Super Mbale	40	3000	2600	16000	Restaurant
Super Busembatya	29	2800	2400	11600	Restaurant
Pakistan	10	2800	2500	3000	Restaurant

Source: Retailer survey (Aug-Sep, 2014).

Buying cheaply priced rice is considered a better option for reducing household expenditure since most families live on limited budget. In addition, Kayiso varieties have the ability to expand on cooking which implies that 1kg of Kayiso rice can serve more people than when using any other variety. Given the same household size, less amount of rice will be required when feeding on Kayiso than when feeding on other rice brands. As a result, the expenditure on Kayiso lowers considerably making it the most demanded. These findings are consistent with Kilimo Trust (2013) study which reported that most rice consumers in Uganda prefer affordability to quality and taste. On the other hand, Super brands are mostly consumed in restaurants and hotels. Since hired labor is involved in sorting rice, restaurants prefer buying relatively high quality Super Mbale to minimize the costs. It should be noted that Super varieties are associated with good aroma which attracts clients who decide to eat out as a way of changing from the daily diet.

4.7 Conclusion

This paper assesses quality management practices, consumer demand and producer rewards to address the problem of low competitiveness of locally produced rice in Ugandan markets. Poor drying of paddy is a major contributing factor to low quality rice in the market. Farmers tend to excessively dry paddy to less than recommended moisture content which increases the broken percentage of milled rice. Much as the rice standards are in place, their implementation has not been effected. The traders and farmers are not aware of such quality requirements since they have not been trained by the standards body. Training of farmers about postharvest skills such as threshing, drying and storage will to some extent contribute to improved rice quality. The national standards body should consider offering free trainings to rice marketing stakeholders to their

respective locations. Lessons for particular category of market actors can be organized in groups to minimize costs. Skills training will need to be complemented with investment in basic drying equipment like moisture meters and tarpaulin by farmers to significantly improve the quality of their rice. However, this can only be possible if the farmers feel the returns to such investments in terms of price premiums are worthy. The premiums for quality are usually paid by consumers to retailers who in turn transmit them to their suppliers (usually wholesalers). However, premium paid by wholesalers to village assemblers does not reach farmers as it is retained by the assemblers to cover high transaction costs particularly transport. As a result, there is less motivation for improving the quality of their paddy. In line with Kherallah (2000), this study recommends the government to invest in infrastructure such as roads in rice farming areas to reduce transport costs. This will help in smooth transmission of price premium to farmers. In turn, farmers will be capable of making important postharvest handling choices which influence rice quality. Also, reduced transportation cost will translate into less consumer price which in turn will increase the demand for local rice as Ugandan consumers are price conscious.

Chapter 5: General Summary

Unlike most of the food crops grown to satisfy household consumption and food security requirements in Uganda, rice is consumed more in urban areas, where it is one of the major foodstuffs. As a result, most of rice produced by rural farmers enters the marketing system. Unfortunately, there is a problem of market access due to poor linkages between the rural producers and the urban consumers. To address this problem, the researcher has used a value chain approach to study the rice marketing system by delving into trade policies and quality aspects while identifying the constraints encountered along the distribution system and upgrading opportunities. Although value chain approach has been used by various studies in Uganda, it has concentrated on mapping and gross margin analysis. The aspect of incorporating upgrading strategies and quality assessment has not been of focus. This study therefore contributes to literature by including the elements of policy, quality and upgrading which are necessary for increasing the competitiveness of the rice industry. The study was based in Eastern Uganda which is the main rice producing area of the country. The research analyzed the marketing system by looking at its governance, network structure and value adding opportunities. There is no lead firm in Uganda rice industry due to market liberalization with minimum barriers to entry and exit. The industry is highly competitive with many uncoordinated smallholder farmers and many less cooperative rice traders. Value chain governance is in the form of trade policies and rice standards formulated by the government. Assessment of the role of such policies to the rice sector formed the first section of this research. Through mapping of the marketing channels, identification of constraints and upgrading options; the network structure was revealed in the second section of the study. To assess the competitiveness of the sector, the study ended by analyzing the quality of rice in the market and the

possibilities of improving it.

To assess the policies influencing the rice sector, the study relied on a range of data sources. It first explored the rice marketing situation in the country by conducting on-desk review of relevant literature. It then used secondary data from local, regional and international databases. These data were helpful in constructing balance sheets, calculating relevant indicators such as self-sufficiency and import dependency ratios, analyzing changes in trade directions, analyzing market price trends and correlations. Such information was important in revealing whether the policy has been helpful. To study the network structure as well as market upgrading opportunities and challenges, a field survey was conducted. The data were captured from farmers, small scale millers and large scale processors. Collection method was through focus group discussions, individual semi-structured interviews, personal observations and key informant interviews. The major topics of interviews included major clients and suppliers, prices and pricing mechanism, support organizations, marketing challenges and upgrading opportunities. The result of that survey was helpful in identifying who holds influence in the marketing chain, trust and relationship between actors among others. A similar survey was conducted to assess the competitiveness of Ugandan rice to improve its quality. The main respondents were the Uganda National Bureau of Standards (UNBS), rice distributors specifically retailers and farmers. The topics for retailers included rice brands, sales, quality management, suppliers and main clients. Such information was useful in estimating retailers' profitability, quality improvement procedures and consumer choices. In addition, personal observation of retailer rice samples was conducted for important attributes of physical quality such as stones and broken rice through manual sorting, weighing and calculating their respective percentages. The major topics for farmers

concentrated around postharvest handling mainly drying, quality management procedures and challenges. The findings of all studies are as follow:

Developing the rice markets in Uganda requires multifaceted approach including policies, governance, quality, infrastructure and improvement of all the processes along the entire marketing channel. In terms of policy, the government of Uganda joined its East African counterparts to enact a common external tariff on rice imports as a way of promoting the local industry. However, the policy is not successful due to two major reasons: (i) less commitment by member partners in terms of implementation due to other conflicting interests and (ii) inflow of rice from one member country (Tanzania) which has a competitive advantage as a replacement for internationally traded rice. Kenya's interest in trading its tea with Pakistan enabled it to levy less than required tariff on Pakistani rice which is then repackaged by unscrupulous traders and exported to Uganda. Similarly, Tanzania prioritizes food security and as such removes tariffs from rice imports during periods of shortage. Such actions enable Tanzanian traders to import excess rice which is then smuggled to Uganda. Since the enactment of import tariff, the volume of rice imported from Tanzania to Uganda has drastically increased to cover the reduced imports from Pakistan and Viet Nam. This has helped Uganda's rice import dependency ratio to remain unchanged. The implication is that the initial purpose of the import tariff which was reducing foreign imports to motivate local farmers has not benefited Ugandan but Tanzanian farmers. For Ugandan farmers to benefit, it will require the cost and quality of their rice to at least equal to that of Tanzanian rice in Ugandan markets. This can be possible by reorganizing and or improving the entire processes along the rice value chain.

Ugandan rice value chain is long with many actors who hold varying degrees of power and influence. There are many smallholder farmers who produce rice either

individually or in groups. However, marketing is mostly done on individual basis which significantly reduces the bargaining power of farmers. Given that most rice millers provide milling services at a commission rather than engaging in buying of rice, market power remains with village assemblers who purchase rice from farmers and sale to wholesalers. Relative coordination among village assemblers, high transport costs to other markets and small volumes of rice supplied by individual farmers are some of the factors responsible for the assemblers' bargaining power. For farmers to raise their bargaining power there is need for horizontal coordination and aggregate their produce before selling. Currently, many farmers have joined groups aimed at joint production. Formation of these groups has been facilitated by several development organizations. However, marketing receives less attention and is supported by few agencies. More marketing support in terms of group formation, trust and management skills is required. The poor road conditions limit some traders from reaching the rural areas, leading to an oligopsony which empowers buyers at the expense of sellers. There is need for improving the condition of rural roads to lower transport costs and enable farmers to access better markets. In liberalized rice sector of Uganda, market access alone is not enough to improve the incomes of farmers. The high rice milling costs will need to lower for farmers to improve the profitability of rice farming. Since electricity cost is relatively lower than diesel cost, farmers can reduce milling cost if they use electricity operated machines. Similarly, rice millers make a better profit with electricity operated compared to a diesel operated machine. Therefore, a program aimed at rural electrification is beneficial to all stakeholders and can play a major role in improving the competitiveness of rice produced by Ugandan farmers. Clustering of small scale millers as practiced in the study area is good since the cost of providing services to clusters is minimized. However, allocation of

a common electricity meter should be discontinued since some defaulting members are leading to electricity disconnection which affects the milling operations of the rest of members. Lower cost contributes to competitiveness to a certain extent and the rest is covered by high quality.

The quality of Ugandan rice is still low due to poor postharvest handling and simple milling machines without cleaning and grading capabilities. The most critical stage of postharvest handling is drying where farmers tend to over dry paddy before storage or milling for fear of rotting which can cause more severe losses. It is also at the drying phase that foreign matter mixes with paddy leading to further quality deterioration as paddy is spread on the bare ground. If farmers were trustworthy, they would get advance financial credit from millers to invest in basic drying equipment like moisture meters and tarpaulin to improve the quality of their rice. However, farmers' failure to repay the credit has led to mistrust between them and their lenders and as a result hampered any credit advancement. This necessitates strengthening of the linkages between different chain actors through vertical coordination. Vertical coordination is essential in building the relationship and trust between several actors across the chain which can result into a win-win scenario for all the participants. As well as being more profitable to traders, local rice brand Super is more appealing to consumers compared to imported brands due to its aromatic attributes. In addition, Super rice has thick grains which are not easily broken during milling thereby helping to keep its quality relatively high. Focusing on promoting Super rice as a replacement for imported rice and as a possibility of improving quality is a viable consideration. Also, improving quality will require training of all value chain actors the required skills. Therefore the government needs to strengthen the agricultural extension services.

The development of rice markets in Uganda will require increasing the competitiveness of Ugandan rice value chain rather than protecting it through policies. First, efforts towards strengthening the coordination among actors at the same chain node should be taken to receive the benefits of economies of scale and smoothen the internal functioning of the groups. Second, improving relationships between actors at different nodes should be facilitated to build trust and enable intra-chain financing to improve rice quality. Third, improvement in public services such as rural electrification to reduce milling costs and rural roads to allow sellers access many buyers is another viable option.

Although this thesis tries to employ a holistic approach of assessing the policies, quality and upgrading options of Uganda rice markets, many questions remain unanswered. In terms of policy, the study finds that the import tariff has not been helpful. This is mainly because implementation by member countries is weak. What is not clear however is what the impact would be if all member countries were committed to the policy implementation as stated in the protocol. A study addressing such scenario would be helpful. Also, the study indicates that consumers who buy rice for home consumption consider price while those who buy for hotel and restaurant business consider quality. However, it does not go into details of consumer preferences and willingness to pay for quality rice. Therefore a study in that area is worth considering. In Uganda, supermarkets are coming up at a high rate. Studies about their role on the quality of rice are still limited and are therefore recommended.

Notes

- 1) Former Vice President of Uganda, Gilbert Bukenya, identified upland rice as a strategic crop in poverty alleviation and initiated the Upland Rice Project which was aimed at promoting upland rice (particularly NERICA) cultivation.
- 2) Whole rice refers to 1996 Harmonized System item code HS 100630 Semi-milled or wholly milled rice, whether or not polished or glazed: Parboiled.
- 3) Broken rice refers to 1996 Harmonized System item code HS 100640: Broken rice. It is used for human consumption in Uganda and has high demand due to its low price.
- 4) Engelburg is an old type single pass steel roller huller which is popular in Uganda due to its less maintenance costs. Mill-top machines are compact single pass rubber roller hullers. Both machines have no de-stoners and produce low quality rice.

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ウガンダにおける米市場の発展 ーバリューチェーン分析ー

ウガンダにおいて、米は他の食糧とは異なり、都市部で多く消費されており、現在では主要な食品の一つとなっている。その結果、ウガンダ農村で生産された米のほとんどは市場で流通している。しかしながら、農村の生産者と都市の消費者の間の連携はうまくいっておらず、農家にとって米の市場にアクセスすることに問題がみられる。この問題に対処することを念頭に置き、本論文では、米の流通上の制約と販売機会の向上を明らかにするとともに、貿易政策や米品質面の問題を詳細に検討しながら米のマーケティングシステムを明らかにすることとする。研究方法としてバリューチェーン・アプローチに着目した。調査はウガンダの主要な米生産地である同国東部で行い、マーケティングシステムのガバナンス、主体間関係の構造、商品価値を高めるための方策について分析した。ウガンダの米産業は自由化されているが、参入や撤退が少ないため、主導的地位にある企業はみられない。米産業は、組織化されていない多くの小規模農家や、農家にとってあまり協力的ではない流通業者などから構成され、競争が激しくなっている。バリューチェーンのガバナンスは政府によって策定された流通政策と米の品質基準を通して行われている。本論の第2章では、米産業に対するこのような政策の評価を詳述した。続いて第3章では、マーケティングチャネルの全貌を描くことで、流通上の制約と販売機会の拡大の可能性を探るとともに、米産業の主体間関係の構造を明らかにした。第4章では、ウガンダの米産業の競争力を評価するために、市場で流通している米の品質を分析し、品質向上の方策を考察した。

米産業に影響を及ぼす政策を評価するために、様々なデータを用いて研究を行った。まず、関連文献のレビューを行うことにより、ウガンダにおける米のマーケティングの状況を調査した。次に、国や国際機関などの様々なデータベースを用いて、米の自給率や輸入依存率などの関連指標を算出し、貿易の変化や市場価格の動向とそれらの関係性を分析した。このような情報は、政策立案に関係するかどうかを明らかにする上で重要である。さらに、市場における販売機会の獲得や課題、主体間関係を検討するため、農家や精米業者を対象に地調査を行った。具体的には、フォーカスグループディスカッション、米産業で重要な役割を果たしている人や個別農家などを対象とした聞き取り調査を行った。聞き取りの主な内容は、主要な販売先や原料購入先、価格と価格メカニズム、支援団体、マーケティング上の課題や顧客獲得などである。このような調査によって、流通構造の中での信頼関係と他の構成者に影響を与える主体を明らかにした。ウガンダの米の品質向上と競争力を明らかにするため、ウガンダ国立標準局（UNBS）、米流通業者（特に小売業者）、農家を対象として同様な調査を行った。小売業者に対しては、米のブランド、販売状況、品質管理、仕入先、販売先などについて聞き取りと資料収集を行った。その結果、小売業者の収益性、品質向上の手順や消費者の嗜好を明らかにした。また、小売業者から販売されている米のサンプルを入手し、品質水準の調査として小石などの異物やくず米の混入割合を独自に分類して計算

を行った。農家に対しては、米の収穫後の取り扱いを中心に聞き取りを行い、乾燥・調整工程や品質管理について明らかにした。以上の調査から導き出された研究結果は、次のとおりにまとめられる。

ウガンダの米市場を発展させるためには、政策、ガバナンス、品質、インフラストラクチャー、およびマーケティングチャネルにおけるすべての取引システムの改善など、多面的なアプローチが必要である。政策面に関しては、ウガンダ政府は国内産業を振興する方法として、東アフリカ諸国とともに米輸入の対外共通関税を設定した。この政策は次の二つの点から成功しているとは言い難い。第1に、締約国は他の利害関係の対立により、積極的に実行しようとしなないことがあげられる。第2に、タンザニアからの安い価格で流入する米の問題があげられる。ケニアはパキスタンへ茶を輸出したいがために、パキスタンからの輸入米に高関税を掛けず、悪徳業者はその米を別の袋に詰め替えて、ウガンダに安く輸出している。また、タンザニアは、食料安全保障を優先しており、米が不作するときに関税が免除される。その時期にタンザニアの業者はより多くの米を輸入し、その米がウガンダに不正に流れている。共通関税政策の導入以降、ウガンダではパキスタン・ベトナムからの輸入量が減少したが、それを補って余りくらいタンザニアからの輸入米が大幅に増加している。その結果、ウガンダの米の輸入依存率はほとんど変わらないままである。共通関税政策の当初の目的は国内農業の振興であったが、むしろその恩恵はタンザニアのほうを受けていると言えよう。ウガンダの農家が利益を確保するためには、ウガンダ市場において、タンザニアからの米と同等水準以上の品質と価格競争力を必要とする。こうしたことは、米バリューチェーンの中で、全体の生産・流通システムを改善することによって可能となる。

ウガンダの米バリューチェーンは、様々な支配力や影響力を行使する主体から構成されている。影響力の様々な程度を保持し、米農家は小規模であり、個別に営農を行っている者もあれば、集団で生産している者もある。しかし、販売活動は主に個別農家単位で行われており、そのため各農家の交渉力は非常に小さなものとなっている。ほとんどの精米業者は、米を購入するのではなく、手数料でサービスを提供していることを鑑みると、農家から米を購入し卸売業者に販売している産地仲買人の市場支配力が大きい。それは、産地仲買人が流通業者の中で調整力が比較的高いこと、市場までの輸送コストが高いこと、農家の販売ロットが小さいことによる。農家が交渉力を高めるためには、生産物を集約して販売するという水平的な調整が求められる。現在、多くの農家は、共同生産を目的としたグループに参加している。これらのグループは、様々な開発支援団体がサポートすることで組織されてきた。しかし、マーケティングについてはほとんど関心が寄せられず、支援団体の関与もほとんどみられてこなかった。販売を組織化し、市場における信頼や管理能力の面で、よりいっそうのサポートが必要である。道路のインフラストラクチャーが整備されていないため、農村地域に到達できる取引業者が限られ、売り手の利益を損なう買い手寡占の状態となっている。輸送コストを削減し、農家が多様な市場にアクセスすることを可能にするために、農村道路を改善する必要がある。ウガンダの米産業の参入規制はないが、個々の農家にとって販売先

が限られているので農家の所得向上にはつながっていない。農家は稲作の収益性を向上させるために、精米費用を節減する必要がある。エネルギーに関するコストは、燃油でも電気でも高いが、電動精米機を用いるほうが、費用を節減することができる。同様に、精米業者も、ディーゼル精米機の電動精米機よりも、収益性が高くなる。そのため、農村地域の電化を進めることは、すべての米産業の主体にとって有益であり、ウガンダの農家によって生産される米の競争力の向上に大きな役割を果たすであろう。調査地域でみられるように、小規模な精米業者が集積することは、サービスを提供する費用を最小化することができる。しかしながら、共通のメーターを設置すると、電気料金を支払わない者が発生したときに、全体で電気が止められてしまうことがある。低コスト性と高品質性は、ウガンダ米の競争力を高める上で重要である。

精米機が洗浄や選別機能がないことや収穫後の調製作業が不十分であるため、ウガンダ米の品質は依然として低い状況である。収穫後に最も重要なのは、精米や貯蔵の前に行う籾の乾燥であるが、農家は腐敗による損失リスクをおそれて、過剰に乾燥を行う傾向がある。その乾燥過程では、籾を地面の上に広げるので異物が混入し、より品質が劣化することになる。農家が金融上の信用力があれば、製粉業者から代金を前借りして、水分計やブルーシートのような基本的な資材に投資することができるかもしれない。しかし、従来農家が返済に滞ることが多く、事前の信用貸しが避けられ、結果として不信感につながっている。このことは、垂直的調整を通して、他のアクターとの連携強化を必要とすることを意味する。垂直的調整は、バリューチェーン全体の中で主体間の信頼関係を構築する上で不可欠であり、すべての主体にとって互恵的に結果につながる可能性がある。国産米のブランドである「スーパー」は、取引業者にとって収益性が高いが、芳香性に優れているので、輸入米と比べると消費者にとっても魅力的である。また、「スーパー」は米粒が厚いので精米過程で破碎されることが少なく、市場に流通したときに比較的高い品質を保つことができる。「スーパー」を奨励品種としていくことは、国際米の品質を高め、市場において輸入米と競争していく上で、実現性の高い方策である。

以上のことから、ウガンダの米市場を発展させるためには、政策によって保護するのではなく、ウガンダの米バリューチェーンの競争力を高めることが必要である。そのために、次の3点が求められる。第1に、各チェーンのステージにおいて、同類の主体間の連携を強化していくことである。それによって、規模の経済の効果が得られ、集団の内部機能が発揮できる。第2に、異なるステージでの主体間の関係を改善していくことである。信頼関係を構築し、チェーン内部で資金調達を可能にすることで、品質改善が図られる。第3に、農村部において電力や道路といった公共サービスを改善することである。そのことは、売り手である農家は多くの買い手にアクセスできるようになり、健全な市場の形成につながる。

本論文は、ウガンダの米市場に関して、政策、品質およびその向上策について総合的に研究を行ったが、多くの論点が残されている。政策の面では、輸入関税が十分に機能していないことが明らかになった。これは締約国に対する強制力が弱いことに起因する。しかし、協

約どおりに施行された場合，どのような影響があるかについて分析することは有益であろう。また，本研究では，米の購買行動で重視されることとして，ホテルやレストランなど外食産業では品質，家庭用では価格であることを示した。しかし，消費者の嗜好や高品質米の支払い意思額についてはより詳細に検討する必要がある。近年ウガンダにおいてもスーパーが次々と開店しており，米の品質に関して小売店がどのような役割を果たすのかということについても，今後の研究課題である。

Appendix 1: Survey guides used in data collection

A) Constraints and opportunities to upgrading Uganda's rice markets survey instruments

A1) Guide to producers/farmers (household level)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. What is the total land area you have and how much is cultivated?
2. What part of your land is irrigated and what form of irrigation?
3. How long ago did you first start growing rice? How (from whom) did you learn about the way to grow rice?
4. What production technology/inputs do you use for growing rice (seed variety, irrigation, fertilizer and chemicals, value adding)?

Production technology	Usage response (yes or no)	comment
Improved seed		
Irrigation		
Fertilizer		
Agricultural chemicals		
Other (specify)		

5. What is your average yield (volume per area)?
6. Did you receive any support or advice? What kind and from whom? (government extension, NGOs, buyer, input supplier, neighbor, etc.)

Source of support	Response (yes or no)	comment
Government extension		
NGO (specify)		
Buyer		
Neighbor/friend		
Other (specify)		

7. Do you use formal or informal credit to grow rice? (loans from family members or neighbors, banks, microfinance institutions, savings and credit clubs, etc.)

8. Do women and men have different roles in rice production and marketing? Please explain.

9. Do you sell rice? Where or to whom do you sell? (farm gate, association, intermediary, broker, processor)

Date (m.)	Volume (kg)	Price (Ush/kg)	Buyer	Transport means	Transport cost

10. How do you negotiate price with these buyers? How is the price determined?

11. How far is the nearest milling machine? Do you use it for milling? If no, why and how far the one you normally use?

12. Can you provide us with an overview of your main marketing costs (labor, value adding, packaging, transport, etc.)?

Activity	packaging	transport	milling
Cost/100kg bag			

13. What forms of help or assistance do you receive from the different types of buyers? (advances of seeds or other inputs, technical assistance, advance contract for sale, cash credit, transport services)

14. How do you find out about markets, prices, new buyers, new products, etc.?

15. Do you belong to any farmers association? What are the activities you do together?

Have ever sold rice as a group?

16. Are there any benefits or problems encountered during group selling? What are they?
17. How do you address these problems together?
18. Is there anything else about selling rice that you think I should know?

A2) Guide for farmers groups (parish level)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. What is the average land ownership (in acres) per household?
2. What proportion of total land per household is under cultivation?
3. What crops are usually grown by members of this parish?
4. What is the average size of a rice field in this parish?
5. From the following Options, check the three main rice buyers in this community.

(a) Village assemblers (b) Rural millers (c) traders from town such as retailers and wholesalers (d) Processing companies (e) local institutions e.g schools, hospitals and prisons (f) charity organizations such as World Food Program and Red Cross (g) Supermarkets (h) Others (specify).....
6. How is the selling process for the main three buyers? (a) deliver to buyer (b) buyer collects from.....(specify)

7. List support organizations in the production and marketing of rice in this parish, specify the main activities for each organization?
8. What are the main constraints associated with rice marketing?
9. In your view, how can such constraints be addressed?
10. Any other market issues you think need to be discussed?

A3) Guide to rural rice millers (individual level)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. For how long have you been in the milling business? When did you start the milling business?
2. Why did you start this business? What was your occupation before milling business?
3. What was the initial cost for this business? And how did you fund it?
4. Where do you source your paddy from (in terms of nature and number of farmer and distance)

Distance	Number of smallholder farmers	Number of medium and large scale farmers
Less than 20 Km		
20 – 40 Km		
40 Km or more		

5. Do you provide some assistance to your farmers (credit, storage)
6. How is your relationship with your suppliers with regard to credit recovery

7. Do you receive some assistance in your business? What kind of assistance and since when?
8. What is the milling capacity of your machine? What power source do you use?
Electricity or diesel?
9. How much is the milling fee? How much rice do you handle per day (during peak and off-peak periods)?
10. Do you buy or sell rice after milling?
11. Are there traders who purchase farmers rice after milling? What kind of traders are they?
12. How is the price determined between buyers and sellers
13. Do you hire skilled laborers in your business? How many permanent and temporary laborers? Cost?
14. What are the main challenges in your business?
15. What should be done to address the above challenges?

A4) Guide to rural millers (Groups)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. For how long has this group been in milling business?
2. Which kind of milling machines are mostly used in this community?
(a) Engelberg (b) Mill-top (c) other (specify).....
3. Average milling capacity per machine?
4. Average paddy processed by miller per day (for both during season and off-season)?
5. What is the main source of power used during milling? (a) Electricity (b) Diesel?

6. What is the cost of Diesel per liter?
7. Milling commission charged per Kg?
8. Do millers give financial credit to farmers (suppliers)?
9. If yes, how successful is it to recover such credit?
10. If some organizations are involved in assisting rice milling business, which kind of assistance are they offering?
11. If some millers are involved in buying of rice after milling, what is their proportion?
12. Are there some rice selling transactions which take place from the milling place?
13. Whom do you think are the main buyers
14. How many laborers does an average miller hire? And what are the typical salaries for such employees?
15. What are the main challenges in milling business?
16. What should be done to address the above challenges?

A5) Guide for processors & distributors

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. In what value chain functions do you engage? How many agents are there of your type?

Value chain function	Number of agents

2. In the course of your business do you interact with government representatives? Which and for what reason?

Government representative	Reason

3. Are there any government policies or practices that are helpful to your business?

Which?

4. Are there any policies or practices that you would like to see changed? What changes would be helpful?

Policy	Required change

5. For processors: can you describe the processing technologies that you are using, the main costs involved (including investment cost, working capital needs, capacity utilization and total per unit production cost), and the range of shelf-ready rice products you sell?

Production technology	Capacity	Production cost per unit	comments

6. How many tons of rice do you process in a year?

Period	Tons processed	Main supplying area
January - March		
April - June		
July - September		
October - December		

7. Who are your main clients (buyers)? How are quality and price defined in the end

market (by buyer, channel, consumer segment)?

Product	Main buyer	Price per unit

8. How do consumers compare imported vs. domestic rice? How do relative prices affect the end consumers' substitution of rice with other food staples?

9. What are demographic and other forward-looking trends that will impact on consumer preferences? What are the implications of this for the rice value chain?

10. What percentage of your rice is from domestic production, how much is imported rice?

11. How do you collect rice? (collect directly from farmers, use agents, brokers or farmers deliver to the factory premise)

12. Do you contract some farmers? What are the contract basics/terms? (group or individual farmers, acreage requirements, contract period, product pricing)

13. Who are your main suppliers? (gender, scale, location)

Main supplier	Proportion (%)	Location
Contract farmers		
Non contract farmers		
Brokers		
Others		

14. What are the key logistical and infrastructural requirements and challenges (e.g., storage, transport, information, etc.)?

15. How many employees do you have? Do you have problems finding appropriately

skilled employees? Explain. How has this situation changed over time?

16. Given the main market opportunities, what are the main improvements/upgrading that need to take place along the value chain?

17. What specific upgrading investments have you recently made or plan to make in the next few years?

18. What do you think about the competitiveness of the rice business in this country?

19. Do you have additional observations or comments that we have not discussed?

B) Enhancing the quality of locally produced rice in domestic markets questionnaires

B1) Guide to farmers (individual)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. Which varieties of rice do you cultivate? And what is the current acreage per each variety? (a) Lowland (Super)..... (b) Lowland (Kayiso).....
(c) Upland (NERICA).....(d) Others specify.....

2. For how many days do you dry paddy?

3. How many hours per day do you dry rice?

4. How thick is the paddy spread (depth in cm)

5. Do you stir the paddy while drying? If yes, after every how many hours?

6. How do you tell whether the paddy is dry enough for milling?

7. How do you tell whether paddy is of good quality or not? (a) amount of immature grains (b) presence of foreign matter (b) disease and pest damaged paddy (d) cracked paddy due to over drying (e) others specify

8. Which practices do you engage in to improve paddy quality?

(a) Harvesting ripe paddy (b) separating different varieties when drying (c) drying on

tarpaulin (d) drying to optimum moisture content (e) keeping away poultry (f) others (specify).....

9. Can tarpaulins be accessed if someone had money for buying them? (Distance to the nearest shop).....
10. What is the cost of tarpaulins?
11. Are there any benefits to selling high quality rice? (a) None (b) buyer trust (c) Readily marketable (d) high price premium (e) other (specify)
12. What are the constraints to paddy quality improvement? (a) lack of quality control skills (b) it is expensive to produce quality paddy (c) No price incentives for quality (d) lack of price information (e) others specify
13. Household expenditure and income for the last year?

Period	Expenditure	Income	Balance	Coping strategy
Sep-Dec, 2013				
Jan-Apr, 2014				
May-Aug, 2014				

B2) Guide to farmer groups

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. What is the main rice variety cultivated in the area.
2. Average acreage per household?
3. Average length of paddy drying (in days)?
4. In a typical day, paddy is dried for how many hours?
5. How thick is the paddy spread (depth in cm)

6. After every how many hours is paddy stirred during drying?
7. How do you tell whether the paddy is dry enough for milling?
8. How do you tell whether paddy is of good quality or not? (a) amount of immature grains (b) presence of foreign matter (b) disease and pest damaged paddy (d) cracked paddy due to over drying (e) others specify
9. Which practices do you engage in to improve paddy quality?
 - (b) Harvesting ripe paddy (b) separating different varieties when drying (c) drying on tarpaulin (d) drying to optimum moisture content (e) keeping away poultry (f) others (specify).....
10. Can tarpaulins be accessed if someone had money for buying them? (Distance to the nearest shop).....
11. What is the cost of tarpaulins?
12. Are there any benefits to selling high quality rice? (a) None (b) buyer trust (c) Readily marketable (d) high price premium (e) other (specify)
13. What are the constraints to paddy quality improvement? (a) lack of quality control skills (b) it is expensive to produce quality paddy (c) No price incentives for quality (d) lack of price information (e) others specify

B3) Guide to distributors (wholesalers/retailers)

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. Which brands of rice do you sale? And what are their proportions? (a) Kayiso
 - (b) Super local.....(c) Super imported..... (d) Pakistan..... (e) Others specify.....

2. Do you also sell different grades of same brand? Give examples and prices

Brand	Grade	Sales (Kg)	Price	Comment

3. What determines the grades? Attributes/specifications
4. Are there some government rules or guidelines regarding rice grades and standards?
5. Who are your main suppliers of these rice brands and grades? Including place (e.g district, town, country) of production! (a) Farmers from (b) Traders from (c) Importers from..... (e) Others specify.....
6. Do you communicate with your suppliers about quality enhancement of their rice?
7. Are suppliers complying with your quality requirements? If not, why?
8. Do have any measures taken against non-complying suppliers? List.
9. Who are the main clients/buyers of your rice? To be determined according to your perception of their income levels e.g low income, middle income and high income earners
10. Are there any preferences towards particular rice brands and grades by these clients?

B4) Guide to National bureau of standards

The information obtained using this guide is exclusively for research purpose and will be treated with utmost confidentiality

1. Are there minimum standards for paddy and milled rice? Give figures
2. If yes, when did these standards come into effect?
3. Are rice value chain stakeholders aware of such standards? Number of trainings per year, fees per trainee.
4. If yes, have they complied with the set standards?

5. Are the quality requirements for imported rice and paddy same as for locally produced one?
6. Do you have some statistical data on paddy and rice quality in Uganda?
7. Are there any measures taken in case of non-compliance with the above standards
8. Are facilitative services to standards such as certification, laboratory testing and others available?
9. Any suggestions which may help improve paddy and milled rice quality?

B5) Personal observation guide

brand	grade	%stone	%broken	price	comment
Kayiso	A				
	B				
	C				
Super	A				
	B				
	C				
Upland	A				
	B				
	C				
Pakistan					

Appendix 2: Curriculum Vitae

Dan Makosa (Mr)

Address: Department of Agricultural Economics, Tokyo University of Agriculture

1-1-1 Sakuragaoka, Setagaya-ku, Tokyo 156-8502 Japan

E-mail: dan.makosa@yahoo.com

Date of Birth: 29/11/1979

Telephone: +8180-3556-3585

Nationality: Ugandan

Education

2013 – 2016: Tokyo University of Agriculture, Tokyo, Japan

PhD Agricultural Economics

- PhD Thesis – Developing the Rice Markets in Uganda:

A Value Chain Analysis

2001-2003: Tokyo University of Agriculture, Tokyo, Japan

MSc. Agricultural Economics

- Master's Thesis – Improving Rural Livelihood through NERICA

Farming in Uganda: A Case of Najja Sub-county

2000-2004: Makerere University, Kampala, Uganda

BSc. Agriculture (Economics major)

- Bachelor's Thesis – Marketing of Rice in Kibimba Scheme

1998-1999: Kyambogo College School, Kampala, Uganda

Uganda Advanced Certificate of Education

Professional Experience

2006-2010: CIMMYT-Sasakawa and Partners Impacts, Kampala, Uganda

Supervisor – Impact Assessment

- Headed the data collection team of Mukono district

- Analyzed the impacts of Sasakawa Global 2000 and partners on rural livelihood

Feb-Sep, 2009: USAID-LEAD Project, Mukono, Uganda

Field Facilitator

- Promoted the concept of Farm Field Schools

2004-2006: National Agricultural Advisory Service (NAADS), Busia, Uganda

Agricultural Consultant

- Promoted the growing of improved Groundnuts (Serenut) and Rice (NERICA) through farmer training and demonstration plots

July-Sep 2003: Tilda Uganda Limited, Bugiri, Uganda

Farm Management Internship

- Supervised the daily activities pertaining to production and marketing of rice

Publications

1. Makosa, D. (2015) “Constraints and opportunities of upgrading Uganda’s rice markets”, Journal of Development and Agricultural Economics, Vol.7 (12), pp.386-399
2. Makosa, D. (2015) “Enhancing the quality of locally produced rice in domestic markets: A survey in Eastern Uganda”, Journal of Rural Community Studies, Vol.121, pp.42-55
3. Makosa, D., Takayanagi, N. (2014), “Improving rural livelihood through NERICA farming: An inquiry into Najja sub-county in central Uganda”. Asian Journal of Agriculture and Rural Development, Vol. 4, No.1, pp.59-73
4. Makosa, D. (2014), “Analysis of Uganda’s rice markets in the context of East African

integration”, Report on Agricultural Economics, Vol.45, pp.1-11

Short courses

Advanced Certificate in Climate, Energy and Food Security (United Nations University, Tokyo, Japan), Advanced Certificate in International Development Studies (National Graduate Institute for Policy Studies, Tokyo, Japan), General Certificate in Intellectual Property (WIPO Academy, Geneva, Switzerland), Certificate in Program Planning and Management (DataPro Institute, Entebbe, Uganda).

Conferences and Seminars

Upgrading Uganda’s rice markets: constraints and opportunities (Presented as a conference paper during annual meeting of the Association of Japanese Geographers, 2014)

Improving Rural Livelihood through NERICA farming in Uganda: A case of Najja Sub-County (Presented as a paper during annual general meeting of Japanese Association of Economic Geographers, 2013)

An Insight into NERICA farming in Rural Uganda: A case of Najja Sub-county (Presented as a paper during the annual meeting of the Association of Japanese Geographers, March 2013)

Scholarships, Grants and Awards

Japanese government MEXT Scholarship (2010-2016), Government of the Republic of Uganda (Ministry of Education) National Merit University Scholarship (2000-2004), Tokyo University of Agriculture Graduate Research Grant (2012-2013, 2015-2016), Takenaka Prize of Best Master Thesis (2013)

Academic and Professional Association Membership

African Association of Agricultural Economists, International Association of

Agricultural Economics, International Food and Agribusiness Management Association,
Japanese Association of Economic Geographers, Association of Japanese Geographers

Skills

Computer: MS Word, MS Excel, MS Power Point, MS Access, STATA, SPSS, R

Language: English (Fluent), Luganda (fluent), Luhya (native), Japanese (basic),

Kiswahili (basic), Lusoga (good)

Research Interests

Agricultural Value Chain Analysis, Sustainable Livelihood Analysis, Agricultural
Marketing, Agricultural Policy, Agribusiness Management, Regional Integration, Impact
Assessment of Agricultural Projects.

Referees:

Takayanagi Nagatada, Professor, Department of Agricultural Economics, Tokyo
University of Agriculture, Tel: +81354772371, Email: takayan@nodai.ac.jp

Kayaayo B.R Emmanuel, Associate Director, Sasakawa Africa Association, Tel:
+256414345497, Email: brekayaayo@saa-safe.org