



Food and Agriculture
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THE RICE VALUE CHAIN IN TANZANIA

A report from the Southern Highlands
Food Systems Programme

R. Trevor Wilson
I. Lewis



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EXECUTIVE SUMMARY

Rice is the third most important food crop in Tanzania after maize and cassava. According to official data, annual rice production doubled between 2001 and 2012 (as a result of expanded cultivation areas rather than increased unit yields) and now averages about 1.35 million tonnes. Smallholders currently grow the majority of rice (74 percent of the planted area) under rainfed conditions; irrigated rice (20 percent) and large-scale production (6 percent) are currently less important. The Government of Tanzania has prioritized rice through its National Rice Development Strategy (NRDS): this aims to double rice production again by 2018 in order to improve food security and provide the possibility of export to neighbouring countries.

Rice is used almost entirely as a human food. On average, about 30 percent of rice is consumed by producing households. Almost all the remainder is absorbed into the domestic market, with consumption highest in larger urban areas. Greater Dar es Salaam is the principal end-market for about 60 percent of consumption, with Mbeya and Morogoro the main sources of supply. Tanzanians generally prefer aromatic rice and most consumers purchase loose rice from traditional street retailers or farmers' markets. Supermarkets selling pre-packed rice are, as yet, just a small part of the food retail industry. Consumers tend to shift from maize, cassava and sorghum to rice (for boiling) and wheat (as bakery products) as they become urbanized and as incomes rise. In the first decade of the twenty-first century, rice consumption increased from 20.5 kg (in 2001) to 25.4 kg (in 2011) per person per year.

Around 42 percent of all rice produced is marketed (a larger portion than any other food crop), but this is largely because of the influence of large-scale growers. Tanzania has not been self-sufficient in rice for many years, and there were high levels of imports during the first years of the twenty-first century until an import tariff of 75 percent was imposed in early 2005. Imports were reduced in consequence and this provided the impetus for a major domestic increase in rice production (imports represented 16.5 percent of domestic production in 2001–2004 but dropped to 5.2 percent in 2005–2011). Paradoxically, whilst rice was being imported, there were still exports to neighbouring countries — mainly Burundi, Kenya, Rwanda and Uganda.

Imports were encouraged in part because local rice prices in Dar es Salaam were considerably higher than world prices. Rice prices (for both the producer and consumer) vary throughout the year, but are lowest in the glut period (the 3–4 months around and immediately after harvest) and highest for the other 8–9 months, as less rice is moved on to the market: a high-to-low ratio of monthly prices is 1.23: 1 in Dar es Salaam. This variation provides the rationale for more storage capacity since this is generally inadequate in rural areas.

Demand for rice in Tanzania is projected to triple by 2020, and a substantial — and growing — deficit is forecast (from 1.15 million tonnes in 2009 to 2.84 million tonnes in 2020). These trends are expected to continue past 2025. Rice production grew at an average annual rate of just under 7 percent between 2001 and 2011. Rapidly growing domestic demand means that if the present trends continue the country will find it difficult to produce a surplus for export. If the rice sector were to achieve a 10 percent annual growth rate, there would be surplus available for export; a 5 percent annual growth rate would, conversely, result in increasing trade deficits.

Traditional small-scale rainfed production (either lowland flood or upland dry) is the predominant system and is used on about 74 percent of the national rice area. In this system, there is little use of technology: saved seeds are the planting material, there is minimal fertilizer use, limited use is made of the Warehouse Receipts System (WRS) for storage, and spot prices are the norm in local markets. *Improved* small-scale rainfed production occupies about 20 percent of the planted area. Here, use

may be made of new cultivars, there is hand planting in rows, some irrigation, more use of fertilizer and more storage and trading using WRS. *Large-scale* integrated production — by commercial farms, backed by investment capital — occupies 6 percent of Tanzania's rice area. These enterprises are also involved in other chain activities including providing inputs and services to outgrowers, and storage, milling and distribution to urban wholesalers.

Among the strengths of the sector are the inherent high quality — though low yielding — aromatic rice that is in demand in Tanzania and neighbouring countries, a suitable natural growing environment (in terms of climate, soil and water) and emerging large-scale producers and traders with expanding smallholder schemes.

In opposition to the strengths are a number of critical weaknesses. Paddy yields average only 1.5 tonnes per hectare (t/ha) compared with 2.5 t/ha for Africa as a whole and 4.4 t/ha in Asia. Low output is linked to predominantly rainfed production, the limited adoption and availability of improved cultivars, the minimal use of fertilizers, traditional planting techniques and the limited areas of irrigation. Smallholder paddy production has high labour requirements, which — coupled with very little mechanization — results in high production costs. The value chain has little horizontal or vertical integration and is inefficient and transaction based. The chain operates on a 'supply push' and not a 'demand pull' basis. There is limited information sharing and no overall governance. Sub-chains include production and milling, trading and distribution through wholesalers, and marketing and retailing. Little value is added to the basic product from production to consumption. There is little trust in business transactions, which are generally conducted on an informal basis without contractual obligations: this adds to business costs and is a major impediment to improved governance and the development of value added activities. Poor transport infrastructure results in high transport costs, reduces price competitiveness and means lower returns to growers. Storage capacity in rural areas is very limited, outdated machinery in small mills leads to a high proportions of broken rice, and there is limited grading of milled rice to meet specific customer needs. Finance, credit and insurance are difficult to obtain. Smallholder producers are often far from markets, and have very limited options in terms of buyers, information and services. Data on the sector are of poor quality. Government policies are slow to reach implementation as a result of limited human, financial and physical resources. There is, however, a rice industry association (covering all participants in the chain) that is intended to guide strategic development and exert pressure on government policy.

Opportunities drive growth and change. Domestic demand for rice (especially from Dar es Salaam) continues to expand. Tanzania continues to be a net importer of rice but there is a growing export demand from neighbouring countries. Emerging collaboration between smallholders and large private growers (principally via outgrower schemes) will bring benefits to both parties: smallholders will increase their productivity and gross margins, gain access to a greater area of land and have a more assured future, large farms will make more economic use of their equipment. The Government displays a positive attitude to rice development as indicated in the National Rice Development Strategy, and actively promotes private investment.

The main threats to the sector, nonetheless, are the Government's changing policies on export bans and import tariffs that have reduced customer and investor confidence. These, and many other aspects of a business-enabling environment, are determined by the Government, and need to be addressed if the confidence of both smallholders and large producers is to be regained.

There are currently many challenges to business competitiveness (including problems with many of the key indicators identified by the World Bank), and these — along with the issues of land tenure — need to be solved, since they have a significant impact on both smallholders and large private investors.

The Vision for the rice sector could be:

By 2025, a sustainable, environmentally-sensitive, more productive, competitive and profitable rice sector that will deliver increased output for internal consumption as well as for export, and contribute to reducing poverty, improving food security and providing a better quality of life for all Tanzanians

For this vision to be actualized, a number of strategies need to be adopted. There is a need to:

- *Increase rice production* — Key strategic elements to achieving this will include supporting large private sector companies, trading companies and smallholder interventions that focus on production and processing
- *Increase rural storage capacity* — Key strategic elements to achieving this will include improving community-based grain storage, commercial grain storage, reporting of stored grain volumes, and expanding the use of WRS
- *Improve the functioning and performance of the rice value chain and marketing* — Key strategic elements to achieving this will include: ensuring the large private sector companies involved in production and provision of commercial services have the ability to transform the value chain over time; training key stakeholders in value chain management; conducting consumer research; training to build trust and a greater understanding among stakeholders of the advantages of contracting business transactions along the chain; conducting a scoping study to identify opportunities to add value and recommend how these can be implemented in rural areas in particular; increasing understanding of regional export markets, the competitive situation, customer requirements and the requirements for market development)
- *Establish an industry-wide body or alliance* — Key strategic elements to achieving this will include scoping the need for (and role of) such a body or alliance; and
- *Enhance the business-enabling environment* — Key strategic actors influencing this will include USAID's SERA Project, the World Bank and a number of donors already actively involved in providing advice on these issues to Government.

The United Nation's Food and Agriculture Organization (FAO) has major strengths and experience in training and in understanding agro-industry business models in developing countries. It is thus recommended that FAO should focus on two broad areas: training and research. Specifically, it should:

- train and develop the skills of smallholders in a multitude of topics (such as agriculture, business management and contracting);
- train stakeholders in value chain management;
- build trust and understanding between stakeholders of the advantages of contracting business transactions along the chain;
- contract consultancy studies to research critical issues related to agro-industry development in the rice sector;
- review existing smallholder outgrower schemes and develop solutions to overcome current bottlenecks;
- review how to increase the availability of grain storage in rural areas;
- initiate a scoping study to identify the opportunities for adding value and recommend how these can be implemented especially in rural areas; and
- conduct research on Dar es Salaam consumers.

ACRONYMS

ACDI	Agricultural Cooperative Development International
AfricaRice	Africa Rice Centre (formerly the West Africa Rice Development Association)
AKF	Aga Khan Foundation
AKIRIGO	Association of Kilombero High Quality Rice Growers
ASLM	Agricultural Sector Lead Ministries
ARI	Agricultural Research Institute
ASA	Agricultural Seed Agency
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
AVRDC	World Vegetable Research Centre
BMGF	Bill and Melinda Gates Foundation
BRELA	Business Registrations Licensing Agency
CAADP	Comprehensive African Agriculture Development Programme
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CET	Common External Tariff
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
CPD	Continuing Professional Development
CRS	Conservation Resource Centre
CRDP	Cooperative Rural Development Bank
DALDO	District Agricultural and Livestock Development Officer
DFID	Department for International Development (United Kingdom)
EAC	East African Community
EAGC	Eastern Africa Grains Council
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FEWS NET	Famine Early Warning Systems Network
FFS	Farmer Field School
GDP	Gross Domestic Product
IIDS	Integrated Industrial Development Strategy
IITA	International Institute of Tropical Agriculture
IRRI	International Rice Research Institute
JICA	Japan International Cooperation Agency
KATC	Kilimanjaro Agricultural Training Centre
KATRIN	Kilombero Agricultural Research and Training Institute
KPL	Kilombero Plantations Limited
M4P	Making Markets Work for the Poor
MAFC	Ministry of Agriculture, Food Security and Cooperatives
MARTI	Ministry of Agriculture Research and Training Institute
MFI	Microfinance Institutions
MITM	Ministry of Industries, Trade and Marketing
MKUKUTA	National Strategy for Growth and Poverty Reduction (acronym from Swahili name)
MLFD	Ministry of Livestock and Fisheries Development
MWI	Ministry of Water and Irrigation
NAFAKA	Tanzania Staples Value Chain ('nafaka' = grain in Kiswahili)
NAFCQ	National Agricultural and Food Corporation
NAIVS	National Agriculture Input Voucher Scheme
NALPIG	National Agriculture and Livestock Extension Policy and Implementation Guidelines

NARS	National Agricultural Research System
NBC	National Bank of Commerce
NBS	National Bureau of Statistics
NGO	Non-Governmental Organization
NMB	National Microfinance Bank
NMC	National Milling Corporation
NORAD	Norwegian Agency for Development Cooperation
NRDS	National Rice Development Strategy
NSCA	National Sample Census of Agriculture
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PASS	Private Agricultural Sector Support Programme
PHS	Plant Health Service
PMO — RALG	Prime Minister's Office — Regional Administration and Local Government
RATIN	Regional Agricultural Trade Intelligence Network
RLDC	Rural Livelihood Development Company
RUDI	Rural Urban Development Initiative
R&D	Research and Development
SACCOS	Savings and Credit Cooperative Societies
SAGCOT	The Southern Agriculture Growth Corridor of Tanzania
SDC	Swiss Agency for Development and Cooperation
SERA	Tanzania Policy Project (USAID)
SHIDEPHA	Services Health and Development for People Living Positively with HIV/AIDS
SHFS	Southern Highlands Food Systems
SIDO	Small Industries Development Organization
SIPA	School of International and Public Affairs
SILC	Savings and Internal Lending Communities
SME	Small and Medium Enterprises
SPS	Sanitary and Phytosanitary
SRI	System for Rice Intensification
SUA	Sokoine University of Agriculture
t/ha	Tonne/hectare
TAP	Tanzania Agricultural Partnership
TARIPA	Tanzania Rice Partnership
TASU	Tanzania Agriculture Scale Up programme
TAZARA	Tanzania — Zambia Railway
TBS	Tanzania Bureau of standards
TDV	Tanzania Development Vision
TFDA	Tanzania Food and Drugs Authority
TIN	Tax Identification Number
TOSCI	Tanzania Official Seed Certification Institute
TPB	Tanzania Postal Bank
TPRI	Tropical Pesticides Research Institute
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania
USAID	United States Agency for International Development
VOCA	Volunteers in Overseas Cooperative Assistance
VSO	Voluntary Service Overseas
WRS	Warehouse Receipts System

GLOSSARY OF KISWAHILI WORDS AND PHRASES

Chenga	Broken rice (the lowest quality in the local grading system)
Duka	A shop (plural = maduka)
Kilimo kwanza	'Agriculture First' (a Government development policy)
Mchele	Milled rice
Mpunga	The growing rice crop; also the unmilled grain or paddy
Panya	Rat (also slang for a bush track used for the informal export of rice)
Wali	Cooked rice (mchele)

Currency exchange rates

US\$ 1.00 = c. 1 600 Tanzania Shillings (TSh) in September 2013

1. INTRODUCTION

1.1 Study Objectives

The major objectives of this study were to:

- identify the strengths as well as the bottlenecks in production, processing, marketing and the institutional environment of the Tanzania rice industry;
- establish links between performance drivers along the value chain and examine efficiency / competitiveness issues;
- present and take part in a validation workshop with public and private sector stakeholders on the results of the assessment;
- propose strategic interventions to government and private sector stakeholders regarding the improvement of organization and performance of the rice chain with a view to increasing efficiency and competitiveness; and
- prepare a publishable report on the 'Tanzanian Rice Value Chain Analysis'.

1.2 Methodology

The rice value chain analysis took place between July and August 2012. It included a field mission in Tanzania to support FAO's SHFS programme. Meetings and discussions were held with stakeholders across the sector (Annex 1) and many documents were consulted (Annex 2).

In brief the methodology of the study comprised:

- an analysis and review of the rice subsector in Tanzania using a value chain analysis framework;
- a description, analysis and review of the value chain as a whole (as well as at each individual stage) covering critical factors including: production, processing, transport, marketing and end users. The performance and competitiveness of the latter were measured against relevant criteria, and the key drivers of the chain — and the issues impacting it — were also identified;
- a review of relevant reports and studies was undertaken; this was coupled with interviews with actors at each stage of the chain in order to gain a better understanding of their roles, the key issues influencing their performance (as well as the chain as a whole) and therefore identify opportunities for improving and adding value;
- further interviews with relevant government agencies to understand key policies, their implementation and other aspects of the enabling environment impacting on the sector;
- a SWOT analysis of the key strategic issues; the formulation of strategies to develop, improve and evaluate the chain; and the provision of recommendations for both the private and public sector; and
- a presentation of the analysis, findings and strategic recommendations in a report for publication.

The range and breadth of the literature sources (as detailed in Annex 2) show the wealth of data on the rice value chain. Much of it, however, is qualitative. There is such disparity between quantitative data sources that their reliability — and indeed their usefulness — are open to doubt. The data presented in this report should thus be considered indicative rather than definitive. Inconsistencies in the quality of official data apply particularly to production, export and import information. Where credible detailed analysis has been undertaken (and revisions proposed outside government) that data have been used in this report in preference to official sources.

1.3 Brief Overview of the Value Chain

Rice¹ is the third most important food crop in Tanzania after maize and cassava. Official data indicate that current total production averages about 1.35 million tonnes. Rice is grown in most regions of the country: with the Coast, Morogoro, Tabora, Mbeya, Mwanza, Shinyanga and Arusha Regions each producing in excess of 100 000 tonnes. Almost 20 percent of farmers are involved in rice production. Most rice is grown by smallholders under rainfed conditions but some small farmers grow and irrigate 2 — 2.5 hectares under schemes that are often initiated and controlled by government. Larger farms have larger areas under irrigated cultivation but large-scale commercial rice farming is limited to a few private firms who bought their land when the large-scale National Agricultural and Food Corporation (NAFCO) schemes were privatized.

In recent years the Tanzanian government, private sector and civil society have demonstrated a sustained commitment to realizing Tanzania's agricultural potential. The Agricultural Sector Development Programme (ASDP) 2006—2015 of the Government of Tanzania is part of the broader National Strategy for Growth and Poverty Reduction (commonly known by its Kiswahili acronym 'MKUKUTA'). A private sector initiative to invigorate agriculture through the '*Kilimo Kwanza*' ('Agriculture First') campaign (see Box 1) was endorsed by the government in 2009.

The Government has prioritized rice through its National Rice Development Strategy. This seeks to double rice production by 2018 in order to improve food security and provide a potential surplus for export. The strategy aims to improve seed cultivars and input supply, the availability of irrigation, marketing, Research and Development (R&D), and agricultural credit. The major programmes and policies include:

- fertilizer and seed subsidy, and seed R&D;
- infrastructure development (including irrigation and roads);
- an import tax of 75 percent on milled rice for mainland Tanzania; and
- the removal of the export ban during 2012.

The value chain comprises participants from production to consumption (Figure 1).

Figure 1: Generalized rice value chain in Tanzania



¹ Rice is the English generic term for various forms of the crop including: the growing plant (also sometimes referred to as 'paddy'), unmilled grain (also sometimes known as paddy), milled grain and the cooked and ready-to-eat product.

In Kiswahili the crop and unmilled grain are known as 'punga', the milled grain as 'mchele' and the cooked product as 'wall'.

Box 1: 'KILIMO KWANZA'. The Principal Points and the Ten Pillars

Principal Points

- Agriculture is an economic priority in Tanzania;
- Kilimo Kwanza is a national strategy intended to accelerate agricultural transformation;
- It is not a new strategy but rather a catalyst for the implementation of the Agricultural Sector Development Programme (ASDP), with some additional features;
- In contrast to the past, the private sector is expected to lead the implementation of 'kilimo kwanza';
- The strategy is formulated by the Tanzania National Business Council, a forum for public-private dialogue.

The Ten Pillars of Kilimo Kwanza

- Mobilize political will and the commitment of all Tanzanians to implement 'kilimo kwanza';
- Finance Kilimo Kwanza including through a new Tanzanian Agricultural Development Bank;
- Emphasize good governance, better coordination, monitoring and evaluation;
- Prioritize what is produced and marketed, giving top priority to food crops;
- Improve land access and tenure security;
- Establish incentives to attract and retain private sector investment in agriculture;
- Establish industries for backward and forward linkages, and to provide added value;
- Utilise scientific, technological and human resources;
- Develop infrastructure;
- Mobilize the government machinery and private sector and sensitize all Tanzanians for Kilimo Kwanza.

2. END MARKETS

2.1 National market

There are active markets for paddy and rice throughout the year. Both products store well and will keep from one year to the next and are therefore extensively traded. Rice in Tanzania is mostly sold to consumers as polished milled rice. The preferred type for consumption is aromatic long grain rice but there is also a demand for sticky white long grain rice. Very few other products are available although there are limited supplies of brown rice and rice flour. Value added products such as rice crackers, as produced in Thailand, appear to have no place on the Tanzanian market.

Rice is a staple food and is consumed in both urban and rural areas. The urban area of greater Dar es Salaam is the principal end market and accounts for about 60 percent of national consumption. Mbeya and Morogoro Regions are the main sources of supply. Dar es Salaam has Tanzania's highest Gross Domestic Product (GDP) per caput (US\$ 1 741 compared with the national average of US\$ 1 471 in 2010), the highest urban population and the third largest total population in the country. Rural consumers include smallholder rice farmers, who retain about 370 kg of their production for consumption by their own household of around five persons. Consumers usually purchase rice loose from bulk sacks either from traditional small retailers or at farmers' markets (see Figure 2). Quality differentiation is limited mainly to the amount of broken rice present (e.g. 80 percent whole grain, 20 percent broken grain), to whether it is aromatic or non-aromatic (Figure 3), and to whether it is local or imported. There is no significant premium for < 5 percent broken rice as demand is largely for 20 percent broken. Processors therefore mix broken and unbroken rice to achieve 20 percent broken; they also mix non-perfumed with perfumed rice as there is little demand for the former. Tanzanian rice achieves a premium over imported rice. There are also regional ('place-of-origin' or 'geographic') preferences and rice is often labelled as being from regions that are perceived by consumers as offering special qualities:

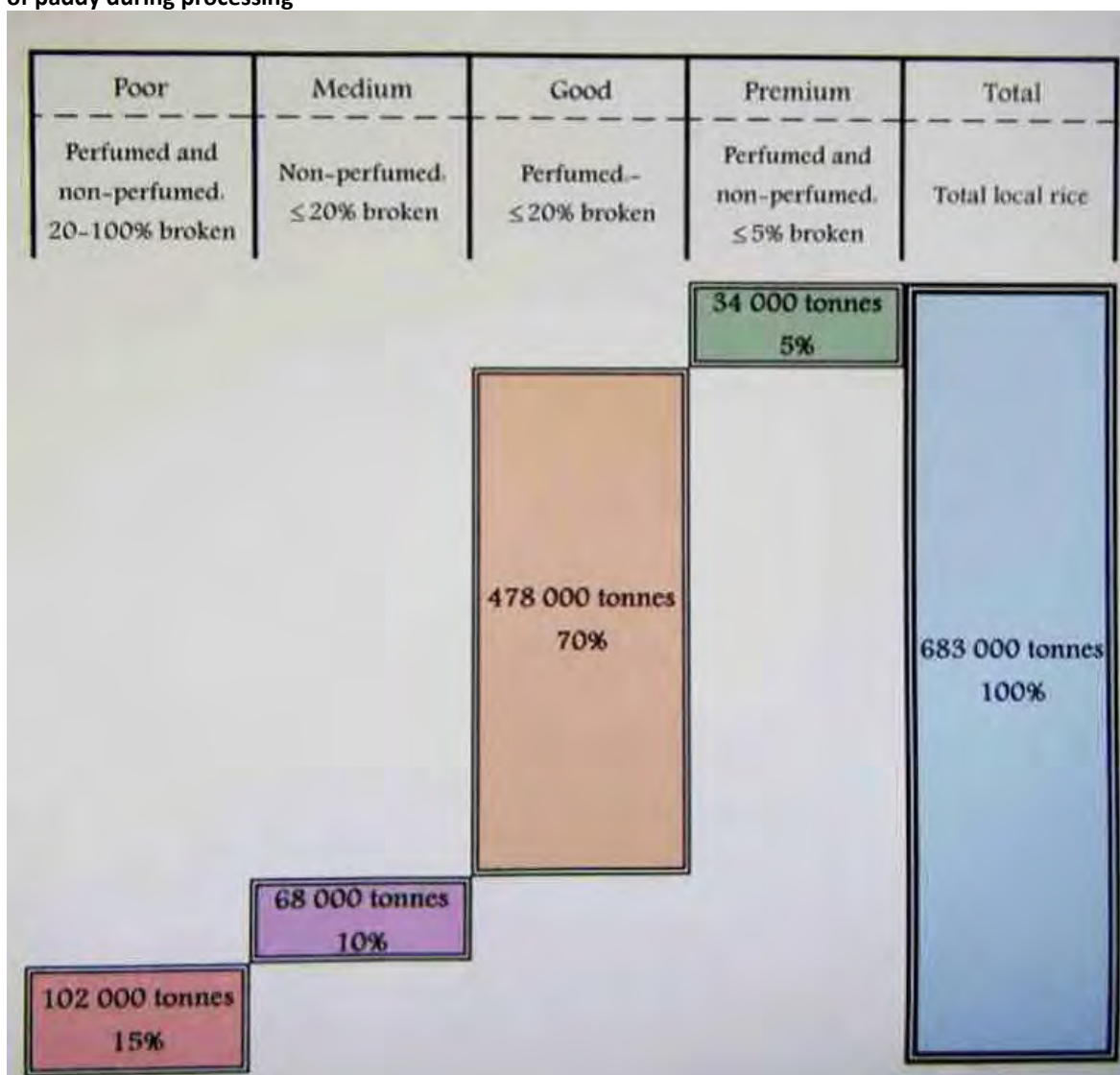
- rice from Kyela is considered to be the best, followed by rice from Mbeya;
- Morogoro rice is viewed as good quality, but inferior to Kyela and Mbeya;
- Shinyanga rice is viewed as low quality as it is not aromatic and historically has contained a large amount of foreign matter.

There is currently only very limited branding (see Figure 4). Supermarkets are a recent urban arrival in Tanzania (the first one opened in 2001) and only a small part of food retailing takes place through them (perhaps only 10—15 percent in Dar es Salaam, and even less in other urban centres). The scale of operations is still small and most outlets have limited stock keeping facilities. An inventory of supermarkets in Dar es Salaam includes the locally owned Shrijees (5 stores — see Figure 4), Nakumatt (1 store; 4 planned), the Kenyan owned Uchumi (2 stores), the locally owned Village Supermarket (3 stores) and the South African Shoprite (3 stores). The food service market is an important end user of rice and comprises several subsectors including traditional stalls and cafes selling cooked 'street' food, fast food outlets modelled on the American style (only in Dar es Salaam and other large cities), as well as western style restaurants, hotels and resorts. Institutional markets include the military, hospitals and educational establishments.

Figure 2: Rice for sale at typical retail outlets



Figure 3: Consumption (amount and proportion) of local milled rice in Tanzania, assuming a 40 percent loss of paddy during processing



Source: modified from BMGF, 2012b

Rice is used almost solely for human consumption, and is second only to maize in terms of calorie supply, accounting for around 8 percent of the nation's calorie intake. In the first decade of the twenty-first century, annual per capita rice consumption increased by 6.15 percent per annum, rising from 20.5 kg in 2001 to 25.4 kg in 2011 (Table 1). Maize consumption decreased during the same period. Increased rice consumption is both the result of population growth (2.88 percent) and an increasing preference among higher income urban households for rice. Tanzania's steady economic growth has stimulated increased domestic production of rice as well as imports and, as incomes rise, rice, and wheat, are preferred to sorghum and maize since they are easier to prepare and a symbol of increased social and economic status.

Figure 4: Rice branded by Shrijee Supermarket (left) as 'Mbeya/Moro Super Grade' and retailing at TSh 5 000 per 2 kg; the Shrijee supermarket outlet in Oyster Bay, Dar es Salaam (right)



Indications from the National Sample Census of Agriculture 2002—2003 (NSCA) show that rice is more commercialized than other staple crops, with 42 percent of produce marketed (compared with 28 percent of maize and 18 percent of sorghum). The figures may, however, be misleading and distorted by larger rice growers who account for the bulk of sales. The NSCA found that only a small proportion of small-scale growers sell any rice; the rest use their crop entirely for their own consumption.

There were significant imports in the early 2000s before a duty of 75 percent was imposed in 2005. This caused a drop in imports and was the basis for a major increase in internal rice production (there are still considerable imports from Pakistan, India and Vietnam, however). Imports accounted for 16.45 percent of domestic consumption between 2001 and 2004, but only 5.2 percent between 2005 and 2011. Reduced imports means that domestic prices are less subject to the volatility of world prices yet more vulnerable to variations in domestic production. Except for a brief period in 2008, rice prices in Dar es Salaam have been higher than world prices (Figure 5), which means that Tanzanian consumers are paying a significantly higher price than consumers in many other parts of the world.

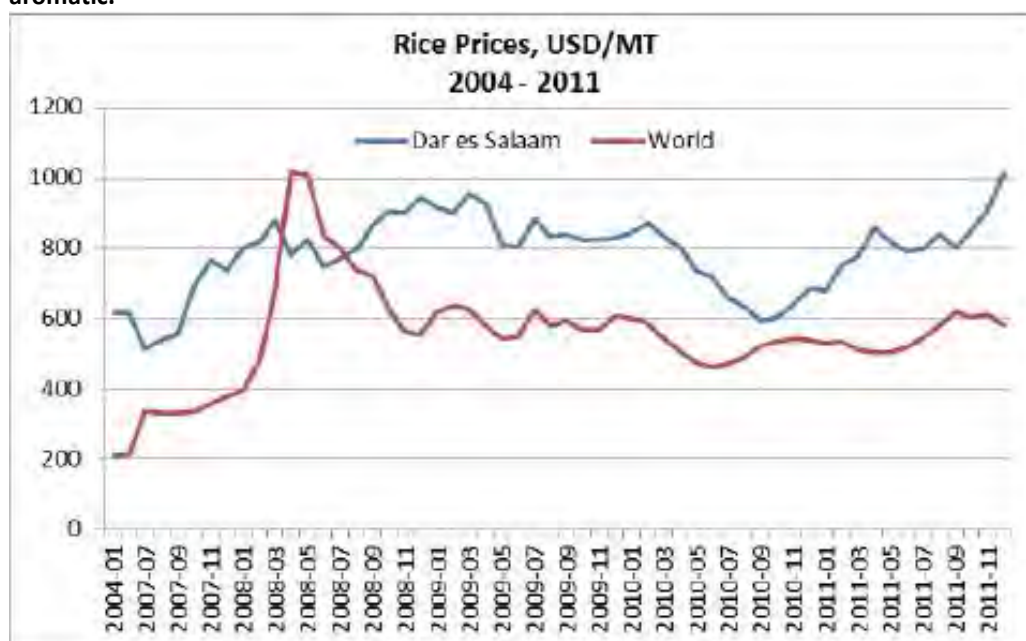
Table 1: Estimates of Tanzania rice consumption and production, 2001-2011 (tonnes milled rice)

Year	Consumption	Imports	Exports	Seed	Production
2001	824 447	139 053	4 768	34 000	724 162
2002	857 805	76 530	9 055	37 000	826 610
2003	88 197	189 621	11 006	37 000	746 582
2004	924 299	181 986	2 487	42 000	786 800
2005	976 646	67 495	10 618	45 000	964 769
2006	1 033 891	90 480	10 093	43 000	996 504
2007	1 084 885	45 187	20 176	43 000	1 102 874
2008	1 132 699	64 147	34 197	55 882	1 158 631
2009	1 177 027	39 607	48 218	44 483	1 230 121
2010	1 250 465	1 493	62 239	42 503	1 353 714
2011	1 332 078	32 884	76 260	47 782	1 423 236

Source: Stryker and Amin, 2012

Tanzania regularly imports rice, primarily because the domestic wholesale price in all markets is significantly higher than the international price of Thai Super A1 broken rice. The lowest local prices are in Songea (which is a rice surplus zone), followed by Singida (which is near the production zones of Mwanza and Shinyanga). The highest prices are in Dar es Salaam and other rice deficient markets (Figure 6). The difference between prices in Songea and Dar es Salaam is almost US\$ 100/tonne.

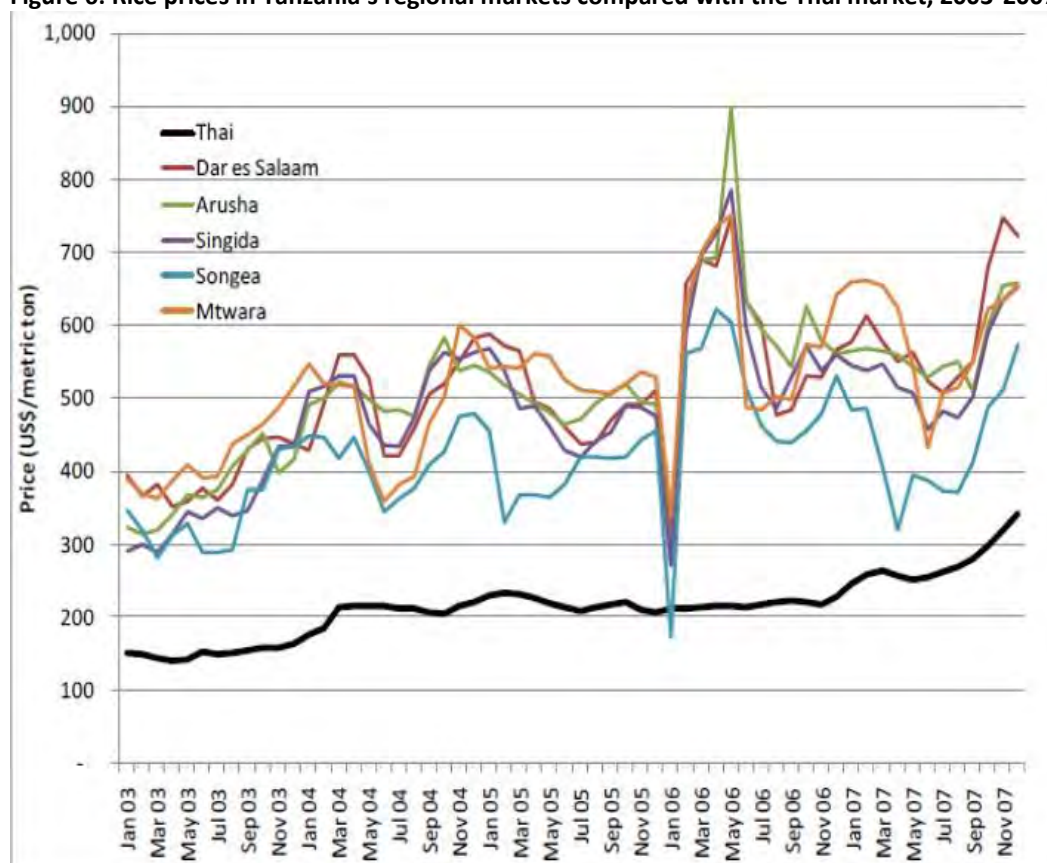
Figure 5: A comparison between Dar es Salaam and world rice prices, 2004-2011 (US\$/tonne). The world price is for Thai 5% broken FOB Bangkok; the Dar es Salaam price is for wholesale top grade Tanzania aromatic.



Source: Stryker and Amin, 2012

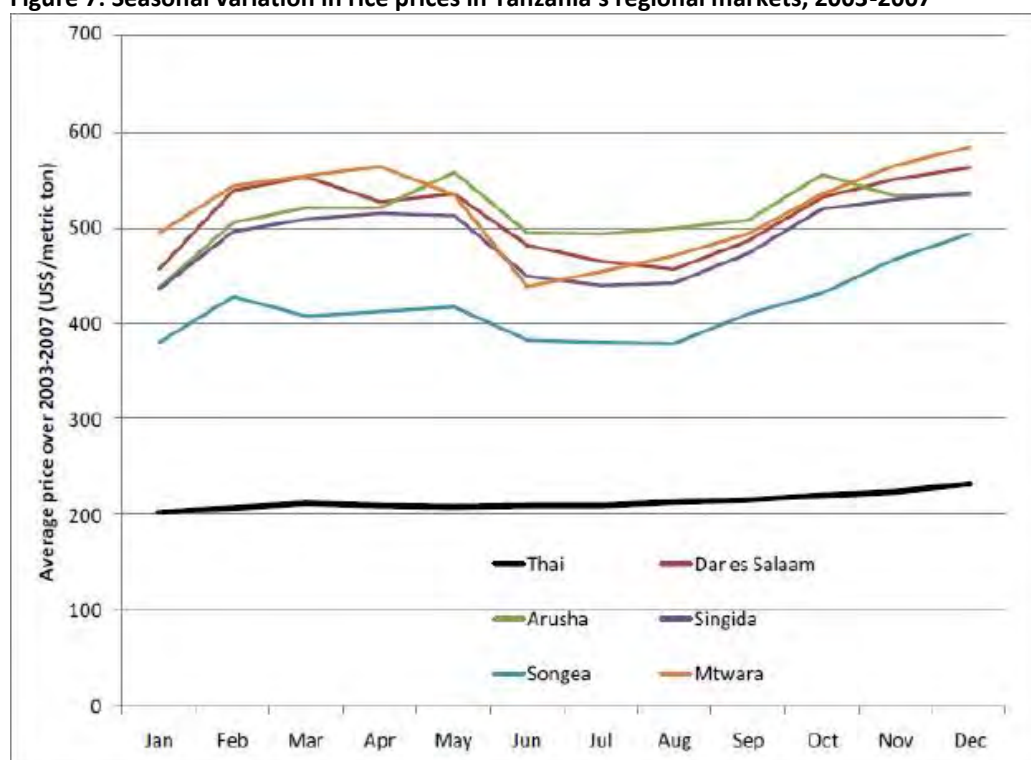
Rice prices vary seasonally (and thus provide much of the rationale for storage) and help determine when a producer sells or stores crop. Prices are generally lowest immediately after harvest when supply is at its greatest (Figure 7). The highest-to-lowest monthly price ratio varies between 1.23 in Dar es Salaam and 1.33 in Mtwara. Domestic demand for rice grew at an annual average of 4.92 percent between 2001 and 2011. Demand is expected to increase threefold between 2010 and 2020 (see Figure 8) as a result of population growth (3 percent per annum), increased affluence (economic growth at 7 percent per annum) and continued urbanization (5 percent per annum).

Figure 6: Rice prices in Tanzania's regional markets compared with the Thai market, 2003-2007



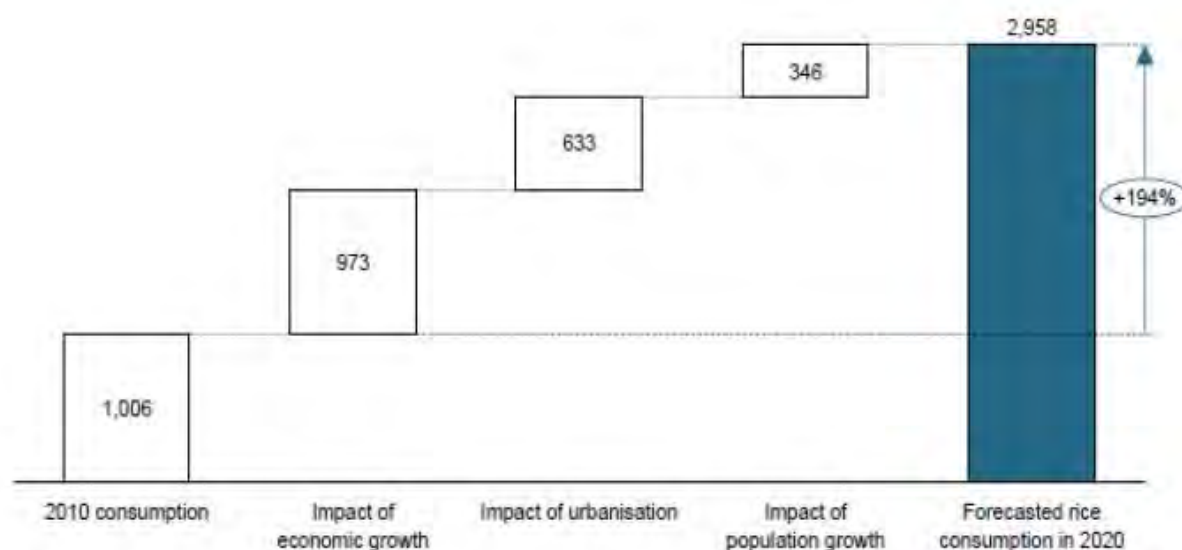
Source: Minot 2010

Figure 7: Seasonal variation in rice prices in Tanzania's regional markets, 2003-2007



Source: Minot 2010

Figure 8: Growth in national demand for rice, 2010-2020



Source: BMGF 2012b

2.2 Export Markets

Exports accounted for only about 5 percent of rice production during the 2000s. Exports are principally to neighbouring countries (including Uganda, Rwanda, Kenya and Burundi) and occasionally to Malawi and Zambia. Tanzania official export figures are wildly at variance with official data from the importing countries. Informal trade is quite considerable, certainly under reported and takes place via ‘panya’ tracks that bypass customs posts. The export markets are in the main producing areas, and are very close to the neighbouring importing countries. Good quality Tanzanian rice is preferred in these markets (where it has a 15 percent price premium over other imported rice) but is only irregularly available as a result of export bans and high export tariffs imposed by the Tanzania authorities.

Table 2: Estimates of Tanzania milled rice exports (tonnes) to neighbouring countries, 2011

Country	Amount exported (tonnes)			Total exports
	Formal trade		Informal trade	
	Tanzania data	Importing country data		
Uganda	7 743	27 338	2 734	30 072
Rwanda	23 985	24 228	2 423	26 651
Kenya	2 622	10 475	1 048	11 523
Burundi	155	5 877	588	6 465
Democratic Republic of Congo	1 409	1 409	141	1 550
Total	35 914	69 327	6 933	76 260

Source: Stryker and Amin, 2012. Based on data collected by FEWS NET, RATIN and the Eastern Africa Grain Council

Long-term projections for the East African region are for a substantial and growing deficit in food. The rice deficit is expected to rise from 1.15 million tonnes in 2009 to 2.84 million tonnes in 2020, with a rising trend forecast to continue until beyond 2025. A critical factor in terms of exports, however, is the rate of rice production growth in Tanzania. Production in the decade from 2001 to 2011 grew at 6.99 percent per annum (see previously) but, because of a rapidly growing domestic demand, Tanzania will find it difficult to achieve and sustain an export surplus. If the rice sector were to achieve a 10 percent annual growth rate, there would be surplus available for export; a 5 percent annual growth rate would, conversely, result in increasing trade deficits.

3. THE RICE VALUE CHAIN

3.1 Overview

The value chain describes the range of activities required to move a commodity from the first point of production to the last point of consumption. The chain usually involves (an often complex) combination of physical changes, inputs from various producer services, transfers of ownership and deliveries. Commodity value chains are increasingly recognized as providing a solid framework for the analysis of the public and private sector stakeholders within them, as well as the overall performance of particular markets.

The rice value chain is confounded by many technical and institutional impediments (from supply and use of inputs, via production and processing to marketing and retailing). The chain is fragmented, uncoordinated, disorganised and uncontrolled (in spite of being over-regulated). It is dominated by a large numbers of small-scale producers, an unknown (but undoubtedly immense) number of middlemen who operate across every link, and a similarly unknown number of small processors and individual sellers who supply restaurants, cafes and street vendors (or otherwise put products on the market for the consumer), but who mainly lack the technical and financial ability to run it efficiently and profitably. The horizontal and vertical linkages of the value chain are generally weak and uncompetitive, and will need support if they are to strengthen.

In Tanzania, there are multiple horizontal and vertical links from the producer to the consumer. The rice chain involves and includes: primary producers, traders in paddy and milled rice, processors, wholesalers, retailers and consumers. Most actors are not specialized and their functions relate to various segments of the value chain.

3.2 The value chain map

A preliminary evaluation of the value chain shows that the whole is suspended from the consumer. If the link to the rest of the chain were to be broken the whole would be susceptible to collapse. This situation is more or less true for all other links in the chain. Each link takes the product from its immediate predecessor and 'processes' it to an output that is used by the next link. Nominally, the value of the product increases at each stage until it reaches the consumer. It is possible to provide a succinct list of most of the participants in the chain (see Table 2), but pivotal roles are played by the middle links of the chain through which all products must pass. Many participants in the chain (see Table 3) occupy more than one role.

Further up the chain some processors are also wholesalers and retailers, operating in both the domestic and export markets. Primary producers may sell rice in three key ways: directly through a market, to a trader, or to a processor (they may also use a combination of outlets). A trader may similarly sell to another trader, or directly to a wholesaler, retailer or processor (or again, may broaden his options by using a combination of all channels). Processors, especially the smaller enterprises, may buy rice directly from farmers or from traders, and sell the products to wholesalers or retailers.

Every link in the value chain relies on goods and services in order to fulfil its role(s). At various stages, goods and services include: land, labour, machinery, seed supplies, fertilizers, pesticides, transport, energy and finance. Also required are clearly defined and enunciated standards and a regulatory framework under — and applied by — law. Many of these requirements continue to be weak or non-existent in Tanzania.

Table 3: Simple listing of supply and service participants in the Rice Value Chain

Core actors	Service suppliers
<ul style="list-style-type: none"> Producers: traditional primary producers (who rainfed); improved smallholder production (who use inputs and limited irrigation); commercial producers (who use irrigation and include partly integrated enterprises and a few outgrowers) Traders and agents Wholesalers Dry rice retailers (rural, urban, supermarkets) Rice product retailers (street vendors, cafes, shops, supermarkets) Importers 	<ul style="list-style-type: none"> Research Training and Education Institutions Extension service Inputs (seeds, fertilizers, agrochemicals) Transport Financial services Associations (producer, trader, processor, Tanzania Edible Oil Seeds Association) NGOs and International Aid Agencies International Rice Research Institute (IRRI)

Table 4: Participants and functions in the Southern Highlands Rice Value Chain

Participants	Functions
Research and Extension	There is considerable research on rice in Tanzania. The International Rice Research Institute has a major presence, as do the Consultative Group on International Agricultural Research (CGIAR, see Annex 5). The Zonal Research Institutes and other stations of the Ministry of Agriculture, Food Security and Cooperatives (MAFC) carry out research on rice but are in need of reliable long-term core funding. Uyoile Agricultural Research Institute in Mbeya has responsibilities in training and extension. The Iringa Veterinary Investigation Centre is the reference laboratory for diseases in the Southern Highlands. Research, in principle, works hand in hand with extension.
Input suppliers	MAFC and the municipalities provide limited extension services. The Agricultural Research Institutes (ARI) and Agricultural Seed Agency (ASA) have developed many new varieties and the International Rice Research Institute (IRRI) has released two new types bred especially for Tanzania. However, demand for and uptake of these is very low. None of the 15 private seed companies in Tanzania distributes improved rice seeds. The Government subsidizes fertilizers via a voucher scheme but this benefits large farmers more than smallholders. Financial services are limited and available only to a favoured few.
Producers	Most rice (74 percent by area) is upland rice grown by smallholders. Next in production magnitude (20 percent) is the improved small-scale rainfed production (with some limited irrigation). Finally (6 percent) is from the large-scale production and trading companies that may be partially vertically integrated (and to a lesser extent horizontally through outgrowers)
Traders	Primary buyers and secondary buyer-agents operate throughout the country. Much trading takes place at the point of production. There are a multitude of middle- and small-sized traders throughout the country as well as some larger ones. There is some trade by road from surplus to deficit areas but the main long distance trade is towards the Dar es Salaam market.
Processors	Initial processing — threshing out the paddy, drying and storing — takes place mainly at the point of production usually under intensive labour and often primitive conditions. Post-harvest losses are extremely high with as much as 50 percent of the original grain being lost for various reasons. Local traders and millers further along the chain add value through milling the paddy. Milling is the central hub of processing when the hull (husk) is removed from the grain to become 'rice'. Most mills have a capacity of 5 to 20 tonnes of paddy per day and these probably account for in excess of 90 percent of milling operations. The larger millers — up to 120 tonnes per day — generally operate for about five months in each year. Small mills generally produce inferior rice of 'standard' quality (30—50 percent broken) whereas larger mills produce 'Grade One' rice with less than 15 percent broken grains.
Retailers	Retailing of raw milled rice ('mchele') is usually done through local shops or 'maduka' by recognized but often informal businesses. Street traders and cafes sell cooked rice 'wall' in various ways almost always accompanied by a vegetable or meat sauce. Better quality rice is available at most supermarkets and some specialized retail shops.

The three principal rice production systems are:

1. Traditional —Traditional rainfed production (either lowland flood or upland dry) is the predominant system and is used on about 74 percent of the national rice area. This system is dominated by small-scale farmers who use very little technology: saved seeds are the planting material, there is minimal fertilizer use, limited use is made of the WRS for storage, and spot prices are the norm in local markets. This system is at the beginning of a long chain that is fragmented both horizontally and vertically. Paddy is sold to local or regional traders who use small local mills to process it; some paddy is also sold directly to mill-owners, who in turn sell their processed product to traders and rural households; there are other sales by regional traders via brokers, and others directly to urban wholesalers (who in turn sell to urban retailers). There is very limited value addition, particularly at the milling stage, because most small mills have poor quality machines that result in a high percentage of broken grains. This is not a problem for the 30 percent of rice that is consumed by producing households, but it is a problem for the rice that is milled to be sold at market. Small quantities from the traditional system are exported to neighbouring countries.

2. Improved small-scale rainfed production with some limited irrigation — this system is used in 20 percent of the nation's rice areas. Improved production systems use some new cultivars, plant (by hand) in rows, use some fertilizer and as a result produce better yields. Coordinated and bulk trading — via a WRS — allow better management of the price risk since the access to market is controlled and the post-harvest losses caused by poor storage are minimized. Paddy is normally custom-milled in small mills near production areas. Farmers, at times, operate in groups and take on additional value chain functions: these lead to incremental improvements in both horizontal and vertical integration at the local level.

3. Large-scale production — involves large-scale commercial farms and trading companies (Box 2), which may source in part through outgrowers. The system is used on 6 percent of the nation's rice areas. Operators are involved in other chain functions, and may provide inputs and services, as well as store, mill and distribute to urban wholesalers. (Urban wholesalers sell to various consumer groups — especially the medium to high-income retail segment — and a considerable amount of all the rice traded and marketed can pass through their hands.) Large producers may have their own mill, or will contract a medium to large mill to process their paddy. Large producers have leverage that could transform the value chain, particularly in terms of integration and improving the chain efficiency, performance, governance and information flow.

The rice sector lacks integration. It also lacks transparency, regulation enforcement, traceability and a conducive business environment. Production/processing, trading/distribution (through wholesalers), and marketing/retailing operate largely independently of each other and on a transaction basis; there is little information sharing.

The whole chain largely lacks governance. No single player controls or drives the development of the chain (although the greatest influence is exerted by millers and wholesalers). The chain operates on a commodity basis and is transaction rather than consumer/customer based. It does not operate as an entity and each link looks to serve its own interests. Any interest in backward integration by larger established traders is impeded by a lack of investment data. Little value is added along the chain. Small producers are particularly disadvantaged because of their distance geographically and physically from the main consumer markets and lack of information on market prices.

Box 2: The Big Four in the Rice Value Chain

Mbeya Region

Mtenda Kyela Rice Supply is an export trading company working with contract farmers. It provides training and inputs to over 10 000 smallholders, and distributes milled rice (from the Wela mill) to wholesalers in Dar es Salaam.

Kapunga Rice Farm (Southern Highland Estates) is a production and processing company with the largest rice farm in the region and has plans to launch an outgrower scheme.

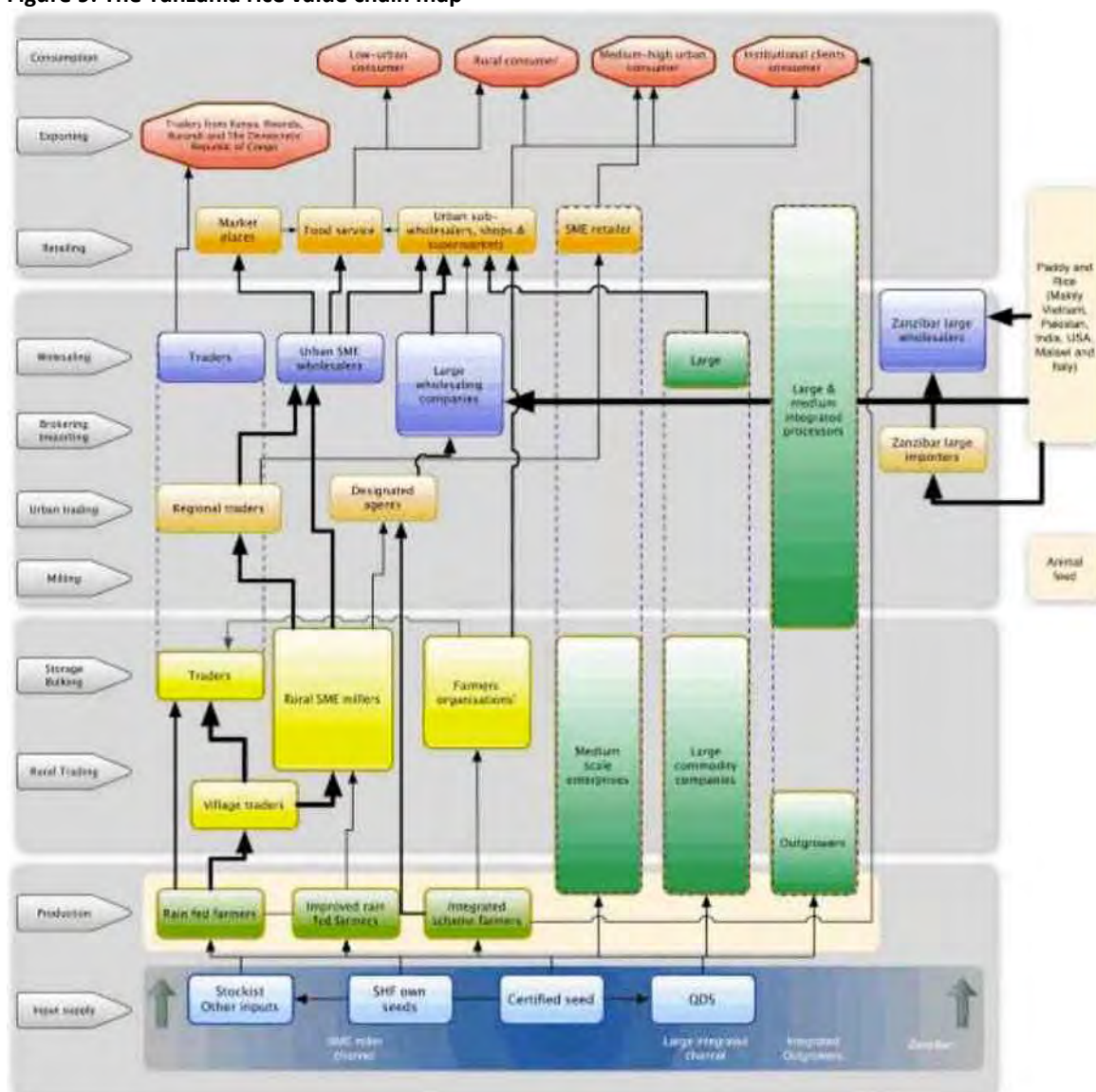
Mbarali Rice Farm is a production and processing company with the second largest rice farm in the region.

Kilombero District

Kilombero Plantations Limited is a production and processing company that distributes milled rice to wholesalers in Dar es Salaam. With 4 700 hectares it is Tanzania's largest rice producer. It has 1 500 outgrowers, and that number is expected to increase to 5000 by 2016. It provides inputs, training, finance, storage and milling for smallholders along with R&D.

Large-scale production linked to outgrowers is expected to expand in the future not only through existing businesses but also via new entrants. In the second category Intrasia has already purchased 30 000 hectares and the Korea Rural Community Corporations some 100 000 hectares for rice production.

Figure 9: The Tanzania rice value chain map



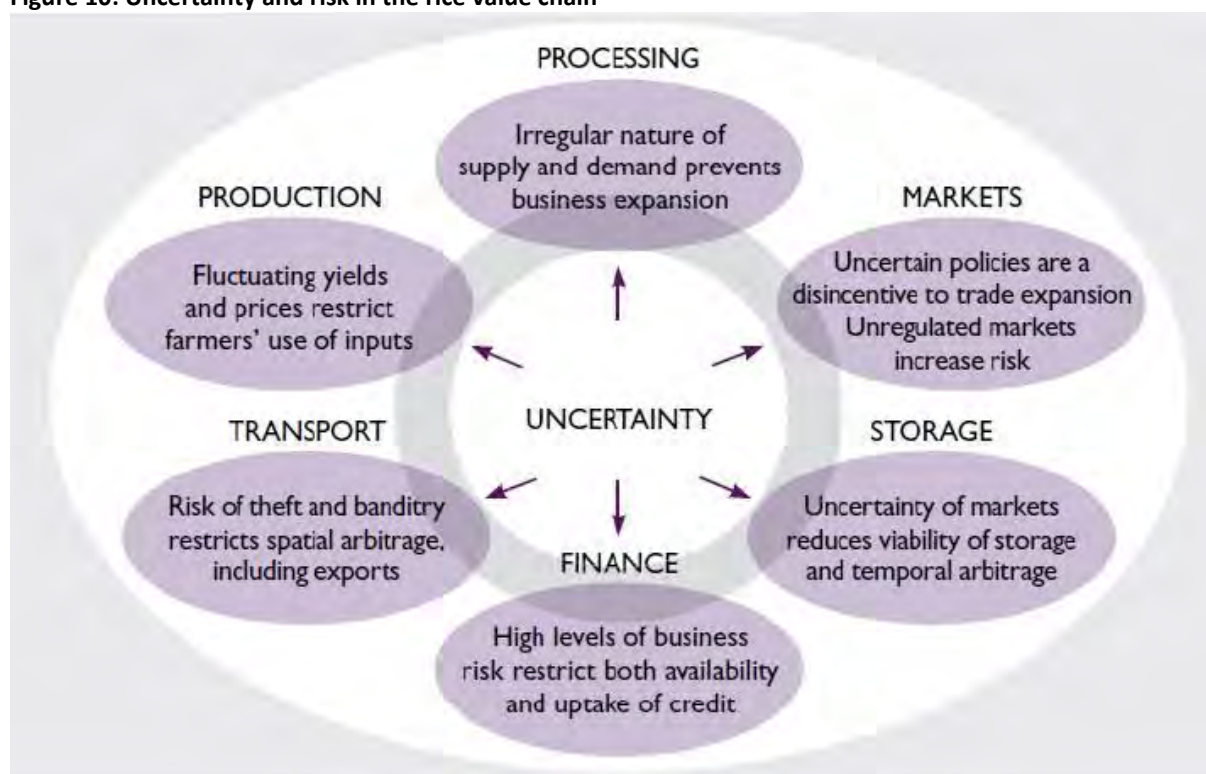
Factors driving dynamics in the value chain include:

- government trade, market, transport, land tenure and irrigation policies;
- weather (climate) and its effects on production;
- consumer income and related preferences;
- investment decisions by large producers, traders and millers in production, storage and processing; and
- competition from other crops.

Uncertainty and risk permeate the value chain. These factors underlie many of the constraints to growth. Uncertainties vary for the different links in the value chain (Figure 10) but are likely to be caused by inconsistent or poorly implemented policies, a dearth of information, inadequate infrastructure and the poor relationships between the players in the chain (including an inherent lack of trust). These risks create inefficiencies in the system and discourage capital investment (via debt equity) that can be minimized and capitalized on only by a large fully integrated company.

Most rice is grown in Tanzania as a rainfed crop. Yields are therefore uncertain and variable, and national production causes dramatic fluctuations in price. Uncertain yields and price fluctuations discourage farmers from investing in improved seed, fertilizer, post-harvest grading/sorting or other quality improvements. Use of processing plants also fluctuates as a consequence, and results in limited investment in processing with many small mills instead of fewer more efficient large ones.

Figure 10: Uncertainty and risk in the rice value chain



Source: USAID 2010a

Market contracts are rare and even more rarely enforced. Informal agreements are the norm and in most transactions both parties are present and witness the goods change hands. All other transactions involve a significant risk that one party will renege on the agreement. This uncertainty is coupled to variable bag weights and variable quality, and inevitably means that trader margins are increased to minimize the impact of bad deals.

Inadequate storage capacity and distribution means that farmers and traders have little choice on the timing of sales. Without storage facilities farmers are forced to sell during or immediately after harvest when there is a glut on the market and prices are low. Were producers able to store their grain they would be able to sell some in the harvest period and store some until prices on the market rose. Better storage facilities would smooth the supply and demand (and thus the price) for paddy. Poor feeder roads result in very high transport costs.

Low value rainfed agriculture is considered a risky proposition for banks and investors. This restricts both the availability of finance and credit (lenders) and the uptake of credit (borrowers). A lack of understanding of how to evaluate and price this risk contributes to the stalemate on both sides of these financial transactions.

3.2 Technology generation

Overall, the technology in use (at each link and throughout the chain) is old and outmoded. The sole exception is the variety TXD 306 commonly known as ‘Saro 5’ (‘saro’ = semi-aromatic rice). This is a high-yielding cultivar developed by the Ifakara Research Centre (formerly the Kilombero Agricultural Research and Training Institute or KATRIN) and the Regional Rice Centre of Excellence (which has responsibility for rice technology improvement and transfer).

Commercial ventures such as Kilombero Plantations Limited (KPL) are a source of new technology generation in the Tanzania rice sector. KPL is involved in several stages of the chain but particularly with inputs (improved seeds, fertilizers), irrigation, production, harvesting, storage, milling and distribution to wholesalers. KPL aims to be the lowest cost rice producer in Tanzania and is prospecting best practice technology wherever rice is produced. They are thus influential in introducing new technology to the various levels of the chain in which they are involved. This applies to both KPL’s own large farm and their involvement in improving smallholder farming.

KPL has generated technology and disseminated many innovations including:

- evaluating 170 new rice cultivars for productivity and quality in the Kilombero environment (obtained by Syngenta — a Swiss global chemical and seeds company — from IRRI in the Philippines and elsewhere in the world);
- introducing the System for Rice Intensification (SRI) for smallholder farmers. This was originally developed to improve yields and quality in Madagascar where it has achieved impressive results (KPL brought the originator of the system to Tanzania to plan its introduction and technology transfer to KPL’s smallholder scheme);
- introducing mini combine harvesters from the Phan Tan company in Vietnam to be used by small outgrowers to improve the efficiency of harvesting and threshing, to maintain paddy quality and to reduce labour costs;
- burning waste (hulls and bran) from milling to generate heat for drying harvested paddy before it is stored and milled (proper drying of paddy is a critical step in maintaining grain quality);
- storing dried paddy in large white plastic tunnels on the ground;
- using high quality medium volume rice milling machines from the Bui Vanngo company in Vietnam based on advice from post-harvest specialists at IRRI;
- promoting centre pivot irrigation as it allows more efficient water use than traditional flood irrigation techniques and will also allow a dry season crop to be grown (thus two crops per year, though from a very capital intensive technology); and
- introducing conservation farming/minimum tillage practices.

IRRI, with which KPL has developed close links, has an extensive portfolio of cutting-edge technology projects that are being implemented on a global basis. One example is the C4 project involving the

introduction of higher capacity photosynthesis systems to increase yields; there are many others projects related to production and post-harvest handling (see Table 5).

Table 5: Opportunities for technology advances for rice development in Tanzania

Intervention	Time frame		
	Short term	Medium term	Long term
Improved varieties	Hybrids Stress tolerance	New generation stress tolerance Varieties for conservation agriculture	C4 varieties Biotechnology (drought, heat, salinity, nitrogen efficiency)
Improved systems	Agronomy (site specific nutrient management, alternate wetting and drying) Conservation agriculture Mechanization	Ecological intensification and diversification New generation Integrated Pest Management (IPM)	
Improved value chains	Post-harvest technology	Grain quality and speciality rice	New value added products and by-products

Source: IRRI, 2012

3.3 Input supply and demand

Improved seeds, fertilizers, chemicals and finance are all critical inputs, yet there is limited use of all in cropping systems in Tanzania.

The ASDP Performance Report for 2009/2010 indicated that the number of crop-farming households using improved seeds increased from 18 percent in 2002/2003 to 24 percent in 2007/2008. Use of chemical fertilizers increased marginally from 12 percent to 13 percent over the same period, whilst the use of insecticides and fungicides declined from 17 percent to 14 percent. Fertilizer use across all crops is minimal, varying from 5 kg/ha to 8 kg/ha, though annual nutrient depletion is estimated at 61 kg/ha. Tanzania has some of the worst soil nutrient depletion in the region, which makes the case for extensive fertilizer use all the more compelling.

A baseline study by the Regional Rice Centre of Excellence in 2011 provides a detailed understanding of current rice production. The study randomly selected 722 households across six rice-producing districts (Mbarali, Kyela, Sengerema, Bunda, Kilombero and Mvomelo). Some 70.1 percent of the production area was lowland rice, 24.9 percent was irrigated and 5.1 percent was upland rice. Most producers were cultivating small plots of land ranging from 0.2 to 2.0 ha. The major findings of the study in relation to inputs were:

- Improved production technologies have not been adopted by a broad range of farmers and most farmers are unaware of the available technologies.
- Some 34.5 percent of farmers used improved rice seed but only 19 percent of the area was planted with improved rice varieties. 18 percent of the farmers using improved seed were producing lowland rice, 14.5 percent were producing irrigated rice and 2 percent were producing upland rice.
- The average yield was 2.8 t/ha (with a range of 2.1 to 3.4 t/ha). Mbeya (2.8 t/ha) and Morogoro (3.4 t/ha) had the higher yields.
- Farmers growing improved cultivars were producing yields of 3.6 t/ha (compared with yields of 2.4 t/ha for those growing local varieties).
- Yields were significantly higher on irrigated fields than lowland and upland fields.
- There was limited use of improved sowing or planting methods.
- More men than women used improved seed.

- 13.2 percent of farmers in Mvomelo, 12.2 percent in Kilombero, 5.1 percent in Mbarali, 2.8 percent in Bunda and 1.2 percent in Kyela used improved seed.
- Lack of available seed was the main reason for not using improved varieties.
- Around 40 percent of farmers were planting with local variety saved seed. However, even those using improved seeds recycled their seeds for at least 3 years.
- When retained seed was not used: 30.5 percent of farmers obtained seed from their neighbours, 28.8 percent from local markets, 15.7 percent from local stores and 10.2 percent from extension workers.
- Seed prices averaged TSh 2258/kg, which farmers considered to be too high (the high price is a result of strict seed certification regulations which require compulsory certification but contribute to increased transaction costs).
- Demand for improved seed is higher than production (in 2009/2010 only 1.5 tonnes of breeder seed was available to the ASA, from which it produced 56.8 tonnes of basic seed. This, in turn, was multiplied to produce 550 tonnes of certified (or commercial) seed.
- The preferred attributes in rice varieties were yield and taste ('aroma'). In a separate study carried out in Nzega and Igunga districts, heavy yield, good aroma, marketability, heavy grain, and disease/drought resistance were the most sought after traits.
- Some 47.2 percent of farmers said they applied fertilizers and 41.4 percent used pesticides (note the contrast with the ASDP findings).
- No farmers owned tractors but some hired them.
- Loans were obtained by 16.5 percent of households (41.5 percent from microfinance institutions, 25.2 percent from neighbours and 8.1 percent from relatives).
- Some 24.4 percent of loans were used for the purchase of seed, 19.5 percent for fertilizer and 17.1 percent for pesticides.
- Input subsidies (vouchers) were obtained by 36.9 percent of households. 87 percent of vouchers were used to buy fertilizer.
- A village extension officer visited each farmer at least twice during the rice-growing season. 51.1 percent of farmers obtained information on improved seeds from extension officers; 27.5 percent obtained their information from other farmers.

The Rural Urban Development Initiative (RUDI) supports more than 15 000 smallholder paddy farmers in Kilombero, Iringa Rural and Mbarali Districts. According to RUDI fewer than 10 percent of their farmers use new improved high yield cultivars. This is partly because farmers lack access to improved cultivars and partly because improved cultivars do not satisfy consumer needs (especially in terms of palatability and aroma). Since paddy is a cash crop, farmers prefer cultivars with a strong existing market demand. It has also been found that the introduction of improved rice varieties is best done as a package of technologies including other agronomic practices in order for the new cultivars to achieve their potential.

The availability of credit is a key determinant of whether technology is adopted. Credit has a positive effect on fertilizer use but little impact on the use of improved varieties. Obtaining credit (for capital and recurrent expenditure) is as hard for processors as it is for producers. The National Microfinance Bank (NMB) and the Cooperative Rural Development Bank (CRDB) are the main and largest providers of credit to agriculture in Tanzania. They have branches in most districts of the Southern Highlands. NMB has a range of products including loans for farmer groups and also SME loans for processors. Collateral requirements are strict. Interest rates are based on Treasury Bills plus 1 or 2 percent and range from 19 percent for Small and Medium Enterprises (SME) to 24 percent for microenterprises. Both banks provide funds to Savings and Credit Cooperative Societies (SACCOS) and Microfinance Institutions (MFI). Several other banks, including the Tanzania Postal Bank (TPB), the National Bank of Commerce (NBC) and Exim Bank Tanzania (EBT) operate in the Southern Highlands (see Table 6) and could be sources of credit for farmers in the future. The Government is in the process of establishing

an Agricultural Bank as proposed in the ‘*Kilimo Kwanza*’ (Agriculture First) initiative and has made a start with the Agriculture Window Unit in the Tanzania Investment Bank.

Table 6: Banks operating and providing loans in the Southern Highlands

Item	Bank				
	NMB	CRDB	TPB	NBC	EBT
Loan amounts (TSh)	300-500 million per MFI/SACCOS	300-500 million per MFI/SACCOS	Average 1.1 million per MFI/SACCOS	5-250 million per MFI/SACCOS	500 million per MFI/SACCOS
Types of products	Offer a whole range of financial products to individual clients: these include savings, loans, money transfer, payment services etc. Wholesale loans are extended to SACCOSs and MFIs.				
Profile of clients	NMB, NBC, EBT and CRDB are primarily indirect providers to rural areas through their links with MFIs and SACCOSs. TPB has a greater tendency to provide direct services to individual rural clients.				
Portfolio characteristics	CRDB loans to rural agriculture comprise about 25 percent of its total lending. NMB has extended significant lending in agriculture whereas TPB, NBC and EBT continue to lend to individual farmers as demand arises.				
Financing sources and capital structure	SACCOS and other MFIs are able to generate funds from the banks, NGOs and own members.				

Source: Small Industries Development Organization (SIDO) 2009

Inadequate access to finance is a problem at every stage of the input chain. Access to finance is an important determinant of the ability of importers and dealers to run their business. Banks do not normally offer credit to their agro-customers; it is rather importers and wholesalers that usually offer credit to agro-dealers. Most farmers are forced to use the money earned from crop sales to buy inputs, yet farm inputs have to compete with other pressing needs including tax payments, school fees, food and medicines.

The Government’s main policy response since 2007 to overcome the low use of inputs has been the National Agriculture Input Voucher Scheme (NAIVS), funded by the World Bank, and intended to facilitate the purchase of fertilizers and seeds. The NAIVS is delivered through village councils, is being introduced in phases, and aimed to reach 3 million farmers by 2011. Beneficiaries each receive a voucher (worth about 50 percent of the retail cost) but must find the other half themselves. Vouchers can be redeemed at designated outlets managed by trained agrodealers who have received complimentary training.

Fertilizers are packaged in 50 kg bags, which retail at TSh 11 000 for local and TSh 50 000 for imported phosphate fertilizers. This is generally too expensive for smallholders, and retailers therefore also sell fertilizer loose (though this increases its final cost because of losses due to spillage, caking and inaccurate scales). The value of the subsidy up to the end of 2011 was US\$ 80 million. It is acknowledged that the major challenge is to get inputs to the farmgate.

There are additional issues that affect the uptake of inputs (especially seeds and fertilizers). For example:

- fertilizer demand is subsidy dependent, which limits the growth and investment opportunities for suppliers,
- improved seeds and fertilizers are seasonal and capital intensive products, and a retailer’s limited inventory and capacity to borrow cannot meet the level of demand. This results in a lack of unavailability: an important constraint to uptake;
- dealers lack knowledge about input products and have basic business knowledge. These can be both a cause and effect of high failure rates and low profits;

- most agro-input retail stores are in major towns or along the main highways — there are very few stores in rural areas because of poor infrastructure and high transaction costs;
- many of inputs and most of the outbound crop are transported by head load or by bicycle (Figure 11) — this greatly increases distribution and marketing costs.

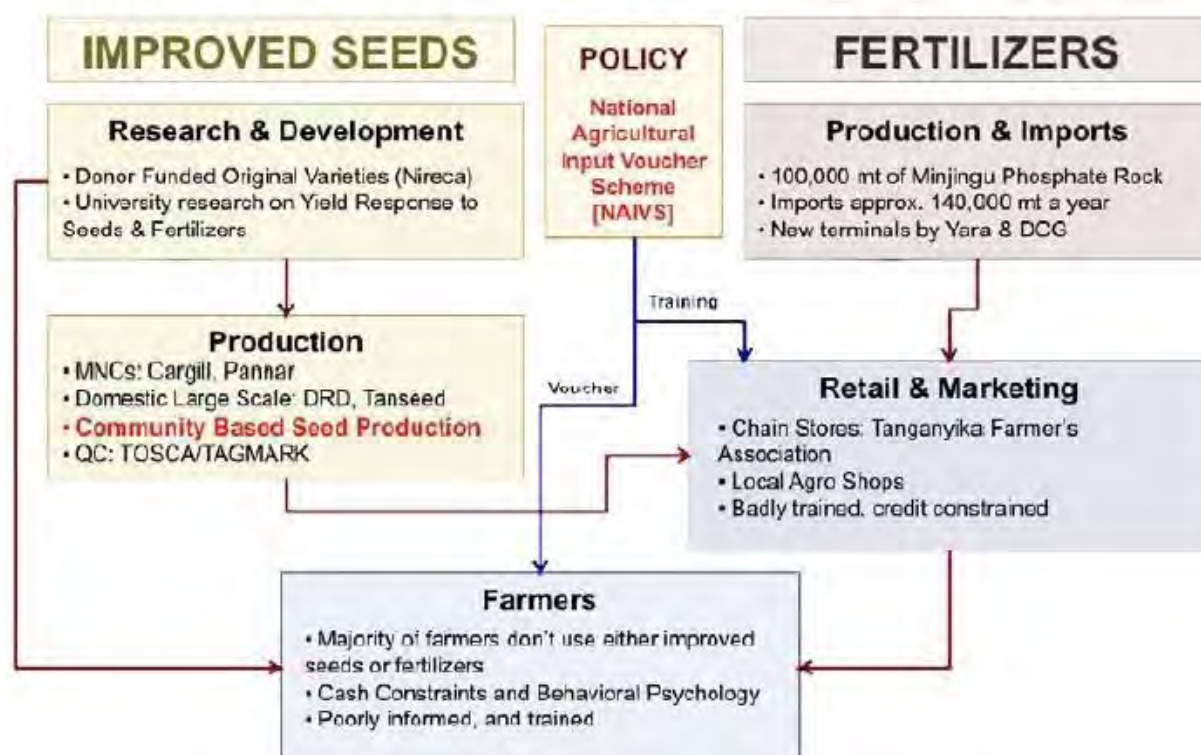
The internal problems of fertilizer supply and distribution are compounded by the shallow and overcrowded port of Dar es Salaam. The port is inefficient and poorly equipped to handle fertilizers, and this leads to excessive caking. In addition, the maximum 20 000 tonne vessel capacity results in high unit freight costs. Two Scandinavian fertilizer companies — Yara (which is a partner with the Southern Agriculture Growth Corridor of Tanzania (SAGCOT) and will build a fertilizer distribution centre in the southern highlands) and Dar es Salaam Corridor Group — are developing fertilizer terminals at Dar es Salaam.

In summary, several challenges impede the demand for — and supply of — inputs as well as the systems that deliver them (Figure 12). Farmers often don't know about new cultivars, and this has important implications for the effectiveness and supply of public and private extension services (and therefore of technology transfer). The farmers that are aware are concerned that the attributes of new cultivars do not fully satisfy consumer preferences and therefore the marketability of their product will be diminished (this concern is justified in part). In addition, there are availability, distribution and cost issues for both improved seed, fertilizer and crop health products that have an impact on input delivery to the farmgate. There are also many challenges for agrodealers because seeds, fertilizer and chemicals are in demand only seasonally, and, although rice inputs are unlikely to represent their main business, there is risk from unsold stock. New technologies need to be promoted as an integrated package rather than as piecemeal interventions.

Figure 11: Local transport of rice necessities



Figure 12: Schematic representation of Tanzania's input sector as it relates to rice



Source: SIPA, 2010

3.4 Production

Systems and small and large-scale production

Rice is a highly versatile crop that can be cultivated in a range of different ecosystems. In Tanzania most rice is grown under lowland rainfed conditions, some is grown with the aid of irrigation, and a smaller amount still is grown in an upland system (Figure 13). Many steps are involved in rice production from seed selection to post-harvest handling (Annex 6).

Figure 13: Rice production systems in Tanzania: lowland rainfed, irrigated and upland



Rainfed lowland rice is typically prone to drought, favours a medium depth, is subject to water logging and submergence under floods, and produces erratic yields. Rainfed lowland rice is grown on around 65 million hectares, equivalent to about 74 percent of the total national rice area (see Figure 14). The main production areas are around Lake Victoria, and in the regions of Tabora, Shinyanga, Dodoma and Kigoma. Only one crop per year is possible and fields are flooded to a depth of as much as 50 cm during part of the season. Production is variable mainly because of the lack of technology but major challenges include water control (both drought and flood), weed management and low soil fertility. On the positive side, soils in the lowland ecosystems are generally less fragile and floodwater conditions promote the growth of nitrogen-fixing bacteria and blue-green algae that also produce

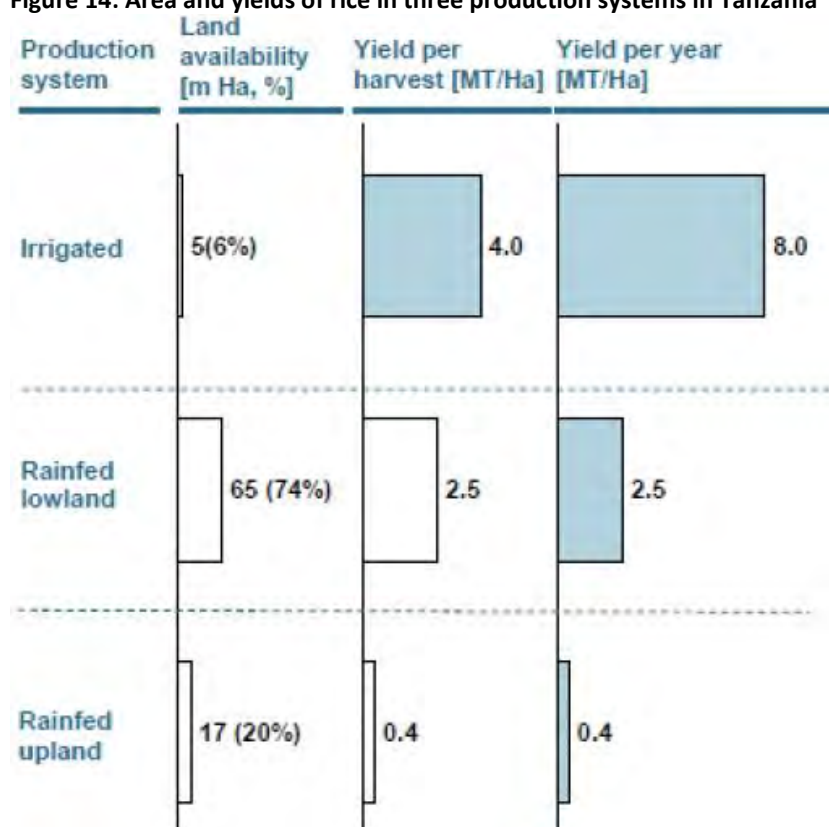
nitrogen to sustain crop growth. Attainable yields (with full control of water) are 3 to 6 tonnes per hectare, but actual yields in Tanzania are much lower (typically 1 to 3 t/ha). The quality of the paddy is low due to poor water management and delays in harvesting as farmers wait for their fields to dry out (the harvested paddy is then drier than optimal).

Irrigated lowland rice is not directly dependent on rain and can usually be grown throughout the year. Mbeya Region, Kilombero District and Mtibwa are the main irrigated rice production areas. Irrigation of rice is practised on 5 million hectares, equivalent to 6 percent of the national rice area. Full water control allows two crops per year to be grown. Irrigated rice is grown in bunded (embanked) paddy fields, which can maintain a water depth of 5–20 cm. Average yields of paddy from these farmers' fields are between 3 and 6 tonnes per hectare per cycle. The paddy quality is generally good and the supply of water can be controlled.

Upland rice is grown under dryland conditions in mixed farming areas without irrigation. It is grown on 17 million hectares, the equivalent of 20 percent of Tanzania's total rice area. Most upland rice is grown in the Usambaras, Uzungwas and Mahenge. The crop is affected by drought, low soil fertility and acidity, and the yield is reduced by a host of biotic stresses such as diseases, insect pests, weeds and birds. Yields are very low (usually less than one hectare per tonne) and the quality of the crop tends to be poor.

A critical issue facing the rice sector is low productivity. (Although the amount of rice produced rose considerably between 2000 and 2010, this was a result of increased planted areas not increased yields per unit — see Table 7). An output of paddy at 1.5 t/ha is low even by African standards (2.5 t/ha) and very low by Asian standards (4.4 t/ha). Unit area yields in Tanzania declined by 2 percent per year between 2000 and 2010, but rose by 0.9 percent in Africa as a whole and 1.2 percent in Asia.

Figure 14: Area and yields of rice in three production systems in Tanzania



Source: BMGF, 2012b

Output per unit area in Tanzania varies by region and by year. Manyara Region generally has the highest yields and Dodoma Region the lowest (Figure 15). As almost all of Tanzania's rice is rainfed, the weather has a dramatic and fluctuating effect on output from one year to the next. Rainfall in 2007/2008, for example, was generally higher across the nation than in 2002/2003.

Higher rice productivity (Box 3) can be achieved with a technology package that includes:

- high-yielding cultivars;
- application of appropriate fertilizers (i.e. those that are matched to both crop and soil nutrient status);
- irrigation coupled with good water management (this will not only increase yields but allow two crops to be grown in any 12 month period — a rainfed crop in the wet season and an irrigated crop in the dry season);
- planting in regular rows rather than broadcasting seeds (thus making weed control easier);
- weed, pest and disease control; and
- effective harvest/post-harvest practises and managements that includes mechanized harvesting and threshing (to maintain grain quality and reduce post-harvest losses prior to milling).

Table 7: Area, yield and production of paddy in selected countries and regions

Country	Area		Yield		Production			
	'000ha 2010	Annual growth (%) 2000- 2010	t/ha 2010	Annual growth (%) 2000- 2010	'000 tonnes 2009	'000 tonnes 2010	Annual growth (%) 1990- 1999	Annual growth (%) 2000- 2010
Tanzania	720	5.6	1.5	-2.0	1 334	1 105	-0.2	3.5
Madagascar	1 350	1.1	3.5	5.5	4 540	4 738	0.7	6.7
Ghana	181	4.6	2.7	2.3	391	492	11.7	7.1
Senegal	147	5.5	4.1	5.8	502	604	3.2	11.6
Egypt	460	-3.5	9.4	0.3	5 520	4 330	7.0	-3.2
DRC	420	-0.6	0.8	0.0	317	317	-1.3	-0.6
Mali	686	6.9	3.4	4.8	1 951	2 308	11.1	12.0
Nigeria	1 788	-2.0	1.8	1.8	3 403	3 219	3.1	-0.2
Sierra Leone	545	11.5	1.7	4.4	785	909	-7.6	16.4
Mozambique	185	0.0	1.0	-0.1	179	180	7.6	0.0
AFRICA	9 050	2.5	2.5	0.9	23 278	22 852	3.5	2.7
Thailand	10 990	1.1	2.9	1.0	32 116	31 597	3.9	2.0
Vietnam	7 514	-0.2	5.3	2.3	39 050	39 989	5.6	2.1
ASIA	134 923	-0.1	4.4	1.2	684 780	672 021	1.8	1.2

Source: FAO, 2012

Farmers who participated in the baseline study (discussed earlier) produced an average of 5.39 tonnes of rice per household, of which 3.5 tonnes was sold. Household consumption (of 1.6 tonnes) represents 30 percent of production. After accounting for the rice saved for seed (5 percent), some 65 percent of production was sold. The average total household income was TSh 1 382 821 with men earning more than women. Rice was the most important source of income in the households studied (36—39 percent of total), this was followed by off-farm income (25—34 percent of total). The main constraints to increased production were considered to be unreliable rainfall (57.8 percent), lack of capital (37.5 percent) and the high cost of inputs (31.2 percent).

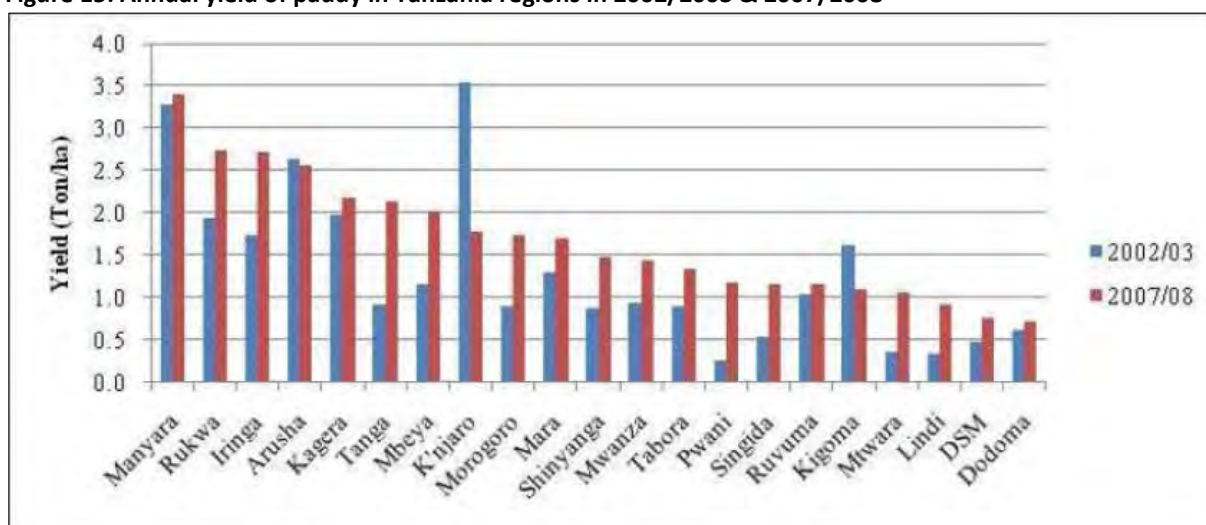
Smallholder rice production — whether 'traditional subsistence' or 'improved' — should be viewed as a continuum, not as two distinct and separate systems. Smallholders have limited access to (and participation in) market-focussed value chains. Their main sales outlets are small traders who

purchase paddy at the farmgate (at what is usually a less than fair price). Poor road access, and the long distances to key urban markets, are other barriers to smallholders adopting a more market-focussed approach. These factors hinder their progress to becoming larger more commercially-focussed enterprises with stronger links to the markets. Overcoming these obstacles would facilitate the adoption of technology, which in turn would increase productivity.

Traditional rice production is labour intensive. The very limited use of mechanization is thus a key hindrance to higher productivity. The very low use of mechanization across the continent means that the number of 'person days' required to produce rice is higher in Africa than elsewhere. However, in countries where there is some use of mechanization (e.g. Senegal) manual labour has been reduced (see Figure 16). Low use of mechanization results in poor land preparation, delayed planting, late harvesting, as well as a serious loss of quantity and quality in post-harvest operations. It also interferes with the needs of other crops. Improving mechanization could have a significant effect on rice production in Tanzania, as elsewhere, as was demonstrated by KPL, who introduced 2.5 metre-wide combine harvesters for smallholders to use, and thus reduced harvest time from 3 days to 3 hours on 0.47 ha of paddy.

Several farmer and industry organizations are involved — usually with the support of NGOs — in helping small landholders improve their production and commercial position (Box 4). The services provided include capacity and capability development, representation at policy forums, as well as commercial functions including marketing and trading. They mainly operate with smallholders on a group basis.

Figure 15: Annual yield of paddy in Tanzania regions in 2002/2003 & 2007/2008



Source: ASDP 2011

Box 3: How Caroline increased her rice yield



Caroline is a 52-year old woman with four children. Her husband is a fisherman. She grows 1.6 hectares of rainfed rice on land that she owns, and produces one crop a year. In the past she grew traditional varieties and produced 20 bags (100 kg) per year. Around 50 percent of this was for seed under the Quality Declared Seeds of ASA and 50 percent was for family consumption and sale. In 2012 she changed to the improved variety TXD 306 (the popular SARO 5) and produced 30 bags: a 50 percent increase in output.

Her success was due to:

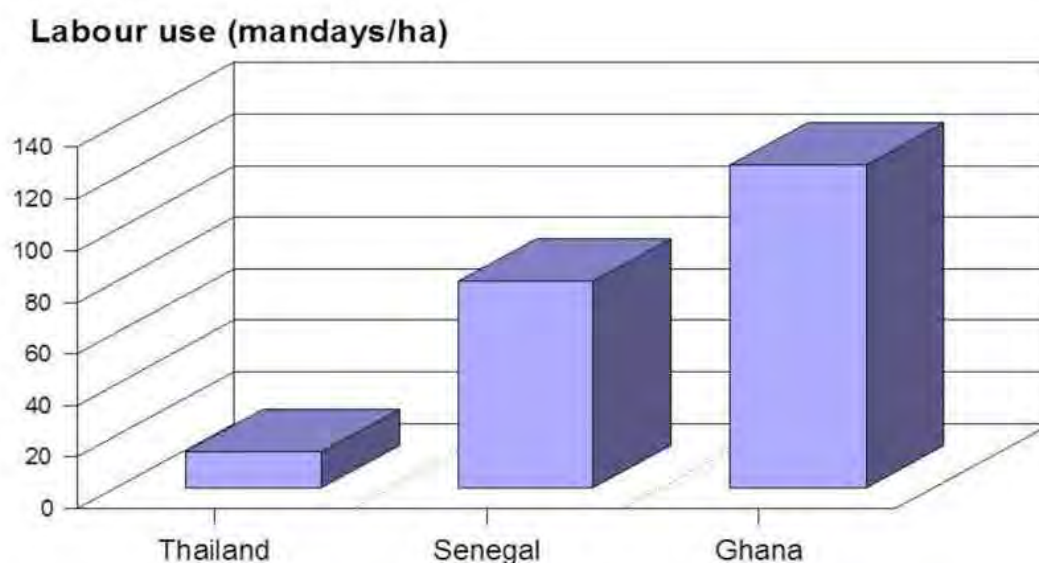
- use of an improved variety — Cultivar TXD 306 (Saro 5);
- hand planting of seedlings in rows for easy weeding;
- use of fertilizer (diammonium phosphate and urea) and a post-emergence herbicide;
- mechanical cultivation prior to planting of seedlings; and
- use of contract labour for weeding and harvesting.

Inputs are bought from the agrostore (one kilometre away) and brought to the farm by bicycle. Harvested paddy is transported the same way from field to house (where it is stored) and on to the market. Marketing is the biggest challenge.

Box 4: Organizations assisting small farmers to increase their production and commercial position

- The Association of Kilombero High Quality Rice Growers (AKIRIGO) represents 42 farmer groups with a total of 12 000 members. It also operates eight warehouses and four milling machines.
- The Tanzania Agricultural Partnership (TAP) based in Ifakara deals with 6 200 smallholder farmers in groups.
- RUDI covers 15 000 smallholder paddy farmers based in Kilombero, Iringa Rural and Mbarali Districts. It is involved with the development of associations, collective sales through warehouse receipts, market/credit/input linkages, capacity building, and the organization of public private dialogue at the district level.

Figure 16: Labour requirement (person-days) to produce one hectare of rice in Asia and Africa



Source: BMGF, 2012

Large-scale farmers have adopted — or will adopt — various strategies and tactics in order to increase the area cultivated as well as total production.

KPL is the largest commercial producer of rice in Tanzania. Its production and processing operations are mainly directed at distributing milled rice to wholesalers in Dar es Salaam. KPL began in 2008, and at the end of 2012 some 4700 hectares of land were under cultivation giving average yields of 3.5—4.0 tonnes per hectare under rainfed conditions. The company works with 1 500 outgrowers (the United States Agency for International Development or USAID provides some financial support) and that number is projected to increase to 5 000 by 2016. Inputs, training, finance, storage and milling are part of the outgrower package. A centre pivot system on 215 hectares allows an irrigated crop yielding 6 t/ha to be produced in the dry season. Serious consideration is being given to an investment of US\$ 25 million that would expand the area under centre pivots to 3 000 hectares and enable two crops to be produced per year. KPL conducts its own seed research to improve yields and quality and uses bespoke fertilizers from Yara International: it has ambitions to become the lowest cost producer in Tanzania.

Kapunga Rice Farm is the largest rice farm in Mbeya Region (and the second largest in the country) and has plans to launch an outgrower scheme. It has received strong financial backing from its parent company, the Export Trading Group, which has invested large amounts of capital in the refurbishment and operation of the farm. Kapunga already grows rice on 3 000 ha (of which 1 200 ha is farmed by smallholder tenant farmers). It achieves average yields of 3.5 t/ha from its own commercial production and 6 t/ha from its tenant farmers. The farm carries out its own seed research to improve yields and quality and uses fertilizers specific to individual situations. A modern processing facility produces a quality end product. Under these circumstances Kapunga aims to challenge KPL and become the lowest cost producer in Tanzania with a rice brand suitable for both the domestic and export market.

Mbarali Rice Farm is the second largest organization growing paddy in Mbeya Region (and the third largest in the country). It is also a production and processing company.

Mtenda Kyela Rice Supply does not produce rice but is a trading company that works with contract farmers and provides training and inputs to over 10 000 smallholders. It distributes milled rice (from the Wela mill) to wholesalers in Dar es Salaam.

Profits from production

Two examples of the financial implications of smallholder rice production are worth examining. One is from Kilombero district, where KPL operates a smallholder outgrower scheme. The other is from Mbeya and is associated with the Mtenda production facility and based on information provided by a large trader. Both examples demonstrate the profitability of adopting improved technology packages.

Example 1: Smallholders associated with Kilombero Plantations Limited, Mngeta

Smallholders growing rice under traditional rainfed conditions are estimated to have a gross margin of US\$ 33 per hectare whereas those adopting KPL's SRI improved technology package will have a gross margin of US\$ 394 per hectare holding (Table 8).

Example 2: Smallholders associated with Mtenda Kyela Rice, Mbeya

Traditional rainfed smallholders are estimated to have a gross margin of US\$ 207 per hectare whereas those who adopt Mtenda's improved technology package (including improved seeds, fertilizer and other aspects) will have a gross margin of US\$ 643 per hectare (Table 9).

Table 8: Financial analysis of smallholder rice production at Kilombero without and with the adoption of KPL's SRI package

Item	Type of production	
	Traditional	KPL's SRI
Physical data		
Area planted (ha)	1.0	1.0
Crops per year (no)	1.0	1.0
Paddy yield (t/ha)	2.5	6.0
Paddy market price (US\$/t)	226.0	226.0
Costs (US\$ per activity)		
Seed/a	21	19
Plough	48	48
Harrow	48	48
Plant/b	48	190
Weed 3 times	239	143
Post-emergence herbicide	12	12
Fertilizer	0	267
Harvest and thresh	101	202
Storage	16	32
Financial data (US\$)		
Total variable costs	532	961
Total value of paddy	565	1 335
Gross margin	33	394

Please note: a = Mbeya Supa @ 60kg/ha for traditional; Saro 5 @ 20kg/ha for SRI

b = Broadcast for traditional; on grid (48 person-days) for SRI

Source: adapted from BMGF, 2012b

Table 9: Financial analysis of smallholder rice production at Mtenda Kyela rice scheme in Mbeya, without and with the adoption of an improved technology package

Item	Type of production	
	Traditional	KPL's SRI
Physical data		
Area planted (ha)	1.0	1.0
Crops per year (no)	1.0	1.0
Paddy yield (t/ha)	2.7	6.8
Paddy market price (US\$/t)	226.0	226.0
Costs (US\$ per activity)		
Seed/a	21	19
Plough	32	90
Harrow	32	90
Plant/b	32	90
Weed 3 times	45	129
Post-emergence herbicide	32	52
Fertilizer	129	258
Harvest and thresh	65	90
Storage	10	43
Financial data (US\$)		
Total variable costs	403	894
Total value of paddy	610	1 537
Gross margin	207	643

Please note: a = Mbeya Supa for traditional; Saro 5 for SRI

b = Broadcast for traditional; on grid (48 person-days) for SRI

Source: adapted from BMGF, 2012b

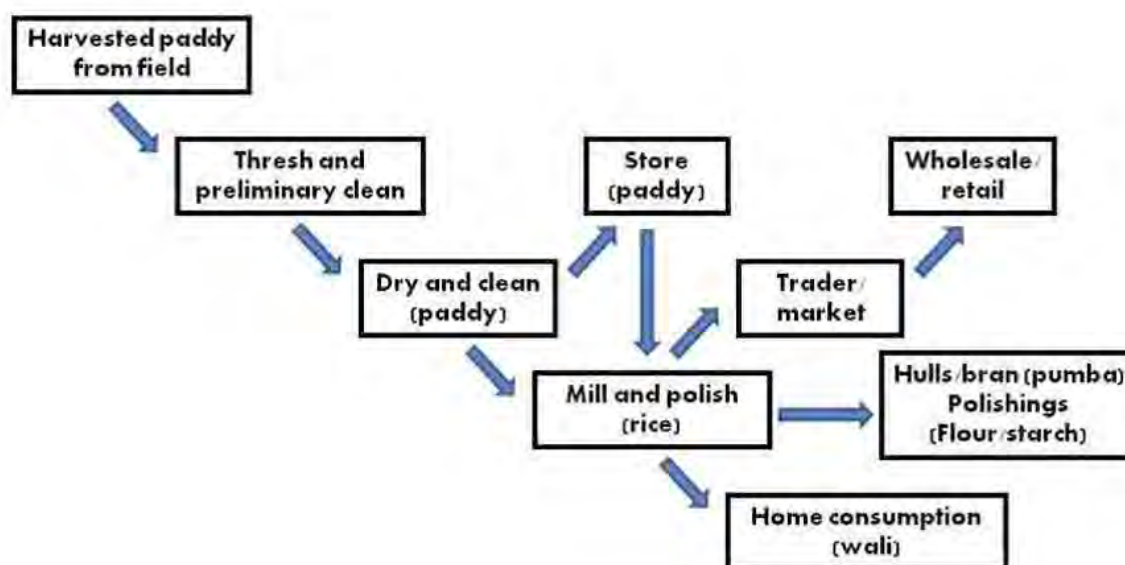
In general smallholders producing paddy under rainfed conditions have negative to modest returns of 27 percent. Thus many smallholders are hardly profitable in a commercial sense and are merely operating at a subsistence level. Irrigated farms are more productive and profitable with simplified gross margins from 2 to 61 percent. The main cost drivers for producers are their own labour (60—80 percent), inputs (10—30 percent) and local transport costs (5—10 percent). Traders, millers and retailers have positive gross margins varying from 9—25 percent with the main cost drivers being paddy (60—80 percent), transport (6—12 percent), milling (5—10 percent), loading/unloading (2—3 percent), taxes (2—3 percent), and — for bigger traders — storage (20—30 percent).

3.5 Processing

Overview

Processing may be considered to start at the moment the paddy is harvested at its point of production. From this point there are many pathways paddy can follow before ending up as food (for humans or livestock) or by-products (see Figure 17).

Figure 17: Process flow of paddy from point of production to consumption



Marketing

In the 1960s and 1970s grain was extensively marketed and processed through NAFCO and the National Milling Corporation (NMC). With the operational and financial failure of these entities, however, the market was 'liberalized'. Liberalization included effective privatization of physical infrastructure, irrigation schemes, farms, mills and storage facilities. Markets are still controlled to some extent by a plethora of rules and regulations. The main areas of regulation are for exports (by the Strategic Grain Reserve) and imports (tariffs). At the district level, bylaws can be invoked against food sales out of the district in times of shortage. The WRS also acts in part as a regulator through its storage and payment systems. Important regulatory authorities include the Tanzania Bureau of Standards (TBS), the Tanzania Food and Drugs Authority (TFDA), the Tanzania Business Registrations Licensing Agency (BRELA), the Occupational Safety and Health Authority and Local Government Authorities (LGAs). The Ministry of Industry, Trade and Marketing (MITM) issues operating licenses to rice processing industries, as well as trade licenses to rice traders. Licensing for food branding from TFDA and TBS takes a very long time and costs about TSh 400 000 per license. Other issues that create difficulties for the efficient functioning of the rice subsector are Government policies that label rice as a staple food crop rather than a cash crop. This limits its commercialization. In addition, district trade officers are overseen by MITM whereas production is overseen by MAFC, and the absence of consistent policies matching the two closely-related aspects also impede the functioning of the chain.

There are many formal markets — and more than a few informal markets — where it is possible (even mandatory) for producers to take or to send their product; at market it is either sold by auction, or by individual or group bargaining. There is an extremely active trade in rice. Trading, in the sense of a professional middleman buying and selling products at some point along the chain, is an important and, in the Tanzanian context, indispensable link in getting food from the producer to the consumer. Such traders are often accused of making excessive margins at the expense of other links but there is little evidence to support this contention (the margins are at wholesale and retail levels). Traders undoubtedly make speculative purchases from farmers but in the majority of cases they are buying to order, or on the presumption of an order and of an early resale. Traders, nonetheless, bear far less risk than other participants in the chain as a result of having the crop in their possession for the smallest amount of time. Since rice is both a major food and trade crop, and has a very broad market demand, the number of links between producer and processor can be long and convoluted and in turn lead to a confusing range of grades and prices (Annex 7).

The marketing process for large farms is somewhat different, as they prefer to sell their products directly to an end user (usually as milled rice rather than paddy). These direct sales are not without hazard, however, and it is not uncommon for large producers to still have difficulty in selling the crop for what they consider to be a fair price.

Threshing

The harvested whole paddy has to be threshed to remove the grain from the straw. In smallholder systems the process is almost invariably a manual operation although oxen may occasionally be used to trample out the grain. Hand operated or motor driven small threshers are available but are only very rarely used. Large-scale operations usually employ some form of mechanical power for threshing, or a combine harvester may be used to harvest and thresh in a single operation.

Drying

Drying is the most critical operation after harvesting and threshing. Delays in drying, incomplete drying or ineffective drying reduce the quality of the grain and result in various magnitudes of loss. Drying aims to reduce the grain moisture content to 18–22 percent and so make it safe for storage. Smallholders usually dry the grain on mats spread out in the sun; these might be placed in the field or on a convenient road that provides a ready made flat surface (Figure 18). Open-air drying leaves the paddy exposed to contamination by foreign matter such as stones, soil and faeces from straying animals. If the paddy is destined for milling within the next week or so, drying is undertaken by the local miller. Large-scale operators may use forced cold air drying or heat the air by burning the hulls or bran that are by-products of the milling process (Figure 18).

Figure 18: Traditional sun drying (left) and hot air drying using rice bran as the heat source



Source: Ian Lewis (photos)

Storing

Paddy needs to be properly stored to keep it in good condition until it is milled (either for sale or household use). Proper storage reduces losses to weather, moisture, rodents, birds, insects, micro-organisms and theft. Storing paddy also enables producers to wait and take advantage of the higher prices offered later in the season. Most smallholders store paddy in their own house or a building attached (or very near) to it, in less than optimal conditions. An improvement on home storage (if and where there is a nearby facility) is to store paddy under a WRS, managed by the Warehouse Licensing Board. The advantages of this system are that producers can store paddy until they decide to sell, whilst at the same time using it as collateral with financial institutions for short-term loans in advance of sale. Organizations such as RUDI have been involved in establishing and developing the WRS system and some NGOs are assisting in the rehabilitation of older warehouses to meet the required standards (Figure 19). Unfortunately the WRS remains the exception rather than the rule.

There is a critical lack of storage capacity in rural Tanzania. There is a greater need for storage in rural areas because it is economically rational to transport milled rice (rather than paddy) to urban areas. The lack of rural storage affects not only farmers but small traders and private sector warehouses. Initiatives to redress the problem have focussed on developing farmers' storage capacity. It is not essential, however, that rural farmers should store or own storage facilities. The same advantages of professional storage (inventory credit and delayed sales) could be derived from a professionally-managed storage system if there were enough such systems to ensure proper competition. Such a system could be owned by farmers, by independent warehouse operators, by traders or by a combination of all three groups. The larger operators have their own storage facilities, either permanent or temporary (Figure 19).

Figure 19: A renovated smallholder warehouse at Ifakara, with TAP Extension Officer, Elia Shemto (left) and large-scale storage under plastic tunnels at KPL Mngeta (right). The smallholder renovation was funded by the European Union



Source: Ian Lewis (photos)

Milling

Milling is the crucial step in the post-harvest process. Paddy is milled to remove the hull and the bran layers (in Tanzania these are usually removed together). If only the hull is removed, the resultant product is brown rice. Removing the bran as well as the hull results in white rice, which may then be polished to produce an edible white kernel ready for cooking or further processing. In larger mills, rice is usually graded into various qualities (Grade One Supa is the top grade in Tanzania); in smaller mills grading is unusual. The ratio of rice to paddy after milling is usually about 65 percent but this varies (both above and below) by 5 percent.

A range of factors determines rice quality. The variety is very important (in Tanzania, aromatic rice is preferred). However, the milling process is the main determinant of quality (grade) since it affects the rice's appearance and the proportion of broken rice. Small mills (Figure 20) generally use old machinery, which produces a large proportion of broken rice, known as '*chenga*' in Kiswahili. Large modern mills (Figure 20) are able to produce graded and polished rice. Since the milling industry is dominated by small mills, most traded rice is ungraded and may mix different origins and varieties. If grading is carried out (after and separate from the milling operation) the costs are in the region of TSh 17 000 per tonne (of which TSh 10 000 is for the grading machine owner and TSh 7000 for the labour charge).

Mills in Tanzania are mostly of Chinese origin (although Vietnamese machines are being introduced). They are generally electrically powered though some are driven by diesel engines. Roller mills in the Ifakara—Morogoro area generally have an output of 0.8-1.3 t/hour and produce about 10-12 t/day. Mills of this capacity cost TSh 5.8-6.2 million (US\$ 3600-3800) ex Dar es Salaam. The high prices of mills and graders dramatically affect the performance of the small- and medium-scale millers that dominate this link in the value chain. A further critical factor for the viability of milling is the availability of paddy: milling is most economic if there is a continuous and steady year-round supply of paddy but this is rarely the case.

Most milling is carried out as a service function. Producers or local brokers bring paddy to the mill and the mill charges for the decortivating process. Charges for milling are in the range TSh 60/kg to TSh 70/kg based on the output — that is the rice at the end of the process and not the paddy at the beginning. As many of the small traders are women they employ labourers to move their product in and out of the mill at a cost of around TSh 1600 per bag (TSh 16/kg) which includes, in the case of removing rice from the mill, sewing up the bag at the end of the milling operation. Loading and unloading charges outside Dar es Salaam are TSh 800-1000 per 100-kg sack.

Figure 20: Chinese mill in Ifakara milling paddy for smallholder household consumption and a large-scale Vietnamese mill with grader at KPL complex at Mngeta



Source: Ian Lewis (photos)

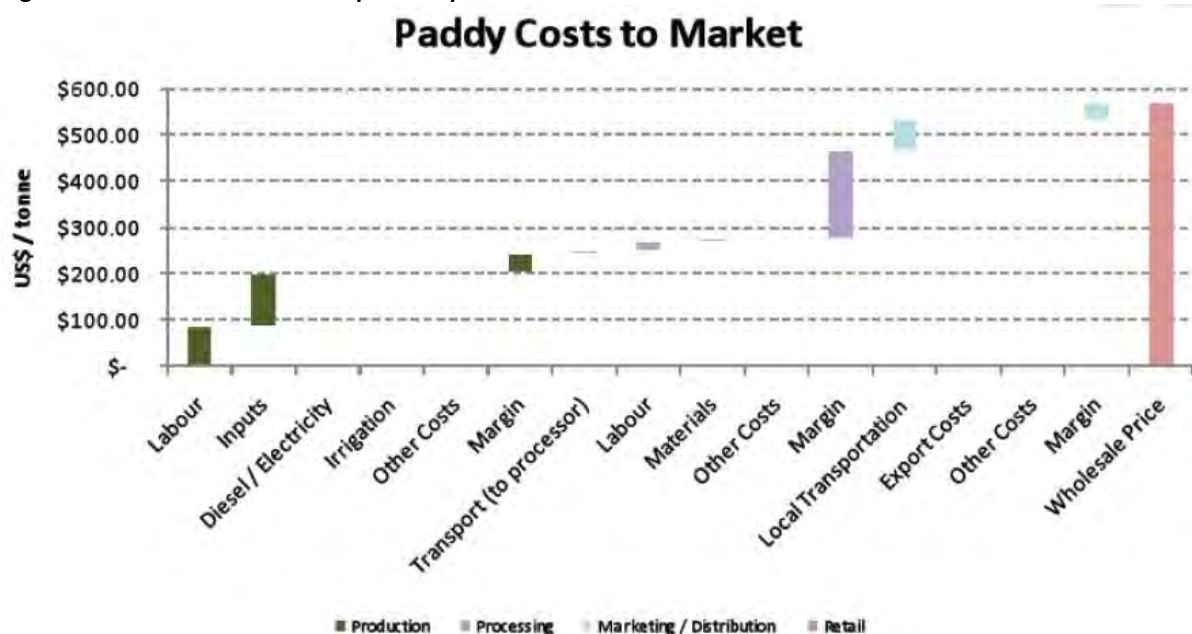
Adding value

There are few operations to add value to rice subsequent to milling. Mills capable of producing graded rice are usually limited to three or four grades plus '*chenga*'. Urban retailers may present, however, a bewildering array of grades based on minute differences in physical appearance (not apparent to the untutored or even tutored eye), aroma and origin. Some wholesalers specialize in producing retail packs whose mass varies from 1 kg to 25 kg. This is a basic form of branding but variation in supply, source, accuracy of grading, and variety mean that there is no guarantee that a 'brand' of August 2012 will be the 'brand' of September 2012. There is very little local production of more sophisticated products such as rice flour, rice starch or rice cakes or bread.

3.6 Wholesale and retail distribution

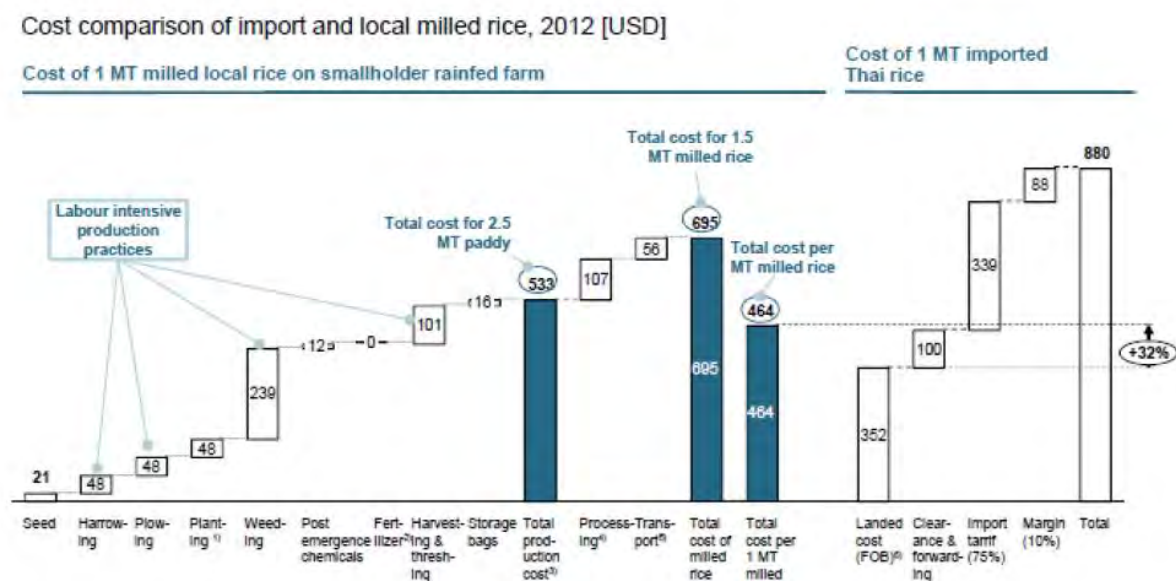
Local farmers or traders move paddy from the point of production to a mill. Regional traders gather here to buy milled rice from the decorticator. Deals may be struck by these traders before milling, with the purchaser then assuming the cost of the operation. If no regional traders are present, local operators store paddy or rice at the mill until a regional trader appears to conclude a transaction. Storage charges are usually around TSh 1000 per sack of 100 kg; this is not time bound, as deals are usually struck within a few days. Some regional traders move rice from the production area to deficit areas such as Arusha and Moshi. Most movements from the Southern Highlands are to Dar es Salaam. On average, transport costs US\$ 0.40 per tonne/kilometre from farmgate to rural primary markets and US\$ 0.27/t/km from secondary to wholesale markets (Figure 21). However, costs may be higher than this during peak times and when transporting rice from very remote rural areas. Moving rice from farmers to the final consumer involves multiple transactions. The margins required by each party within multiple actor chains substantially increase the final retail price. Long traditional chains, labour intensive production practices and high transport costs diminish Tanzania's competitiveness and encourage imports. The end result is that local rice is often more expensive than imported rice (Figure 22).

Figure 21: Rice chain costs from point of production to retail outlet



Source: SAGCOT 2011

Figure 22: Comparison of costs (US\$, 2012) for local and imported rice



Source: BMFG 2012b

The four large private rice producers are the biggest individual suppliers of rice to wholesalers in Dar es Salaam but are still small in terms of Tanzania's overall production. As large suppliers, however, they influence others in the value chain. Each of the four companies has indicated that their future plans include improved marketing (with more branding) to wholesalers & retail consumers, with the offer of different pack sizes. In this, however, they have been pre-empted by some of the large traders who have adopted a tentative 'place-of-origin' or 'geographic' branding approach (see Figure 23, and also Section 2.1, National markets).

An estimated 15 major rice wholesalers or brokers operate in Tandika, Tandale and Buguruni (the three main markets in Dar es Salaam). Tandika is probably the biggest market and is where the larger wholesalers are based. It has adequate space for trucks from Chimala (Mbeya) and Ifakara to offload. Wholesalers (see box 5) supply both traditional retail and institutional outlets (the latter include schools, the military etc.).

Consumers visiting traditional retailers (whether based on the street or at farmers' markets) usually buy their rice from 100-kg bulk sacks. The rice is usually loose, and the customer usually buys just a small quantity (sometimes just enough for the day). More affluent consumers with large families may buy pre-packaged quantities of up to 25 kg.

Competition between retailers is intense, especially as consumers can buy rice at market stalls that have minimal capital and operating costs. The large number of retailers — and the cost sensitivities of consumers — result in tight margins and slim profits. There is some opportunity to make a profit by using volumetric measures that are not immediately verifiable. However, retail returns rarely seem to exceed 5 percent and are usually closer to 2 percent of the value sold.

Only a small proportion of food retail in Tanzania takes place through supermarkets. In the largest urban centre, Dar es Salaam, perhaps 10 to 15 percent of retailing takes place through supermarkets. Supermarkets — and especially locally owned 'minimarkets' — are increasing in Arusha and other large urban centres. Supermarkets (like other retail outlets) tend to sell imported rice (often for just a small market segment) as well as local rice.

Figure 23: The beginnings of rice branding: geographical indication of origin and individual naming, August/September 2013



3.7 Target Group Considerations

A survey by the Regional Rice Centre of Excellence in 2011 looked at 722 farming households in six districts (Bunda, Sengerema, Mbarali, Kyela, Mvomelo and Kilombero) and found that:

- households were primarily producing for subsistence, with rice being the main determinant of household food security;
- there had been at least some degree of food insecurity in the four years prior to 2011 (33.6 percent of households reported a surplus of food, 33.9 percent reported having enough food to meet household needs, 23.8 percent had seen a small deficit and 8.7 percent had suffered a large deficit);
- men were at the head of 87 percent of the households, women of only 13 percent; and
- the average total household income was TSh 1 382 821, with crops and livestock sales contributing the most to income. Men had a higher income (TSh 1 545 824) than women (TSh 1 040 724).

From these results it is difficult to determine if gender requires a specific focus. The key is to be inclusive and involve both men and women in future programmes and activities (at a village meeting in Mngeta in August 2012, 40 percent of the 60 people attending were women). Youths in rural areas are also an important consideration in agricultural development. They do not see agriculture — which they equate to ‘a hoe’ — as offering a remunerative activity, seeing it as a livelihood of the past rather than the future. Young people from rural areas tend, therefore, to move to the city where they perceive there is more opportunity. If agriculture were more remunerative and had more of a value chain approach it could become attractive to the younger generation.

Box 5: Rosemary's rice business: profits and margins

Rosemary Lameck is a rice wholesaler at Tandika market, Dar es Salaam. She has owned and operated Singu Ushirombo Store for three years. This is primarily a rice wholesale business but it also has a small retail shop front. Her wholesale customers are small retail shops in the near neighbourhood together with an institutional market (schools, military). She has two male employees. At the end of August 2012, her buying and selling prices and margins for two different grades of rice were:

Rice grade	Buying price (TSh/kg)	Wholesale dealing		Retail dealing	
		Selling price (TSh/kg)	Margin (%)	Selling price (TSh/kg)	Margin (%)
Super (100% whole grain mainly from Mbeya)	1 600	1 800	12.5	2 000	25.0
Other (Ifakara, Morogoro Region and Chita, Shinyanga Region)	1 100	1 300	18.2	1 600	45.5

Suppliers are paid cash directly into their bank account using the M-Pesa facility on a mobile telephone. Transport to Dar es Salaam costs TSh 8 000 per bag (TSh 80/kg) from Mbeya and TSh 6 500 per bag (TSh 65/kg) from Ifakara. A 'cess' (tax on movement, unrelated to any production function) of TSh 3 000—10 000 per bag is levied by various local authorities. Rosemary sells 1 000 bags (100 tonnes) a month, of which 50 percent is 'super' and 50 percent is 'other'. The margins on 'other' rice are much higher than those on the better quality 'super'.

4. SYSTEMIC CONSTRAINTS AND UPGRADING OPPORTUNITIES

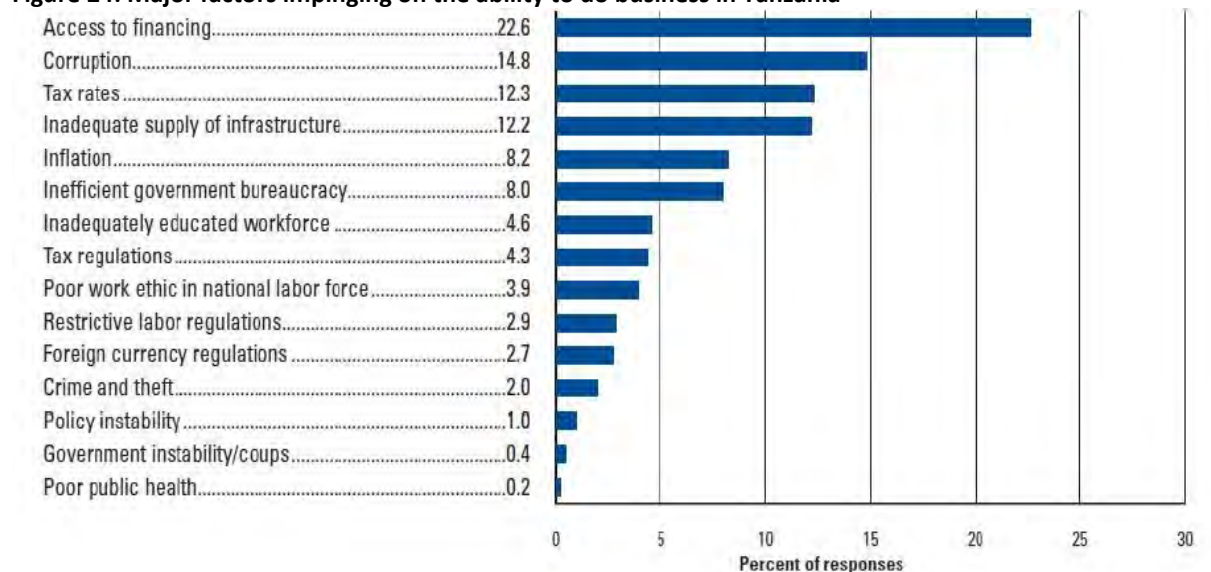
4.1 A Business Enabling Environment

Doing business

The ability to carry out business in an efficient and profitable manner is important not only for internal commercial operations but to attract Foreign Direct Investment (FDI). According to the World Bank, in 2012 Tanzania ranked 127 out of 183 countries in doing business, with the regional average being 137. Concurrently, the World Economic Forum found Tanzania to be one of 37 ‘factor-driven economies’ and ranked it 120 (down from 113 the previous year) out of 142 countries². It cited the major reasons for its low rating (in order of priority) as: access to finance, corruption, tax rates, inadequate infrastructure, inflation and inefficient government bureaucracy (Figure 24).

Infrastructure is especially underdeveloped with limited and poor quality roads and ports, an unreliable electricity supply and few fixed telephone lines (mobile communications have, however, rocketed to overcome this problem). Primary education enrolment is commendably high but enrolment rates at secondary and tertiary levels are among the lowest in the world. The educational system is in dire need of improvement. A related area of concern is the low level adoption of new and appropriate technologies. This bodes ill for investment in new businesses, or indeed the expansion of existing businesses. It remains to be seen if the necessary investments will be made to take the rice value chain to the next level.

Figure 24: Major factors impinging on the ability to do business in Tanzania



Source: Schwab, 2011

Legislation and regulations

Tanzania is widely regarded as a country with a heavy regulatory burden that is only lightly implemented. Multiple — and often conflicting — legal instruments under the jurisdiction of multiple ministries and other official bodies impinge upon the agricultural sector (Box 5). Under ASDP, for example, the target was to have four regulations in place by 2009/2010 (only one was in place in 2005/2006): that target was achieved. The 2010/2011 target was to have 13 pieces of legislation in place (there were only nine in 2005/2006): this target was superseded and 20 were in place by the

² The situation is somewhat anomalous, as Tanzania's performance appears to have remained stable; the change in rank is mainly the result of other countries improving more quickly.

target period. Six new acts on agricultural marketing were approved in 2004/2005 and a further six pieces of legislation were enacted in 2009. Current legislation includes:

- The Food, Drugs and Cosmetics Act No 1 of 2003 (which establishes the Tanzania Food and Drugs Authority or TFDA);
- The Tanzania Bureau of Standards, Code No TZS 109 (1987);
- Fertilizer and Animal Foodstuffs Act (1972);
- Seeds Act No 18 (2003);
- Cooperative Societies Act No 20 (2003);
- Food Security Act (1991);
- Warehouse Receipts Regulation and Warehouse Act No 37 (2007);
- Executive Agency (National Food Reserve Agency) (Establishment) Order (2008);
- The Standards Act No 2 (2009);
- The Cereal and Other Produce Act (2009);
- The Fertilizer Bill (2009);
- The Food Labelling Regulations;
- The Food Import and Export Regulations;
- Standard TZS 538:1999 — Packaging and labelling of foods;
- Standard TZS 34(Part 1): 1979—Animal feeds and feeding stuffs.

Additional laws and regulations also pertain to specific types of contracts (e.g. crop-related legislation, banking law, microfinance, warehouse receipts and secured transactions).

Box 6: The Sound and the Fury. Over-Regulation and Under-Enforcement in Crop Trade Activities

Internal trading:

- A free Tax Identification Number (TIN) is required for all businesses. This is obtainable from the Tanzania Revenue Authority (TRA).
- After receiving a TIN number, a business licence is required. This can be obtained from BRELA, based in MITM.
- Factories, mills, shops (and related premises) require a premise inspection certificate. This is obtained from TFDA.

Export and import trading:

- A free TIN from TRA is required for all businesses (to allow for taxation);
- A business/export licence is required from BRELA (after income tax payment to TRA);
- A Sanitary and Phytosanitary export certificate is required for each lot exported (this is issued by the Plant Health Service);
- An import permit is required: this is issued by the relevant authority in the importing country.

The importation of foundation seeds has been liberalized since 2009. Seed monopolies, such as that held by ASA, have been removed and at least 16 private seed companies were operating in Tanzania in September 2013. Breeder seeds are soon to be made available to them. The five national seed farms no longer monopolize production of foundation seeds, and registered seed producers are allowed to produce quality declared seed that conforms to minimum standards for the crop. The National Variety Release Committee must approve breeder seed. The approval process for importing seed remains bureaucratic, involving at least ten steps and five regulatory agencies and taking at least six months to complete. Once imported, varieties are subject to continued scrutiny after import by the Tropical Pesticides Research Institute (TPRI) and Tanzania Official Seed Certification Institute (TOSCI). Seed certifications outside the East African Community (EAC) are usually not recognized. TPRI regulations conflict with the Seeds Act of 2003 and, to be sure of compliance and minimize harassment, investors in the seed sector need to get phytocertificates from both the Plant Health

Service (PHS) and TPRI. The sanitary and phytosanitary (SPS) regime is thus most disadvantageous for agricultural producers who have considerable difficulty in obtaining high-yielding seed varieties. As a result, agriculture does not realize its potential and Tanzanian crop yields (not only rice) are among the lowest of any country in the region. Seed regulation and certification particularly affect women and their children who might be more food secure if they had access to higher yielding varieties.

Land rights and land markets

Land tenure in Tanzania is in the form of a right of occupancy and leasehold. All land belongs to the nation and there is no freehold system. The primary legislation governing land ownership is the Land Act No 4 of 1999 and the Village Act No 5 of 1999. Under the Land Act, there are several categories of land but the most relevant is 'general land'. This is the land for which the Commissioner for Lands may grant a right of occupancy or leasehold (upon application and fulfilment of certain conditions). Village land is administered at grass roots level and a Certificate of Title can be granted to the holder(s).

The Village Land Act provides for a customary certificate of occupancy. This provision, presumably, was to provide those occupying village land with a mechanism for using it as collateral. Banks are reluctant, however, to take village land as collateral. Banks take collateral to secure loans with the understanding that in case of default the collateral can be sold to cover their loss. Collateral is therefore only as good as the market demand is for the asset. Sale of village land to someone outside the village requires that its status be changed from village to general land. Depending on the size of the parcel, this change could require approval at the village, district, region or even national level and may include presidential approval. The process makes village land illiquid and thus unsuitable for collateral. Some banks have, however, performed due diligence at the village level to ascertain whether local villagers would be willing to buy the land in case of repossession. In this case, the banks are restricting possible demand for practical reasons but this limits the value on resale. Regardless of the buyer the barriers that the Village Land Act raises with regard to resale make the policy anti-credit.

As indicated previously, although the right to land can theoretically be obtained by investors for varying periods, anecdotal evidence suggests that this is easier said than done. Lack of transparency in land use, rights and ownership affects small and large-scale farmers, businesses and investors. These issues are, indeed, some of the most important factors for potential large-scale investors.

Government policy for rice and general crop production

A supportive policy and regulatory environment has been evolving only gradually in Tanzania. The result has been a very low level of FDI in the country's agribusiness sector. Several initiatives launched recently appear to be incompatible with the goal of strengthening private sector commitments to the agricultural sector in general. The effects of these emerging policies have yet to be fully determined.

The Government has been increasing its overall budgetary allocations to the agricultural sector but from a very low base: for example, the agriculture budget was only just over 7 percent of total government expenditure in 2010 (it was 30% less in 2009). The budgetary commitment still remains far below the required level, is almost exclusively committed to on-farm activities, and almost completely disregards the demand end of farm-to-market chains. There is no funding from Government either for the market or supply chain development.

The Government accepts the urgent need to channel funding to the agricultural sector but its plans appear short sighted. Private institutions in the financial sector have avoided lending to agriculture because of the risks involved. Should the Government decide to channel funding to agriculture (in

spite of the risks) rather than focussing on addressing the risks, it may well squander the limited resources that it has. The Private Agricultural Sector Support Programme (PASS) works to encourage growth in the agricultural sector. It provides business plan support to entrepreneurs and facilitates access to credit with the support of a guarantee that varies from 30 to 70 percent. It is not a first-loss guarantee so lenders must exercise their recovery methods before PASS provides coverage.

The ASDS (introduced in 2001) and the ASDP (introduced in 2002) are both managed by MAFC. They are a sector-wide framework for managing the institutional, financial and investment development of the sector. ASDP has not replaced existing planning and implementation mechanisms but aims to facilitate the process, emphasize priorities and monitor overall progress. ASDP covers a range of priorities that includes, among others, irrigation and water management, better land husbandry, mechanization, storage, post-harvest activities, agroprocessing, community empowerment and agricultural information. Among the constraints to meeting the national agricultural growth targets, ASDP acknowledges high transaction costs as a result of poorly maintained or inadequate infrastructure, especially rural roads. A stated objective of the programme is to improve the quality and quantity of public investment in physical infrastructure through more devolved, technically sound planning and appraisal. The ASDP results framework should track development objectives against established indicators but it has proved difficult for outsiders to find official progress reports against these measures. Such a failure symbolizes a trend in which development plans are adequate or more than adequate, but implementation, monitoring and evaluation are unsuccessful.

The 'Kilimo Kwanza' ('Agriculture First') strategy was launched by President Kikwete in 2009. It aims to energize and coordinate government efforts to transform agriculture. The strategy is based on 10 pillars (see Box 1) each of which will require political will, long-term financing, and regulatory reform if they are to be successful. The initiative focuses on many issues including the provision of inputs, the strengthening of the national Food Reserve Agency's food reserve, and the improvement of the rural road network, irrigation and storage facilities. 'Kilimo kwanza' is slowly gaining momentum. Developing the rice value chain would open up opportunities to leverage 'kilimo kwanza' through growth and though critical interventions that could help move forward a more commercial agenda. To have a real and sustainable economic impact, however, supply chain development initiatives must operate in an environment in which the government and the private sector support each other. In such a supportive environment, trust and joint action are of fundamental importance. In the past, there have only been limited opportunities for the public and private sector to meet, discuss, solve problems and form mutual resolutions. Priority actions could be directed at enforcing quality and standards, and developing infrastructure and trade policy.

As already indicated in Section 1.3, Government has prioritized rice through NRDS. This seeks to double rice production by 2018 to provide food security and the potential for export to neighbouring countries. NRDS aims to improve seed cultivars and input supply, the availability of irrigation, marketing, agricultural credit, and R & D (Box 7). The major programmes and policies include:

- fertilizer and seed subsidy and seed R&D;
- infrastructure development (irrigation and roads);
- an import tax of 75 percent on milled rice for mainland Tanzania; and
- removal of the export ban during 2012.

Box 7: The National Rice Development Strategy (NRDS)

MAFC produced a draft NRDS in May 2008. The vision of NRDS is progressively to transform the existing subsistence-dominated rice subsector into a commercial and viable production system.

The general objective of the Strategy is to double rice production by 2018. Were NRDS to be successfully implemented it would contribute considerably to national food security and generate greater household incomes through the production of better quality and higher volumes of rice.

The NRDS has identified targets in eight strategic areas:

- improving seed systems and fertilizer distribution;
- developing improved varieties, production and integrated crop management options;
- post-harvest activities and marketing;
- improving irrigation and water harvesting technology;
- enhancing access to — and maintenance — of agricultural equipment;
- improving the capacity for technology development, training and dissemination;
- providing access to credit and agricultural finance; and
- promoting the medium and large-scale processing industry.

The Government has imposed — and then rescinded — several export bans on rice (and maize) over the past decades, citing pressing food security concerns as the reason. Although policy decisions may be well intentioned (and have certainly benefited consumers in Dar es Salaam) they can have unintended negative consequences. Export bans can:

- hurt smallholder farmers in food surplus regions because a loss of customers can lead to a decline in farmgate prices. They also create a wider price differential between the farmgate and destination markets in other parts of Tanzania that are food deficient (as well as in the cross-border regions in neighbouring countries);
- buyers in importing countries lose confidence in Tanzania as a reliable supplier;
- business uncertainty is created at all levels: this discourages future investment in the sector (when the opposite is needed);
- it encourages 'black markets' as traders try and avoid the ban and maintain export sales to neighbouring countries; and
- when a ban is lifted, the arms of government responsible for export approvals do not necessarily respond in a timely and coordinated manner.

In 2005, a Common External Tariff (CET) of 75 percent on imported rice was agreed by the EAC (the TRA is the enforcing and collecting agency in Tanzania for this). This in effect tripled the existing tariff on imported rice. The charge is intended to protect domestic producers from a flood of cheap rice imports. The CET applies, however, only to the mainland of Tanzania (imports to Zanzibar are subject to a smaller tariff of 25 percent, or are even exempt from tariff altogether.) The law of unintended consequences again comes into force, and there is evidence that while official imports have declined, unofficial imports through Zanzibar have not (indeed importers through Zanzibar are likely to be making significant profits, as are those who are simply avoiding paying the tariff through a spectrum of devious ways). The CET provides nominal protection to Tanzania's rice industry but — in opposition to the export ban — results in higher prices for consumers because it theoretically prevents access to the lower-cost global products.

The international donor community is developing a number of policy options to present to the Tanzanian Government for consideration as alternatives to the export ban and import tariff (which is considered excessive). The quality of data available to help define and implement policy tends to be poor, and the donor community is also addressing this. Ineffective or delayed implementation of policies and programmes (as a result of a lack of resources) are other major factors affecting the

effectiveness and credibility of Government. Many policies and programmes have been announced and implementation started, yet output targets are not documented or met. This deficiency raises the question of the reliability of government agencies as partners in public private partnerships.

Irrigation development

Increasing the area of irrigated rice is integral to increasing rice productivity per unit area and thus increasing the total national rice output. Irrigation methods currently in use are predominantly rudimentary. Traditional irrigation covers 122 600 ha, improved traditional irrigation 25 500 ha and modern irrigation 35 800 ha. The limited area making use of modern irrigation is attributable to the absence of data for planning, lack of funding, limited trained personnel and poor national coordination.

The National Irrigation Development Plan, to be completed by 2014, calls for “removing sectoral constraints” and “implementing irrigation infrastructure” (see Table 10). Progress up until 2012 has been slow mainly as a result of poor institutional development and inadequate funding.

Table 10: Area of rice irrigation in 2002 and projections for 2017

Water management system	Area (ha) in 2002	New developments (ha) to 2017	Total area (ha) in 2017
Traditional and improved traditional	148 141	126 524	274 665
New (modern) smallholder schemes	35 847	26 734	62 581
Water harvesting	7 934	60 241	68 175
Total	191 922	213 499	405 421

Source: SIPA 2010

Increasing irrigated rice areas will, however, have some problems and challenges:

- the amount of water available for irrigation is not precisely known (there is much talk of ‘bountiful water’ but this cannot be substantiated);
- in future the competition for water for other uses could have an adverse effect on irrigation and therefore sustainability;
- the availability of irrigation water depends on hydroelectric power schemes; and
- the current over commitment to irrigation could lead to major political problems and hardships for the people affected, if water allocations have to be reduced.

Public infrastructure

It is usual to read that Tanzania is well endowed with public infrastructure including roads, rail, electricity, water, ports, telecommunications and markets. In general this is true. It is not, however, the whole truth.

While tarmaced trunk roads (which make up around 4000 kilometres of Tanzania’s 85 000 kilometre main road network) are generally in fair to good condition, they are often narrow, resulting in long journey times as heavy haulage vehicles hold up traffic. There is also a high risk of accidents as drivers jostle for position. Restrictions on weight mean that many trucks cannot be loaded to capacity, further increasing costs for farmers and traders. Innumerable checks on vehicle weight — even on the same stretch of road — result in further cost increases, as a result of wasted time (Figure 17) and the frequent need to pay facilitation fees to secure a right of passage.

Unpaved rural feeder roads are often in poor condition, and result in further delays and costs as a result of axle and suspension damage. Many feeder roads are impassable after heavy rains because of broken bridges and waiting times may be extended for hours (or even days) because of flooding. Good tarmac roads can half the journey times associated with dirt roads, as for example on the 240 km Tunduma-Sumbawanga link, which is expected (when completed) to lower the journey time of a

standard light car from more than six to less than three hours. Poor roads (both rural and some main) result in high to very high transport costs: an estimated four times the cost per tonne per kilometre of good paved trunk roads. High road transport costs mean that rural producers do not gain the full benefits of high consumer prices and have to pay higher input costs. Inadequate road infrastructure also has an impact on food security as it slows down or restricts the flow of food from surplus to deficit areas.

The rail system (consisting of the Tanzania-Zambia Railway commonly known as TAZARA, and Tanzania Railways) is extremely inefficient. Only TAZARA passes through the Southern Highlands, and the Central Line from Dar es Salaam to Kigoma operates, at best, only two days a week. Many transporters have, therefore, changed from rail to road to transport heavy items such as copper sheeting from Zambia, thus further lengthening the duration of journeys for other users. The northern line (which connected Tanga to Arusha and Kenya, and linked with a branch to the Central Line³) has been defunct for many years.

Dar es Salaam, and the newly opened Songwe International Airport (some 10 km from Mbeya), are the only airports that can land a large transport aircraft and could be used in the future to export perishable produce from the Southern Highlands. The Kilimanjaro International Airport in Arusha Region is another outlet for perishable produce from the northern areas of the country.

The electricity supply is patchy and most of the rural hinterland is not connected to the 33kVa grid. Supply is often intermittent and may be interrupted for several hours at a time. Telecommunications have improved vastly since the 1980s when it could take two days to get a connection from rural areas. Mobile services (that also allow rapid money transfer) need to be complemented by high speed internet in order to improve business efficiency.

Figure 25: Heavy transport waiting their turn at a weighbridge on the Dar es Salaam-Morogoro road



³ This was 'cannibalized' from its service to the (ill-fated and much derided) Groundnut Scheme line, which ran from Mtwara to Nachingwea in the 1960s.

4.2 Related to vertical and horizontal linkages and value chain governance

Integration

The rice value chain needs greater vertical and horizontal integration; there is also the need for stronger consumer orientation and innovation along the chain. These are the critical issues for improved chain performance. Most initiatives to date have had only brought about limited changes along and across the chain. Efforts by donors have resulted in excellent incremental developments but they have not transformed the chain as a whole. (Initiatives to date include organizing smallholders into groups for warehouse receipts, transferring technology, developing capacity, marketing and increasing the awareness of farming as a business.)

Improving the competitiveness and performance of Tanzania's rice industry should engage the large-scale private producers of rice with their expanding smallholder outgrower schemes. This view is strongly supported by a USAID strategic review, as well as by the Bill & Melinda Gates Foundation study of the Tanzanian rice sector. It also conforms to 'kilimo kwanza' and the SAGCOT initiative. The companies involved are KPL, Mtenda Kyela Rice Supply and Kapunga Rice Farm. These large-scale producers have a significant opportunity to transform smallholders because they:

- are major producers, millers, traders and distributors in their own right;
- have (or shortly will have) large smallholder outgrower or contract farmer schemes which they intend expanding. (KPL, for example, intends to increase its current 1 500 household smallholder scheme to 5 000 by 2016, is considering introducing a smallholder scheme for 3 000 ha of new land in the Kihansi Valley, south of its existing operation, is introducing new technologies including new cultivars, fertilizers and small-scale mechanization, and ensuring that seed and fertilizer are available and delivered on time. Mtenda Kyela Rice Supply intend to expand their present outgrower base from 10 500 in 2013 to 25 000 farmers in 2015, expand their geographical base to other districts, and offer new services to smallholders.)
- are building medium to large-scale modern mills that, in addition to their own production, will draw in additional supplies of paddy that can be appropriately dried, stored and milled (smallholders will have fewer post-harvest problems and therefore improved paddy quality and improved returns); and
- are providing or planning to provide additional services to smallholders including finance (at 8 percent interest) for the purchase of inputs. In addition they provide, or plan to, offering a small price premium to smallholders who mill and market their paddy through them, with all deliveries being paid for in cash.

These changes are about building trust, sharing information and adhering to strong social responsibility values. Competitiveness will also be improved by increasing modernization and operational scale.

Large private sector companies offer the best opportunity to transform marketing in the value chain (particularly the vertical aspects): to make it more consumer driven, to ensure there is greater information sharing and to improve governance. Rice production must increase concurrently with demand expansion in both domestic and regional markets. It is desirable to implement and link many interventions through a commercial organization or value chain rather than implement them in isolation. There is then a greater likelihood of interventions becoming permanent and sustainable.

Governance

A major issue in relation to vertical and horizontal linkages and value chain governance is risk aversion. This is an important social dynamic in Tanzania where the norms of contractual obligations are lacking. In the context of unwritten contracts and informal agreements it is often difficult to discern the dual responsibilities of the contracting parties or how they are bound to the terms of an agreement. The fragmentation of producers and traders means that parties are rarely forced to do

business on a repeat basis. Market incentives lead to a substantial risk of side selling (the sale of crops for a higher price and to a different person than originally negotiated). The large number of traders allows farmers who enter into supply contracts to engage in opportunistic behaviour. A chain based on such spot sales will have great difficulties in functioning effectively or engaging in value added activities.

In most functional contract enforcement systems, a matrix of legal and extra-legal incentives encourages behaviour that enables contract enforcement. Trust is a critical component of efficient value chains. In some communities in Tanzania there is a stigma associated with being the party who was vulnerable (or foolish enough) to be the victim of a breach of contract. In rural communities especially, where rice growers produce at near subsistence levels, the breach of an agreement, far from being associated with dishonesty or untrustworthiness, is often considered to be evidence of intellect and cunning, and may even be prized within the community.

Risk and uncertainty are mitigated by the private sector through agreements. When parties are assured that agreements are enforceable they are able to enter into more complex, value enhancing transactions. There is much progress to be made in improving contracting practices in the rice sector.

4.3 Related to support services

Overview

A service can be defined as a function performed or offered by a service provider, and used by a customer to his or her benefit. Numerous service providers are purported to operate in Tanzania's rice value chain. These include government and private providers who supply inputs, extension services, research and development, training, financial services, market information and regulatory services. The role of the public sector has been elaborated in numerous documents that state that the Government — in collaboration with other stakeholders — will provide core public services such as extension, information, research, training and infrastructure, as well as formulate policies, provide a regulatory framework and protect the environment.

Public sector roles will be implemented by: the Agricultural Sector Lead Ministries (ASLM) including MAFC, the Ministry of Livestock and Fisheries Development (MLFD), the Prime Minister's Office—Regional Administration and Local Government (PMO-RALG), the President's Office—Planning Commission, the Ministry of Water and Irrigation (MWI), and MITM. Other services in related Ministries — e.g. TFDA, TBS, SIDO and the Centre for Agricultural Mechanization and Rural Technology (CAMARTEC) — also have important roles to play. The private sector, particularly under the aegis of 'kilimo kwanza', will be encouraged to perform production, marketing and processing functions.

The Tanzania Rice Partnership (TARIPA)

The Tanzania Rice Partnership (TARIPA) was established in 2011 to help focus and develop commercial value chain activities intended to improved rice productivity, marketing and processing.

TARIPA aims to:

- develop a partnership framework to respond to rice value chain constraints and opportunities;
- build markets and small-scale farmers' capacity to produce rice, in order to address national food security issues, expand domestic production, improve competitiveness and increase value addition;
- scale up core value chain activities in order to catalyse the development of small- and large-scale farmers and agribusinesses in the rice sector; and

- support commercial initiatives by building on current plans and activities to scale up through learning.

Organizations that are partners with the government in TARIPA include USAID, SAGCOT, the Japan International Cooperation Agency (JICA), AKIRIGO, RUDI, the World Bank, Agrica Tanzania, FAO, KickStart, Syngenta, the Tanzania Agricultural Partnership (TAP), TechnoServe and the Norwegian Agency for Development Cooperation (NORAD).

The cereals and other produce board

In 2009, the Cereal and Other Produce Act came into being. This act was intended to “make provisions for the establishment of the Cereals and Other Produce Board, for the promotion and development of cereals and other agricultural produce and to provide for other related matters”⁴. The main functions of the Board — as defined in Section 6 (1) of the Act — are to carry out commercial activities and other activities necessary, advantageous or proper for the development of the cereals and other produce industry.

As per Section 6 (2), the Board may facilitate:

- agricultural research on cereals and other produce;
- extension services to growers and other dealers;
- input services, including fertilizers and agrochemicals;
- the promotion of production, marketing, processing and produce storage;
- the dissemination of information or data relating to cereals and other produce;
- the promotion of technological advancement in cereals and other produce; and
- assistance in the formation of farmers’ co-operatives or organizations.

The Board is allowed (subject to the provisions of the Act and any other written laws) to perform any commercial function or hold interests in any undertaking or projects associated with cereals and other produce. The commercial functions referred to under subsection (1) and Section 7 (2) include the:

- purchase and sale of cereals and other produce at a competitive price;
- import or export of cereals and other produce;
- processing of cereals and other produce;
- provision of warehousing services for cereals and other produce;
- provision of grain and other produce, as well as cleaning, drying, weighing, grading and packaging services according to market standards; and
- performance of any other commercial functions approved by the Minister for the development of trade in cereals and other produce.

It will be the duty of the Board — according to Section 8 (2) — to act in an appropriate manner to promote the quality and competitiveness of the cereals and other produce industry within and outside Tanzania.

The Act also makes provision — under Section 15 (1) — for the establishment of a Cereals and Other Produce Zonal Council in each of the seven agricultural zones of the country. The Zonal Councils, according to Section 15 (3), are intended to strengthen cereals and other produce in their respective areas by:

⁴ As a result of the 2009 Act there were amendments to and effective subsuming of the Food Security Act which was redefined as ‘An Act to establish an Authority to regulate production, processing and marketing of cereals and other produce; to provide for the national food security assurance mechanisms and for other related matters.’

- promoting cereals and other produce;
- forming farmers' associations and other bodies;
- acting as a consultative forum for price negotiations between farmers and buyers/traders;
- establishing and operating a market information system for produce and agricultural inputs;
- promoting the use of weights, measures and grading standards;
- collaborating with the Board and LGAs to provide agricultural education on cereals and other produce;
- performing any other functions the Council deems necessary for the development of the cereal and other produce industry; and
- preparing and promoting zonal production targets.

The Board (according to Section 17) will be funded and resourced by:

- such sums of money as may be appropriated by Parliament;
- any money raised through loans, donations or grants (either inside or outside Tanzania);
- any loan or subsidy granted to the Board by the Government or any other person;
- any money derived from commercial activities; and
- such sums of money or property which may become payable to — or vested in — the Board “under this Act or any other written law or in respect of any matter incidental to the carrying out of its functions”.

The 2009 Act replaces an earlier act, under which Crop Boards were restructured to resume regulatory functions leaving commercial activities to the Cooperative Unions and the private sector. In the new Act the private sector is, once again, not only neglected but actively excluded. The general opinion within the country is that the Board is not doing as much harm as it might do due to the perennial lack of personnel, equipment and finances.

Value chain finance

Many links in the rice chain could benefit from capital and access to recurrent financing. Until early 2013 it was impossible for most chain participants to obtain finance. Many financial institutions provide some credit for agriculture (see Section 3.3, Table 6). NMB has a large agricultural portfolio that could be extended in future to rice. MFIs and SACCOS are possible sources of credit and finance. Finance and credit for the rice value chain is probably restricted by high interest rates, high investment costs in some enterprises (especially irrigated production) and long periods of return on the initial investment. There is also a lack of awareness among stakeholders lower down the chain of the need for investment. Some major characteristics of finance in the chain are:

- large traders are self-financing (or have access to cash via informal sources) so that they can dominate markets and squeeze out small operators who cannot pay immediately in cash;
- there are no favourable financial support packages, preferential interest rate programmes, or guarantee schemes that could ease access to finance;
- traditional small-scale producers, traders and small processors, do not have the knowledge or skills to develop viable business plans or loan applications, and so far have received little support in this area;
- there is no concept of integrated value chain finance such as combined loan schemes for interdependent small-scale producers, traders, processors and retailers.

Insurance

As far as can be ascertained there are no insurance schemes for smallholder crops in Tanzania.

Research services

The fundamental purpose of research is to develop technologies that address the problems affecting the industry in order to increase agricultural production and productivity, augment the industry's

contribution to the national economy, and improve livelihoods. Various stakeholders currently undertake research. The National Agricultural Research System (NARS) comprises a network of public, parastatal and private research institutions. The lead public institution for crops is the Department of Research and Training (DRT) of MAFC. Two semiautonomous institutions — TPRI (under MAFC) and CAMARTEC (under MITM) are also publicly funded bodies. Sokoine University of Agriculture (SUA) is the main academic research body. The University of Dar es Salaam, Moshi University College of Cooperative and Business Studies, Mzumbe University, the Open University of Tanzania and the Institute of Rural Development Planning also participate in some aspects of agricultural research and training.

Private institutions for tea, coffee and tobacco undertake their own research. Many NGOs do some applied research and contribute to training. Five institutions that are part of CGIAR — IITA, CIAT, IRRI, World Vegetable Research Centre (AVRDC), and the Africa Rice Centre (AfricaRice, formerly the West Africa Rice Development Association or WARDA) — work closely with the NARS: several other CGIAR centres have a smaller presence in Tanzania, as does the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA).

To assist research centres to plan and implement research programmes relevant to their respective zones, the Client Oriented Research Management approach is employed, for which funding is provided by the zonal offices under the Zonal Steering Committees and through the Zonal Agricultural Research and Development Fund (ZARDEF). Such committees are made up of regional and district officials, researchers, extension officers and producers (who must comprise 50 percent of the committee). Strategic research interventions theoretically follow a commodity value chain approach.

The long tradition of agricultural research has been jeopardized since Independence by reduced personnel and funding. In view of the importance of agriculture to the economy, and its role in food security and human welfare, the Government's allocation to research can be seen as pitiful. External donors have provided limited and intermittent funding for research but have failed to view their commitments as long-term. In addition, the fractionation of research through devolution and the presumed advantages of zonal priorities have not assisted progress in providing extension services.

Extension services

Historically and traditionally, extension services have been financed entirely by the public sector. In general there has been far too much direct government involvement in the management of extension services, in spite of declining resources. Following Independence, collaboration with the private sector, Faith Based Organizations (FBO) and other NGOs was minimal for many years. Since the 1990s, however, some extension services have been provided by the private sector in the form of farmer-led initiatives, and private agribusinesses (supplying fertilizers and agrochemicals) have started to supplement public services.

The National Agriculture and Livestock Extension Policy and Implementation Guidelines (NALPIG) were developed to elaborate on the extension policies of the Agriculture and Livestock Policy of 1997. The guidelines were prepared to advise all extension workers on the mainland Tanzania (public, private, NGO), and are currently being reviewed to incorporate institutional and policy reforms that have taken place since they were first drafted. The new policy will seek to transform agricultural extension services so that they become participatory, demand driven, market oriented, cost effective, gender sensitive and are provided in a collaborative manner through the involvement of a broad range of stakeholders.

Extension workers are usually trained at one of nine Ministry of Agriculture Research and Training Institutes (MARTI) located around Tanzania. Graduates are awarded a Diploma or a Certificate in

various aspects of crop production and protection. The MARTIs generally have few teaching staff, few staff houses and insufficient student accommodation. At most institutes the teaching facilities are old and obsolete, infrastructure and equipment is in a poor state of repair, and farm units are in need of rehabilitation and retooling for the practical training of students. They do, however, have land suitable for expansion and are strategically located to meet training requirements. Emerging aspects of the rice chain (such as commercial production, private input supply and processing) have specific training needs that require the re-designing of training curricula and the development of new ones.

Extension services for outgrowers connected to large-scale rice schemes are generally good throughout the production links (from land preparation to post-harvest). Outside these schemes, as indicated in Section 3.3, few producers receive extension advice. This is hardly surprising given the severe deficit of extension workers (in 2009 just over 3 300 public service extension workers were in post compared to the 15 000 needed). This lack is compounded by other factors including a lack of transport and equipment for workers. The situation has not been improved by the decentralization of extension services from MAFC to local governments who are perennially short of funds. A further problem is that when extension is provided it is seldom holistic. The promotion of new varieties, for example, is not enough. In order to perform to their potential they need improved management, fertilizer and chemicals, but these are rarely promoted and even more rarely available. Linking smallholders (as outgrowers are) to major schemes that are able to provide and deliver the whole package is an appropriate approach. There is clearly a huge need to provide additional training for field extension staff using MARTIs, and to retrain existing workers to equip them with new technologies and motivate them to actually get out into the field.

In order to fully support crop value chains, extension services should:

- be strengthened and help develop the private sector as part of the implementation of 'kilimo kwanza';
- shift their focus to diversifying market demands and export opportunities;
- encourage effective farmer participation in the value chain to ensure competitiveness;
- empower farmers and encourage links with national and international organizations;
- develop new (and promote current) extension models with farmer trainers in all parts of the country;
- delegate ownership of extension services to farmers, and make extension workers more accountable; and
- create a forum where public and private partners (including producers) come together to develop common policies and standards.

Seed supply

Until 2009, public and quasi-public bodies controlled the production and supply of seeds in Tanzania (see Section 4.1). Liberation has not, however, greatly improved seed supply. Certified seeds are, in principle, available from agricultural research institutes and ASA. But though both are engaged in multiplying and distributing improved varieties, farmers do not always consider them to have the best genetic range (Box 8).

ASA produces 'Quality Declared Production' seeds that are recognized by TOSC.I but supplies are limited (even though ASA claims to be able to provide adequate stocks of pre-basic and basic seed within a season). None of the 15 member companies of the Tanzania Seed Traders Association (TASTA) sells improved varieties of rice seeds. In collaboration with district authorities, ASA claims to have an innovative approach to getting seeds closer to farmers and making them more affordable by using agro-dealers and ordinary village 'duka'. However, Tanzanian farmers, small- as well as large-

scale, do what farmers the world over do when faced with seed shortages: they swap seeds and retain their own better-adapted varieties.

Box 8: Farmers' Choice or Hobson's choice? Rice genetic resources for Tanzania

An enormous number of improved rice varieties have been developed and released from national and international research institutions. Yet paradoxically there is no great use of (or demand for) improved seed by farmers in Tanzania. As rice is self-pollinating, farmers do not require a large amount of new seed and this acts as a disincentive to wholesalers and retailers.

Tanzanian smallholders have traditionally grown local varieties of rice that have been cultivated for tens (perhaps even hundreds) of years. Many locally-named varieties — such as *Supa*, *Behenge*, *Kula na bwana*, *Kalarnata* and others — are well adapted to their physical and social environment, and their taste (commonly referred to as 'aroma') is very important to local consumers. Most farmers plant seeds saved from their own stock or obtained through exchanges with other farmers. Although well adapted to local conditions, the genetic yield potential of these commonly used cultivars is limited to 1—1.5 tonnes per acre (or 2.5—3.7t/ha).

A partial list of Tanzanian varieties includes:

1. Local cultivars: Kihogo, Red Selection No. 7, Naro fupi, Supa Utafiti, Rangimbili, Dakawa (medium altitude), Kalalu, Mwangza.
2. NERICA varieties for upland rice: 1, 3, 4, 7 and SWAB 450 in 2009 (and 13 in field evaluation). N.B. 'NERICA' = New Rice for Africa, developed by AfricaRice by crossing *Oryza sativa* (Asian rice) and *Oryza glaberrima* (African rice), the former being more productive, the latter more adapted to local conditions.
3. New varieties: IR 22 (medium/heavy yield, medium altitude), IR 54 (heavy yield, medium altitude), Katrin (heavy yield, medium altitude), IR 66, TXD-85 (non-aromatic, low-altitude), TXD-88 (non-aromatic, low altitude), TXD 220, TXD 306 ('Saro 5' — aromatic, irrigated), Kalalu (resistant to Rice Yellow Mottle Virus), Mwangaza (also resistant to Rice Yellow Mottle Virus), Dakawa (medium yield, medium altitude).
4. New lines: TXD-213, TXD-220, TXD-282, TXD-29.
5. IRRI introductions (2008): IRO5N 221 ('Komboka' = 'liberated', aromatic, capable of producing 6.5—7.0 t/ha, and maturing 5—7 days earlier than Saro 5); IRO3A 262 ('Tai' = eagle, non-aromatic, capable of producing 7.0—7.5 t/ha, and maturing 7—14 days earlier than Saro 5).

N.B. not all the above varieties are current and not all are necessarily released for use.

Research institutions try to develop varieties that are 'productive' and have good drought and disease tolerance. Farmers on the other hand, do not necessarily opt for 'economic' varieties. Tanzanian farmers tend to prefer varieties with a short to medium maturity period, that produce many tillers, mature uniformly, and produce long translucent aromatic grains for their own use and for selling. Breeding programmes in Tanzania should incorporate and address farmer-preferred attributes rather than breeding primarily for absolute maximum yields (especially when there is no strong farmer demand for that).

Market information

Linking farmers to markets is one of the keys to promoting agricultural growth and reducing poverty. The World Bank views enhanced smallholder competitiveness, facilitation of market entry, improved market access, and the establishment of efficient value chains as critical factors in agricultural development. Pillar 2 of the Comprehensive African Agriculture Development Programme (CAADP) is entitled 'Market Access' and most African governments, including Tanzania's, have been developing policies and programmes to link farmers to domestic, regional and international markets. Improving the quantity and reliability of agricultural data available to decision makers and stakeholders (including both public and private sector actors), are thus preconditions for formulating effective agricultural and rural sector investments that will allow farmers to access market opportunities.

Market data have been collected in Tanzania over many years but have seldom been put to good use (usually they are not used at all). The National Bureau of Statistics (NBS) is the main source of market data for Tanzania but the quality of its information remains a major concern. Many of the collected (and sometimes collated) data are inadequate, lack consistency (through time and between sources) and are full of gaps. Data collection is not embedded in the national psyche. There is inadequate responsibility for verification in order to establish accuracy at all levels. In addition, data are often not readily accessible to users for a variety of reasons and, if available, are not always put to optimal use as they are not presented in a timely manner, are not in the form required or are not disaggregated to appropriate levels.

There is increasing awareness of the need for accurate, consistent, timely and accessible market information. To address this, large-scale rice producers and traders in Tanzania have constructed their own intelligence networks. In addition, several international organizations have set up — or are in the process of setting up — Market Information Systems (MIS). Those relevant to the future of rice production include the MIS of:

- Foodnet — a partnership between IITA, CRS, ASARECA, Agricultural Cooperative Development International (ACDI) and Volunteers in Overseas Cooperative Assistance (VOCA).
- The Famine Early Warning Systems Network (FEWS NET) — funded by USAID, monitors trends in the prices of staple foods in those East African countries that are vulnerable to food insecurity. The FEWS NET price bulletin shows monthly prices for the current marketing year in selected urban centres. This allows users to compare current trends with five-year average prices (indicative of seasonal trends) as well as prices in the previous year.
- Regional Agricultural Trade Intelligence Network (RATIN) — a service provided by the Eastern Africa Grains Council (EAGC) which shows time-series data on prices, storage facilities, cross-border trade and food balances.
- ReliefWeb — a specialized service provided the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

These networks undoubtedly provide useful information on prices and trends but are not necessarily easy to access or use by small producers, the majority of whom continue to obtain their information from more traditional sources (such as neighbours, local traders, shops and markets). Inevitably, this means that producers remain price takers not price makers.

Transport

Rice is grown in many parts of Tanzania. The country is reputed to be well served by road and rail communications but this overstates the reality, and much of the Southern Highlands (like the major rice-producing areas elsewhere in the country) remain isolated from the trunk road system. The TAZARA line traverses the Southern Highlands but operates intermittently and is not considered a viable transport option by the major traders and wholesalers. Rice usually moves from production to consumption areas in 100-kg sacks (although increasingly it is packed in smaller ready-for-retail packs of up to 25 kg) on heavy transport and in lots of 16 tonnes to 32 tonnes (see Figure 26). Transport costs are computed as lump sums, and from Mbeya to Dar es Salaam or Arusha average about TSh 80/kg. Transport from Iringa to Dar es Salaam averages about TSh 60/kg.

Figure 26: Lorries being loaded with rice for transportation to consumption area (note the hand carts used for local urban deliveries)



International and Non-Governmental Organizations

There are opportunities for donors to cosponsor or cofund trials of new business models, as well as help develop and evaluate these models. The main steps would include designing, piloting, evaluating, improving, and implementing models, and increasing the scale of operations. There is already considerable donor and NGO activity in the rice sector (Table 11). Considering the size of the sector, however, the outreach of programmes is very limited, particularly in the Southern Highlands. The main donors include JICA, USAID, the Aga Khan Foundation (AKF), Oxfam GB, and the Swiss Agency for Development and Cooperation (SDC), through their Rural Livelihood Development Company (RLDC) programme. The Tanzania Staples Value Chain programme (NAFAKA) has a strong focus on rice especially in the Southern Highlands. Other donors or agencies operating in the sector include TechnoServe, EAGC, the UK's Department for International Development (DFID), and several local and international NGOs including ACDI/VOCA, Services Health and Development for People Living Positively with HIV/AIDS (SHIDEPHA) and the Voluntary Service Overseas (VSO).

In September 2013, the Bill & Melinda Gates Foundation and the Gatsby Foundation expressed interest in supporting the development of the rice sector in Africa as a whole and Tanzania in particular. The Gates Foundation has recently completed two major studies reviewing a) the rice value chain in several African countries and b) the development of the rice sector in Tanzania, with a view to investing in the sector. Support would be similar to that extended to the Competitive African Cotton Initiative and the African Cashew Initiative, i.e. working in partnership with private sector companies and obtaining 'seed funding' from major donors.

Table 11: Summary of donor and implementer activity in the rice sector in Tanzania

Initiative	Promoters and Implementers			Location (Region)
	Development partners	Public sector	Private sector	
Maize and rice	NAFAKA, ACDI/VOCA, USAID	MAFC, DALDOs	Various local companies	SAGCOT, Kiteto (Manyara), Kongwa (Dodoma), Kilombero and Mvomero (Morogoro) Zanzibar
Maize and paddy	TechnoServe, EAGC			Mbeya
Rice	AKF, DFID, VSO			Lindi and Mtwara
Rice	Oxfam GB, RUDI, SHIDEPHA			

Initiative	Promoters and Implementers			Location (Region)
	Development partners	Public sector	Private sector	
Rice	RLDC	ASA	ASAM VIWATA, ROKO Investment, GAKI	Manyara, Morogoro, Tabora, Singida, Shinyanga
Rice	JICA			MWI, MAFSCC Morogoro, Mbeya, Mwanza, Kilimanjaro, Tabora and Manyara
Rice	JICA			MEVT Arusha

Source: MMA, 2012 and JICA

JICA has been associated with rice development in Tanzania for around 30 years. The Kilimanjaro Agricultural Training Centre (KATC), established in the 1980s, offers specialized short courses in agriculture with an emphasis on improving irrigated rice. JICA, through KATC, provides two-week training courses for farmers from more than 40 irrigation schemes. Following training, the lead farmers become trainers on their own schemes, and practice what they preach through demonstration plots. JICA has experts in place at Ukiliguru, Mkindo and Ifakara MARTIs and at ARI-KATRIN providing technical support. Gender issues are an important element of JICA's approach. Testing and attempting to get certification for Nerica 4 rice on the mainland is also part of IICAs efforts to improve the rice sector (it has been officially released in Zanzibar after successful field testing).

The 'Food Security Implementation Plan' of USAID — which targets Morogoro, Dodorna, Manyara and Arusha Regions — has rice as one of its interventions. Proposals are in place to implement schemes in Dakawa and Kilombero that will closely cooperate with IITA in order to multiply and disseminate improved rice varieties. The plan has a total budget of US\$ 20 million. Funding has also been provided to KPL to develop a microfinance envelope for the provision of inputs to smallholders. Donors participating in these projects are able to link smallholders to private sector projects, which have the potential to provide long-term and sustainable improvements to smallholder incomes.

Oxfam GB provides no direct funding to local communities, but assists rice development in 30 villages in Kahama and Bokombe Districts (both in Shinyanga Region) under the Tanzania Agriculture Scale Up (TASU) programme. The targeted 6 000 households are expected to have increased incomes through increased productivity. The programme assists SACCOS and Savings and Internal Lending Communities (SILC); trains self-supporting producer groups to improve their knowledge, skills, confidence and team work; and helps set up processing companies. Oxfam also works on facilitating improvements through inexpensive technology, better soil and water efficiency, encouraging value addition, as well as learning and sharing with others through Farmer Field Schools (FFS), exchange visits and forums. Oxfam has adopted a value chain approach that encourages beneficiary contributions and also cooperates with private sector service providers and partners to implement.

AKF is assisting a rice development project in Lindi Region working on the M4P programme (Making Markets Work for the Poor). The World Bank's programme for strengthening agricultural productivity and growth in East Africa has approved US \$ 30 million for Tanzania. The programme will support Tanzania to establish a Regional Centre of Excellence for Rice that will aim to improving rice production by improving farmer's access to improved varieties, management practices and post-harvest technologies.

5. VISION AND STRATEGY FOR IMPROVED COMPETITIVENESS AND GROWTH

5.1 Vision

Rice is a major part of Tanzania's agricultural sector, and provides employment and food for the nation. It contributes to household incomes and boosts the national economy by contributing to agricultural and overall GDP. Although its performance is currently far from optimal, solutions to most of its problems are already known. If these solutions can be applied, the vision might be:

By 2025, a sustainable, environmentally-sensitive, more productive, competitive and profitable rice sector that will deliver increased output for internal consumption as well as for export, and contribute to reducing poverty, improving food security and providing a better quality of life for all Tanzanians

5.2 Strategic issues synthesis

Existing policies, strategies and programmes

The Tanzania National Rice Development Strategy has a number of components and strategic *foci* (Table 12). These are based on the main policy, strategy and programme activities organized and put in place by Government (Table 13).

Table 12: Components and strategic *foci* of the Tanzania National Rice Development Strategy

Component/Aim	Strategic Activities
To increase access of improved varieties and seed systems	<ul style="list-style-type: none">• produce basic and certified seeds;• strengthen seed distribution networks;• support on-farm seed production;• create farmer awareness of available rice seed varieties;• strengthen the capacity of public and private seed companies.
To improve fertilizer marketing and distribution	<ul style="list-style-type: none">• strengthen the capacity of agro-dealers to access input credits and agribusiness skills;• ensure proper use of inputs for increased rice production and productivity; and• produce and distribute inputs vouchers.
To increase irrigation and investment in water control technologies	<ul style="list-style-type: none">• rehabilitate traditional irrigation schemes;• construct new irrigation schemes; and• construct rain water harvesting and storage structures.
To increase access to — and maintenance of— agricultural equipment	<ul style="list-style-type: none">• promote agroprocessing of paddy and value addition technologies;• strengthen the capacity of post-harvest and rural agro-industries;• enhance access to (and use of) improved post-harvest processes, rural travel and transport, processing, storage and marketing technologies;• facilitate private sector investment in medium-scale processing.
To improve post-harvest management and marketing	<ul style="list-style-type: none">• promote warehouse receipt systems to ensure producers get better prices for their produce, earn more and have reliable sources of food and income;• establish strong, self-supporting producer groups in which members support each other to produce, process, package and market their rice;• build producers' knowledge, skills, and confidence to improve their bargaining power; and• establish wider links in the rice trade in order to compete in the regional and world market.
To improve research, the dissemination of technology and build capacity	<ul style="list-style-type: none">• conserve and use genetic resources;• manage soil health and fertility;• manage crop and protection options; and• promote advisory services (extension, NGOs and agribusiness).

Component/aim	Strategic Activities
To improve access to credit/agricultural finance	
Implementation	

Source: adapted from MAFC, 2009

Table 13: Existing policies, strategies and programmes of relevance to the rice value chain

Policy / Strategy / Programme	Launch year	Objectives / Areas of intervention
Tanzania Development Vision 2025 (TDV) See: www.tanzania.go.tz/vision.htm	In progress	The Tanzania of 2025 should be a nation imbued with five main attributes: high quality livelihoods; peace, stability and unity; good governance; a well-educated and learning society; and a competitive economy capable of producing sustainable growth and shared benefits. The vision aims to develop a diversified and semi-industrialized economy with a substantial industrial sector, macroeconomic stability, a growth rate of 8% per annum or more, and an adequate level of physical infrastructure. It aims to pursue fast growth while effectively reversing adverse trends, including the current loss and degradation of environmental resources (such as forests, fisheries, fresh water, climate, soils, biodiversity) and the accumulation of hazardous substances.
National Strategy for Growth and Reduction of Poverty II (NSGRP II or MKUKUTA, from its Swahili acronym) See: www.tz.ndp.org/docs/mkukutall draft.pdf	2005	Builds on four key fundamentals, and aims to: (i) efficiently use and develop the factors of production, including human capital/resources, (ii) strengthen and establish well-functioning institutions and markets, (iii) provide infrastructure, and (iv) ensure good economic governance. Builds on four strategic areas to: (i) provide targeted subsidies to selected food crops; identify and promote modern farm technologies; and provide support for the increased use of improved technologies for crop and livestock production; (ii) identify research activities; promote food storage technologies/facilities; enhance agro processing; and promote environmentally friendly technologies and practices especially in rural areas; (iii) improve road network connectivity to facilitate the flow of agricultural produce (outputs); and (iv) improve stock management and monitoring of the national food situation.
'Kilimo Kwanza' (Agriculture First)		Aims to accelerate agricultural transformation by fostering the modernization and commercialization of agriculture; mainstreaming Government planning processes; allocating sufficient resources; mobilizing increased investments; and mobilizing the private sector.
Agricultural Sector Development Strategy (ASDS)	2001	Aims to create an enabling environment for improving agricultural productivity/profitability and farm incomes, thereby contributing to reducing rural poverty and ensuring household food security. It focuses on productive and gainful agriculture: subsistence agriculture must become profitable smallholder agriculture, and the spotlight must switch from public institutions to farmers and agribusinesses.

Policy / Strategy / Programme	Launch year	Objectives / Areas of intervention
Agricultural Sector Development Programme (ASDP)	??	Provides the government with a sector-wide framework for overseeing the institutional, financial and investment development of the agricultural sector. Aims to enable farmers to better access (and use) agricultural knowledge, technologies, and market infrastructure, all of which contribute to increased productivity, profitability and income, and thereby enhance food security. At a district level these interventions are implemented through District Agricultural Development Plans (DADPs) and based on the target communities and the agreed district development priorities. The ASDP aims (among other things) to promote increased control of resources by beneficiaries, pluralism in service provision, and resource transfer based on the evaluation of its efficiency.
Integrated Industrial Development Strategy (IIDS 2025)	??	Provides guidance for the implementation of the Sustainable Industrial Development Policy's (SIDP) 2020 objectives — in the prevailing economic environment — and for the realization of the targets of the TDV 2025. Aims to build internationally competitive business environments, promote enterprises and make the industrial sector an engine of economic growth. It also promotes agricultural development-led industrialization to support the successful implementation of Kilimo Kwanza and ensure the equitable growth of the regions.
Agricultural Marketing Strategy (AMS)	??	Contributes towards the attainment of TDV 2025, NSGRP, Kilimo Kwanza and the Millennium Development Goals (MDG5). The strategy aims to promote a competitive, efficient and equitable agricultural marketing system, including supporting the availability of international accredited laboratories and testing equipment for the introduction and monitoring of appropriate quality standards.
Rural Micro, Small and Medium Enterprise Programme	??	Supports agricultural and agro-industrial development in six target regions (the Coast, Tanga, Manyara, Mwanza, Iringa and Ruvuma). One important contribution of this programme is the provision of information to poor rural entrepreneurs in value chain coordination.
The Southern Agriculture Growth Corridor of Tanzania (SAGCOT)	Not yet launched	Aims at attracting private investment into agriculture in ways that are socially and environmentally responsible. Addresses constraints related to uncertain policy environments, the development of private and public partnerships and availability of affordable and long-term finance. Investments are promoted along the trade routes which link Tanzania to Zambia (serving, within Tanzania, the Coast, Morogoro, Iringa, Rukwa and Mbeya regions). Focuses on discrete geographical areas ('clusters') within the corridor where there are opportunities to establish a critical mass of profitable small and large operators.

Source: 3ADI, 2011

SWOT analysis

Strengths	Weakness
<ul style="list-style-type: none"> • There is strong demand for local aromatic varieties; • Tanzania's climate, soil and water are suitable for rice; • Large-scale producers with outgrower schemes offer good opportunities to increase efficiency and produce higher outputs; • High-yielding varieties are available with the desired producer and consumer traits; • There is strong support from the international community (JICA, USAID, RLDC/SDC, etc.) and international research institutes (CGAR centres); • The Government is committed to rice development (supporting a Centre of Excellence, NRDS etc.). 	<ul style="list-style-type: none"> • Yields are currently low as a result of the widespread use of local varieties and the limited uptake of technologies; • Intensive labour is needed because of low mechanization; • There is inadequate storage in rural areas (WRS); • The value chain is fragmented and only weakly developed: it operates on a 'supply push' not a 'demand pull' basis; • There is limited added value (branding, grading, traceability, use of hulls/bran etc.); • There is a lack of trust in business transactions, and little respect for formal contracts; • There are inadequate road services in remote areas leading to high transport costs over long distances; • Outdated milling equipment is unable to provide accurate quality grading; • There is limited research and extension on varieties and agronomy; • There is extremely limited access to finance and credit; • There are inadequacies in data collection and use, as well as market information; • There is limited producer representation (e.g. farmers' groups, associations and cooperatives); • Government bureaucracy leads to the slow implementation of positive policies.
Opportunities	Threats
<ul style="list-style-type: none"> • There is huge and increasing internal demand, especially for preferred varieties; • A young and increasingly affluent population will add further demand; • There is strong external demand for Tanzanian rice in neighbouring countries; • There is the opportunity to vastly increase Tanzania's output through the use of technology (improved seed, fertilizer, crop health products, water management etc.); • There is the opportunity to add value to basic products through differentiation; • There is the opportunity to organize segments of (or indeed the whole) value chain into groups and associations in order to strengthen and empower; • Agricultural is national priority - 'kilimo kwanza' (agriculture first). 	<ul style="list-style-type: none"> • Inability of seed agencies (ASA and private) to provide adequate quantities of new generation seeds; • High interest rates and an unstable macroeconomic environment (fluctuating exchange rates and inflation); • Climate change may affect some aspects of production; • Rice diseases are universally present and possibly increasing; • Imports have a negative effect on local primary production and value added processing • Frequent policy changes (including export bans and import tariffs) reduce confidence (in both internal and external markets) in Tanzania as a reliable partner.

5.3 Value Chain Competitiveness Strategy

Strategic interventions could improve the competitiveness of the value chain. These include:

- improving knowledge, skills and information throughout — and before — the chain (e.g. promoting agriculture in schools, producer training, business training etc.);
- promoting and strengthening groups and associations from primary producers through to retailers to encourage vertical and horizontal integration and to provide the industry with a 'voice';
- improving existing — and providing new — physical infrastructure to support the growth of profitable agriculture and to generate employment;
- developing, deploying and retaining equitable human resources especially in research and extension services;
- promoting and adopting science and technology including research and development for high-quality, palatable and nutritious food;
- strengthening and introducing investment in infrastructure (including for farm and small/medium enterprise level agroprocessing);
- collecting, collating and disseminating transparent market information including volumes of trade and prices;
- promoting fair and competitive farmgate prices;
- strengthening the links between farmers and markets as well as (higher up the chain) between domestic, regional and global markets;
- promoting private sector investment and encouraging public-private partnerships (although great faith is placed on privatization and private sector investment it is not a panacea);
- increasing the amount — and improving the quality of — value added processed products;
- ensuring that Tanzania's rice products are produced (and can be verified as having been produced) to international standards of food and product safety;
- facilitating access to finance and credit including links to capital and short-term markets and introducing insurance for crop failure;
- mitigating and adapting to the effects of climate change (research programmes to improve existing and develop new technologies);
- promoting measures to cushion producers from the effects of drought and strengthen the Famine Early Warning System (FEWS);
- ensuring that land tenure arrangements for both traditional producers and those wishing to invest in large-scale production are favourable to long-term investment; and
- implementing the National Strategy on Agriculture and HIV/AIDS to support increased production.

5.4 Proposed Strategy Components

Strategic areas that need to be addressed include:

- sustainable use of land, water and natural feed resources;
- public, private and public/private sector investment and financing;
- improvement of productivity, and efficiency of production, marketing and processing;
- rendering support services more effective (e.g. through research, extension, training and dissemination of information);
- general capacity building and empowerment all along the chain;
- chain governance, regulatory and institutional arrangements; and
- cross-cutting and cross-sectoral issues.

Interventions should be designed as an integral part of the country's participatory processes and fit within the general framework of the current policies, strategies and programmes for agriculture and rural development (see Table 12). Further consultations will be needed with a broad range of

stakeholders before any progress can be made. However, there are four strategies (Table 14) that need immediate attention if the rice sector is to fulfil — in an effective and timely manner — its full potential.

Table 14: Components of a strategy to improve the performance of the Tanzanian rice sector

Strategy	Rationale	Tactics, aims and operations
Increase rice production	<p>The strategy will:</p> <ul style="list-style-type: none"> (i) respond to increased demand (both local and export); (ii) increase competitiveness and profitability; (iii) manage and disseminate knowledge 	<p>(1) Support trading company and large private sector company interventions that focus on production and processing:</p> <ul style="list-style-type: none"> • Increase irrigated production; • Increase private sector investment particularly from investors with strong corporate social responsibility credentials who are willing to include smallholder outgrower schemes in their business model; • Commercially focus research and development and increase the availability of seeds of improved cultivars; • Develop smallholder outgrower schemes and provide a range of services; • Review existing business models and develop new and improved models. <p>(2) Smallholder interventions:</p> <ul style="list-style-type: none"> • Improve inputs (high-yielding varieties + matched fertilizer), supply, adoption and specific planting and weeding technologies as a package (this approach is supported by IRRI research in Tanzania, and RiceCheck's experience in Australia, and is the key to increasing yields); • Mechanize production; • Train farmers and develop skills as part of outgrower schemes or separately (e.g. through RUDI). Skills and training can include technical production, business skills, contracting 'action learning' etc.; • Promote block farms for greater efficiency; • Work as a group for extension, to facilitate learning as well as the adoption of new technologies; • Form smallholder producer groups to negotiate with private companies in relation to outgrower schemes; • Promote easier access to finance and credit (including insurance)
Increase rural storage	<p>The strategy will:</p> <ul style="list-style-type: none"> (i) overcome the need to sell paddy at harvest when prices are lowest; (ii) smooth out price fluctuations within the year; (iii) provide a clear picture of the amount of stored paddy and help address food security concerns; (iv) prevent theft and losses due to vermin; (v) WRSs allow smallholders to be paid up to 60 percent of their paddy value in advance of sales. 	<ul style="list-style-type: none"> • Provide community based grain storage (promoted via the development of associated credit schemes which use stored grain as collateral). (This is not a WRS in the strictest sense but can provide many of the same benefits since it stores farmers' grain and provides credit); • Provide commercial grain storage (this is currently not available in Tanzania. In other countries, it is provided by industry cooperatives or the private sector. It is an investment with a slow rate of depreciation and can be financed by long-term capital); • Report the stored grain volumes to improve management; • Expand the use of WRS.

Strategy	Rationale	Tactics, aims and operations
Improve the functioning and performance of the value chain and marketing	<p>(i) The rice sector is not vertically integrated, supply driven or transaction-based. It operates on an informal basis without contracts;</p> <p>(ii) it is vital that domestic and export markets are developed as production increases;</p> <p>(iii) there is a need to increase value added.</p>	<ul style="list-style-type: none"> • Large private sector companies have the ability to transform the value chain over time due to their size. They may move 'downstream' to take on additional chain functions such as milling/processing and distribution to wholesalers. • Train stakeholders in value chain management; • Undertake consumer research (to understand consumers and their preferences, including how, where and how often purchases are made, in order to provide the basis for a more focussed approach to develop the domestic market development, including segmentation, branding and other value adding approaches). • Train to build trust and understanding among stakeholders including of the advantages of contracting business transactions along the chain (this requires a long-term approach and the participation of many stakeholders; changes in attitudes and behaviours are needed since informal transactions add costs to the chain); • Promote an understanding of regional export markets, competition, customer preferences and the need for market development.
Form and industry wide body or alliance	With the possible exceptions of TARIPA and FAO's Rice Working Group there is no formal industry-wide body involving all stakeholders in the value chain, focussing on the strategic development of the rice sector, and engaging the Government on policy issues affecting the sector.	Scope the need for — and role of — an industry-wide body or alliance. This should focus on industry development issues (including evaluating new cultivars, conducting research, developing infrastructure, addressing funding, contributing to government policies that affect the rice sector and raising funds for the body itself).
Enhance the business enabling environment	The business environment needs to be attractive for the successful and profitable operation of the rice sector and all those operating within it (whether smallholder farmers, SME services or large private operators involved in production, milling and distribution).	The Tanzania Policy Project (SERA) of USAID, the World Bank and other donors are already actively involved in providing advice on these issues to the Government.

TUTAFANYA NINI? WHAT FAO CAN DO

It is necessary to be realistic about what can be achieved and delivered in the rice sector in Tanzania. The focus should be on implementing a small number of strategic priorities that will make a real difference.

A strong private sector is required. This is consistent with both 'kilimo kwanza' and the SAGCOT initiative. The private sector can allocate resources to deliver more accountable, commercial and market-focussed outcomes, and can deliver better, more sustainable outcomes for the rice sector than the government can alone.

The Government-determined policies, which create an enabling environment, are obviously critical. Other development parties (including USAID's SERA project) are already strongly involved in this area, however, and there is thus a limited policy role for FAO.

It is unlikely that the present number of farmers in Tanzania can be maintained. World experience shows the number of farmers reducing over time, with fewer farmers cultivating individually larger areas. Larger farms will become more mechanized and will adopt new technologies in order to become more competitive. Agriculture is already the 'default setting' for Tanzania's youth, yet more and more young people are leaving the land to move to the city. This is happening in many other developing countries, where there is a lack of value added activities (and therefore products) in rural areas and a weak manufacturing base in urban areas.

The models and approaches incorporated into a rice development strategy must not maintain the *status quo*. One business model will not fit every situation. A number of different models have been successful in other countries and these need to be critically examined and (if found suitable) promoted and adopted.

Wherever possible, interventions should be linked to the market and not just applied in isolation as a single item.

The role played by FAO (and the programmes it undertakes or promotes) needs to be part of a broader collaborative approach working with the private sector, service providers, donors and those Government entities that are committed to a strong private sector focus. FAO must also identify the unique institutional skills and qualities it can bring to agricultural development.

FAO has considerable experience in training and a strong understanding of agroindustry business models in developing countries. In view of this, it is recommended that FAO's focus in Tanzania should be on training and research. Specifically it is advised that FAO should support training that:

- develops the skills of smallholders in topics from agriculture to business management and including contracting. (A 'training needs analysis' needs to be undertaken before finalizing the programme but it should incorporate 'action learning' so that training is linked to operations in the field, farming as a business and the market);
- builds stakeholder capacity in value chain management (for example, using the practical 'Walking the Chain' approach utilised in developing countries to introduce value chain thinking in agrifood chains (see Collins and Sun 2012 in Annex 4); and
- builds trust and greater understanding among stakeholders of the advantages of contracting business transactions along the chain.

In addition to training, it is advised that there should be consultancy studies to research critical issues related to agroindustry development. In order of priority, it is advised that there is a need to:

- review smallholder outgrower schemes in other sectors and countries, develop solutions to current bottlenecks, and consider new outgrower business models that may be applicable to Tanzania's rice sector based on schemes elsewhere;
- review how to increase grain storage in rural areas (drawing on experiences elsewhere), and develop a plan for action;
- conduct a scoping study to identify value adding opportunities, and recommend how these can be implemented, especially in rural areas; and
- conduct research in Dar es Salaam on consumer rice preferences (including how, where and how often consumers purchase rice) in order to provide a more focussed approach to domestic market development including market segmentation, pack size, branding and other approaches to adding value. (It is important to understand what consumers value. The study should be undertaken in close consultation with the major private rice producing companies and could be undertaken as part of a higher academic degree.

ANNEXES

Annex 1. Stakeholders met

Half-day forum with FAO rice working group participants, August 2012:

- Ntimi Mwakinyuke, Association of Kilombero High Quality Rice growers
- Julius Wambura, Frabho Enterprises
- Said H. Mpombo, MAFC
- Josiah Nyato, Mtenda Kyela Rice Supply Company
- Abel Lyimo, RUDI
- Stephen Kijazi, the Royal Norwegian Society for East and Southern Africa
- Alex Mkindi, Sera Project
- Tertula Swai, Tanzania Private Sector Foundation
- Latiffa A. Kigoda, Tanzania Investment Centre

Other stakeholders consulted, follow up meetings held with working group members, and infrastructure visited:

- Joel Strauss, Tuboreshe Chakula Project, USAID
- Martin Mason, Nafaka, USAID, Morogoro
- Donald, Booz Allen Hamilton, Sera Project, USAID
- Jeffrey Lewis, Co-Founder of TAP
- Ntimi Mwakinyuke, Akirigo, Kilombero
- Elia Shemtor, Extension Officer, TAP, Ifakara
- Mrs Calorine Chelele, small holder rice grower, Ifakara
- Abel Lyimo, RUDI, Dar es Salaam
- Small rice mill in Ifakara with USAID upgrade
- Renovated warehouse in Ifakara with donor upgrade
- Carter Coleman, Director, KPL, Mngeta
- Graham Anderson, Director, KPL, Dar es Salaam
- Thobias Sijabaje, SRI Manager, KPL, Mngeta
- Robert Kivwya, Extension Officer, KPL, Mngeta
- Inspection of KPL farm and rice mill, Mngeta
- Public meeting of 60 smallholder rice growers in Mngeta village
- Jennifer Baarn, Deputy Chief Executive, SAGCOT
- Raymond Wigenge, Foods and Drugs Authority
- Twalib Njohole, MAFC (seed policy)
- Bureau of Standards
- Julius Wambura, Frabho Enterprises
- Julian Camoleonte, Yara international
- Sura Ngatuni, Fidelis Temu and Nicolaus Kaserwa, WLB
- David Rohrbach, World Bank
- Kees Verbeek, NMB
- Prosper Nambya and Richard Makungwa, NMB
- Dr Jonne Rodenberg, AfricaRice Tanzania Station
- Homma Minoru, Japan International Cooperation Agency (JICA)
- Dnesmo Mbele, MIT
- Rosemary Lameck, rice wholesaler, Tandika market, Dar es Salaam
- Street markets retailing rice in Dar es Salaam
- Shrijees Supermarkets in Dar es Salaam
- Latiffa A. Kigoda, Tanzania Investment Centre

- Katrine Plesner, TARIPA Coordinator, NAFAKA - Staples Value Chain Activity
- ACDI-VOCA /USAID Contractor for 'Feed the Future'

N.B. During 'phase 2' many additional stakeholders were met: these are listed in the corresponding annex of the soybean value chain study.

Annex 2. Documents consulted

3ADI. 2011. *Value Chain Support Program for Development of the Red Meat/Leather Industry in Tanzania*. United Nations Industrial Development Organization: Dar es Salaam.

ACT. 2010. *Value Chain Analysis of Rice and Maize in Selected Districts in Tanzania: Volume I: Introduction, Context Analysis and Recommended Way Forward*. Final Report. Agricultural Council of Tanzania and Tanzania Agriculture Partnership. Study undertaken by Match Maker Associates.

AFMA. 2011. *Asian Rice 2011 — Proceedings of the Workshop on Modernizing the Asian Rice Industry*, 16–17 February 2011 Bangkok, Thailand. Agricultural and Food Marketing Association for Asia and the Pacific.

AfricaRice. 2011. *Boosting Africa's Rice Sector: A Research for Development Strategy 2011–2020*. Africa Rice Centre, Benin.

www.africarice.org/publications/StrategicPlan/AfricaRice_Strategic_Plan_2011-2020.pdf

Anderson, G. 2012, Personal communication.

ASDP. 2011. *Agricultural Sector Development Programme Performance Report, 2009/10*. Final draft. The United Republic of Tanzania.

Barrett, C. 2007. *Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa*. Paper presented at FAO workshop on Staple Food Trade and Market Policy Options for Promoting Development in Eastern and Southern Africa, Rome, March 1–2, 2007.

BMGF. 2012a. *Overview of the Rice Value Chain in Burkina Faso, Ghana, Mali, Nigeria, Ethiopia, Tanzania, and Uganda*. Bill and Melinda Gates Foundation.

BMGF. 2012b. *Developing the Rice Industry in Africa: Tanzania Assessment*. Bill and Melinda Gates Foundation.

Binswanger-Mkhize, H. & Gautam, M. 2010. *Towards an Internationally Competitive Tanzanian Agriculture*. A World Bank Draft Report, Dar es Salaam.

Borna, F. 2012. Personal communication on behalf of RUDI (Rural Urban Development Initiatives) Tanzania (www.ruditz.org).

Bucheyeki, T., Shennkalwa, E., Kadadi, D. & Lobulu, J. 2011. 'Assessment of Rice Production Constraints and Farmers Preferences in Nzega and Igunga Districts.' in *Journal of Advances in Developmental Research* 2 (1) 2011: 30–37.

Coleman, C. 2012. Personal communication.

Collins, R. & Sun, X. 2012. *Walking the Chain: Training Stakeholders from Developing Countries in Agrifood Supply Chain Management*. Paper presented at IFAMA 2012 Annual World Symposium, June 11–12, 2012, Shanghai, China.

www.ifama.org/events/conferences/2012/cmsdocs/Symposium/PDF%20Symposiurn%20Papers/566_Paper.pdf.

Coulson, A. & Diyamett, B. 2012. *Improving the Contribution of Agricultural Research to Economic Growth: Policy Implications of a Scoping Study in Tanzania*. Working Paper 12/0093 February 2012. International Growth Centre, London School of Economics and Political Science, UK.

Da Silva, C., & de Souza Filho, H. 2007. *Guidelines for Rapid Appraisals of Agrifood Chain Performance in Developing Countries*. Agricultural Management, Marketing and Finance Occasional Paper 20. Food and Agricultural Organization of the United Nations, Rome.

De bruin, A., Cinderby, S., Stein, C., Kongo, V. & Barron, J. 2011. *Opportunities for Agricultural Water Management Interventions in the Mkindo Watershed in Tanzania*. Stockholm Environment Institute, Sweden (<http://awm-solutions.iwmi.org/Data/Sites/3/Documents/PDF/publication-outputs/learning-and-discussion-briefs/opportunities-for-awm-interventions-in-the-mkindo-watershed.pdf>).

Delgado, C., Minot, N. & Tiongo, M. 2005. 'Evidence and Implications of Non-Tradability in Food Staples in Tanzania,' in *Journal of Development Studies* 41 (3) (April): 376 —393.

Duwayri, M., Tran, D. & Nguyen, V. 2000. 'Reflections on Yield Gaps in Rice Production: How to Narrow the Gaps,' in *Bridging the Rice Yield Gap in the Asia Pacific Region*, FAO RAP Publication 2000/16 (www.fao.org/docrep/003/x6905e/x6905e00.htm#Contents).

Eskola, E. 2005. *Agricultural Marketing and Supply Chain Management in Tanzania: A Case Study*. Working Paper Series No. 16. ESRF Study on Globalization and East African Economies. Economic and Social Research Foundation, Dar es Salaam (www.esrftz.org).

FAO. 2012. *FAO Statistical Year Book*.

Feed The Future. 2011. *Tanzania: FY 2011 —2015 Multi-Year Strategy*. U. S. Government.

IRRI. 2012, International Rice Research Institute (www.irri.org).

Issa-Zacharia, A. 2012. *Draft Survey Report on the Appraisal and Perspectives of the Technical Systems of Rice Processing in Tanzania*. Food and Agricultural Organization.

Kikoka, L. 2012. *Overview of Rice Subsector in Tanzania*. NAFKA Staples Value Chain Project in Tanzania. USAID Feed The Future.

Lwezaura, D. Madula, R. Nduunguru, A. Paul, C. & Chalamila, B. 2011, *Baseline Survey Report*. Regional Rice Centre of Excellence, East African Agricultural Productivity Program (EAPP), 46pp.

Lyimo, A. 2009, *Warehouse Receipt System*. RUDI experience. Presentation to ESAANET Meeting, Nairobi.

MAFC. 2009, *National Rice Development Strategy — Final Draft*. Ministry of Agriculture, Food Security and Cooperatives, United Republic of Tanzania.

MAFC. 2012. *Rice Regional Centre of Excellence Communication Strategy*. East African Agricultural Productivity Programme. Ministry of Agriculture, Food Security and Cooperatives, United Republic of Tanzania.

MMAL. 2012. *Scoping Study on Value Chain Initiatives and Studies in Tanzania for Irish Aid and DANIDA*. Study undertaken by Match Maker Associates Limited. Final Report.

Minot, N. 2010. *Staple Food Prices in Tanzania*. International Food Policy Research Institute, Washington DC. Paper prepared for Comesa policy seminar on 'Variation in Staple Food Prices: Causes, Consequence, and Policy Options,' Maputo, Mozambique, 25—26 January 2010.

Mitchell, D. 2012. Personal communication.

Msami, J. 2011. *Developing Value Chains for Sustainable Grains Production and Market Access in Tanzania*. Paper presented at the 4th African Grain trade Summit, Kampala, Uganda.

Nakano, Y. & Kajisa, K. 2012b. *How does the Adoption of Modern Variety Increase Productivity and Income?: A Case Study of the Rice Sector in Tanzania*. Selected paper prepared for presentation at the Agricultural and Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, Washington, August 12 —14, 2012.

Nakano, Y. & Kajisa, K. 2012a. *The Determinants of Technology Adoption: A Case of the Rice Sector in Tanzania*. International Rice Research Institute. Poster presentation at the International Association of Agricultural Economists Triennial Conference, Foz do Iguacu, Brazil, 18—24 August 2012.

NBS. 2007. *Results of the 2002—03 National Agricultural Sample Census: Volume II*. National Bureau of Statistics, Ministry of Agriculture and Food Security, Ministry of Cooperatives and Marketing, and Ministry of Livestock: Dar es Salaam.

NBS. 2012. *National Sample Census of Agriculture 2007/08: Volume IV, Large Scale Farms*. National Bureau of Statistics, Ministry of Agriculture and Food Security, Ministry of Cooperatives and Marketing, and Ministry of Livestock: Dar es Salaam.

Nishiura, A. 2010. 'The Food Industry and Supermarkets in Eastern Africa: A Preliminary Report on Research in Tanzania and Ethiopia', Chapter 2 in Fukunishi (ed.), *African Producers in the New Trend of Globalisation: An Interim Report*, Chosakenyu Hokousho, Institute of Developing Economies.

MWI. 2009. *Draft National Irrigation Policy*. Ministry of Water and Irrigation, United Republic of Tanzania.

Pauw, K. & Thurlow, J. 2011. *The Role of Agricultural Growth in Reducing Poverty and Hunger: The Case of Tanzania*. Downloaded on 9 September 2012 from www.ifpri.org/sites/default/files/publications/2020anhconfbr21.pdf.

Reardon, T., Barrett, C., Berdegue, J., & Swinnen, J. 2009. 'Agrifood Industry Transformation and Small Farmers in Developing Countries,' in *World Development* Vol.37, No.11, pp.1717 —1727.

RLDC. 2009. *Rice Sector Strategy. Improving rice profitability through increased productivity and better marketing focusing on Tanzania's Central Corridor*. Rural Livelihood Development Company: Dar es Salaam.

Rohrbach, D. 2012. Personal communication.

SAGCOT. 2011. *SAGCOT Investment Blueprint, Appendix IV Value Chain and Market Analysis*. Southern Agricultural Growth Corridor of Tanzania: Dar es Salaam.

Schwab, K. 2012. *The Global Competitiveness Report 2011 —2012*. World Economic Forum.

Seale, J. Regmi, A. & Bernstein, J. 2003. *International Evidence on Food Consumption Patterns*. TB — 1904. Economic Research Service, United States Department of Agriculture.

Shemtoi, E. 2012. Personal communication. Tanzania Agricultural Partnership (TAP) District Coordinator YPERLINK' <http://www.tap.or.tz/index.html>

Shyers, C. 2010. *The Marketing Management Training Needs of Tanzanian Small/Medium Sized Food Processors*. Report for Small and Medium Enterprise Competitiveness Facility (SCF) by M.U.U. Consult Co. Ltd., Dar es Salaam.

SIDO. 2009. *Consultancy Services to Study, Diagnose and Recommend Value Chains and Concomitant Support Activities*. Small Industries Development Organization: Dar es Salaam (Price Waterhouse Coopers).

Sijabaje, T. 2012. Personal communication.

SIPA. 2010. *Food Security in Tanzania: Seven Original Concept Papers*. Booz Allen Hamilton/Columbia SIPA Capstone Workshop. School of International and Public Affairs (SIPA), Columbia University, New York.

SRI—RICE. 2012. *System of Rice Intensification (SRI)*. SRI International Network and Resources Center (SRI—RICE), Cornell University, Ithaca (www.sri.ciifad.cornell.edu).

Stryker, D. & Amin, M. 2012. *Study of Policy Options for Increasing Tanzanian Exports of Maize and Rice (Draft) — Improving Food Security to 2025*. USAID Feed the Future contracted project to AIRD.

Sutton J. & Olomi D. 2012. *An Enterprise Map of Tanzania*. International Growth Centre: London.

Tanzania Daily News. 2012, 'Tanzania: Agriculture Needs Rebranding to Attract More Youth — Minister,' in *Tanzania Daily News*, 31 October 2012.

Thirkildsen, O. 2011. Policy Making and Implementation in Agriculture: Tanzania's Push for Irrigated Rice. DIIS Working Paper 2011:26. Danish Institute for International Studies.

USAID. 2010a. *MicroCLIR/CIBER ASSESSMENT. The Legal, Policy, Regulatory and Institutional Constraints to the Growth of Maize and Rice in Tanzania*. AGENDA FOR ACTION.

USAID. 2010b. *Tanzania — Strategic Review*. Feed the Future.

Weatherspoon, D. & Reardon, T. 2003. 'The Rise of Supermarkets in Africa: Implications for Agrifood Systems and the Rural Poor,' in *Development Policy Review*, 21 (3), 17pp.

World Bank. 2009. *Accelerated Food Security Program of the United Republic of Tanzania under the Global Food Crisis Response Program — Emergency Program Paper*. The World Bank, Washington DC.

World Bank. 2011a. *Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa*. Report Number 60371 — AFR. The World Bank, Washington, DC.

World Bank. 2011b. *Doing Business 2012: Doing Business in a More Transparent World*. The World Bank, Washington, DC.

Zungo, M. 2011. *Analysis of Spatial Price Difference of Major Staple Foods in Tanzania: A Case of Rice — Dar es Salaam city and Morogoro Municipality*. Downloaded on 9 September 2012.
<http://www.scribd.com/doc/87191340/Analysis-of-spatial-price-difference-of-major-staple-foods-in-Tanzania-A-case-of-Rice-Dar-es-Salaam-city-and-Morogoro-Municipality>

Annex 3. CGIAR centres with an interest in rice in Tanzania

CGIAR Centre	Main headquarters location	Regional headquarters location
International Rice Research Institute (IRRI)	Los Baños, Laguna, Philippines	Mikocheni, Dar es Salaam
Africa Rice Centre (formerly West African Rice Development Association, WARDA)	Bouaké, Côte d'Ivoire	Mikocheni, Dar es Salaam
International Water Management Institute (IWMI)	Battaramulla, Sri Lanka	
International Institute of Tropical Agriculture (IITA)	Ibadan, Nigeria	Kampala; Dar es Salaam
International Center for Tropical Agriculture (CIAT)	Cali, Colombia	Kampala
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	Hyderabad (Patancheru), India	Nairobi
International Food Policy Research Institute (IFPRI)	Washington, D.C., USA	Kampala
Association of Agricultural Research in East and Central Africa (ASARECA)	Kampala, Uganda	Kampala

Annex 4. Steps involved in rice production

The key steps involved in rice production (IRRI 2012) are:

Seed selection	choosing a variety suitable to the environment it will be grown in and ensuring the seed of that variety is of the highest quality is the first essential step in rice production.
Land preparation	the aim of land preparation (ploughing and harrowing) is to get the soil in the best physical condition for crop growth and to ensure the surface is level to reduce water wastage.
Crop establishment	the two main practices of establishing plants are transplanting and direct seeding.
Water management	rice is extremely sensitive to water shortages, so sound management practices are needed to use water wisely and maximize yields.
Nutrient management	
Crop health	rice has a wide array of 'enemies' that must be managed including rodents, harmful insects, viruses, diseases and weeds with the last being controlled by the hoe or chemicals.
Harvesting	the process of collecting the mature rice crop from the field is called harvesting — this can be done manually or mechanically. Depending on variety, a rice crop usually matures between 115 and 120 days after establishment (activities include cutting, stacking, handling, threshing, cleaning and hauling). Good harvesting methods help maximize yield and minimize damage and deterioration. Manual harvesting is common in Africa and Asia and involves cutting the rice crop with simple hand tools like sickles and knives: this requires between 40 and 80 person-hours per hectare plus additional labour to manually collect and haul the crop. Mechanical harvesting — using reapers or combine harvesters — is not so common due to the availability and cost of machinery.
Threshing	Following harvesting, rice must be threshed (to separate the grain from the stalk) and cleaned (this can be done by hand or machine).
Postharvest	After harvest the rice grain (paddy) undergoes a number of processes include drying, storing, milling and processing: Drying is the process that reduces the grain moisture content to between 18 and 22 percent, which makes it safe for storage.

Drying is done outside on mats, making use of sunshine or artificially-heated air. Drying is the most critical step after harvesting for a rice crop; delays, incomplete or ineffective drying reduce grain quality and quantity.

Storing until the grain is required to be milled for sale or for household consumption. Good storage reduces loss due to weather, moisture, rodents, birds, insects, microorganisms and theft.

Milling is a crucial step in the postharvest process, the basic objective being to remove the husk and the bran layers and produce an edible, white kernel that is free from impurities. Milled paddy represents about 65 percent by weight of the unmilled grain.

Annex 5. A brief survey of marketing and market price of rice, August – September 2013

Preface

There is a general consensus that too little is known about the operation of the rice marketing system in Tanzania. As a contribution to a better understanding of the system, FAO's Southern Highlands Food Systems Programme (SHFS) agreed to mount a limited study of rice marketing and rice markets. This limited study was carried out in parallel with a study of the soybean value chain in August and September 2013 and after the main study of the rice value chain had been undertaken in July and August 2012 (see main report). In addition to the field-work — which included interviews with producers, traders, millers, wholesalers, retailers and consumers — a period of six working days was allotted to writing up the results.

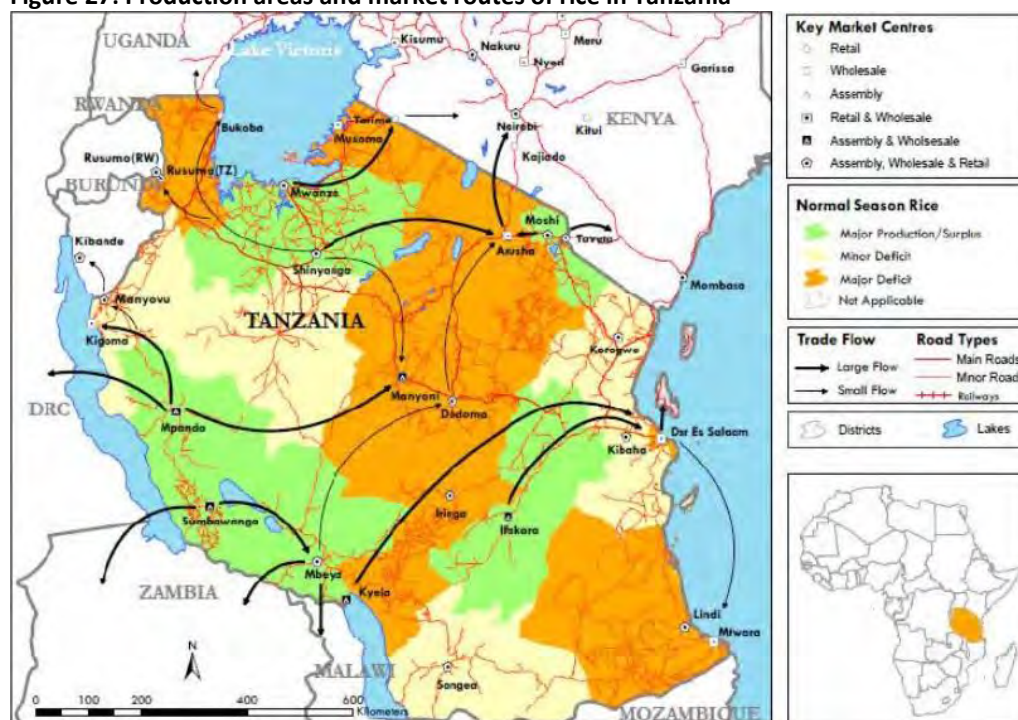
The Terms of Reference were reduced from those of a much more ambitious study proposed by the World Bank and one of the large private companies operating in the rice sector (Appendix A). Following discussions with a limited number of stakeholders in Dar es Salaam the questionnaire was modified in an attempt to provide the maximum amount of information possible in the restricted time (Appendix B). In addition to enquiries by Trevor Wilson (assisted by Joan Kimirei, National Consultant, and Peter Jimbuka, FAO Driver) information from Ifakara was obtained through the assistance of KPL, and in Morogoro through the assistance of NAFKA.

Introduction

Rice (paddy) is grown throughout the country (see Figure 27). About half of all production is, however, concentrated in Morogoro, Shinyanga and Mwanza Regions. Other important areas of production are Rukwa and Mbeya Regions with Kilimanjaro Region being of lesser importance. All other regions are, to varying degrees, deficit areas. It is estimated that some 30 percent of total production is consumed in — or close to — the production area and that 70 percent is moved to areas of consumption. Dar es Salaam is the dominant recipient of rice in the country, followed by Arusha and Zanzibar. Small amounts of rice are exported from the main producing areas to neighbouring countries.

Rice is grown by 16 percent of Tanzanian farmers. Some 99 percent of production derives from smallholders. Some smallholders (an increasing proportion) are participants in outgrower schemes organized by large-scale producers, which are the privatized inheritors of failed former state farms. The National Sample Census of Agriculture 2002/2003 indicated that rice was grown on 5 439 hectares (ha) on 194 large-scale farms and produced a total of 11 453 tonnes. This implies that the average area of large-scale farms was about 28 ha and the average yield was 2.1 tonnes per hectare. The price of rice throughout the chain varies within and between years as a result of production factors, the seasonality of production and the national economic situation. In 2010, production was estimated at about 1.2 million tonnes of paddy or 800 000 tonnes of milled rice: the latter figure was almost twice as much as the 450 000 tonnes of milled rice available at the turn of the millennium.

Figure 27: Production areas and market routes of rice in Tanzania

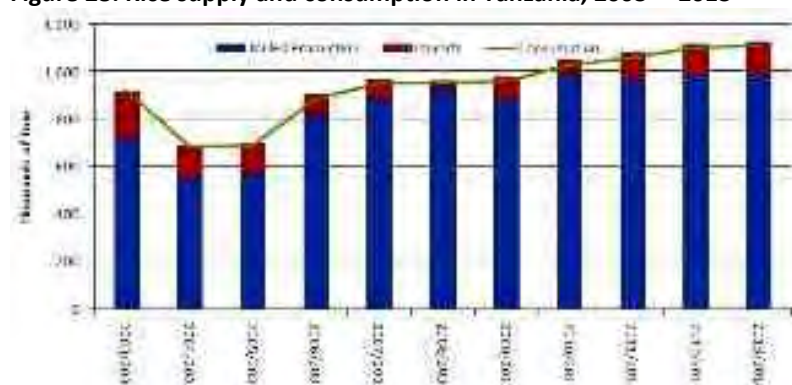


Economic growth during the first decade of the twenty-first century, coupled with increasing urbanization, led to increased consumption of rice at both a national and individual level. Rice is a preferred food, and consumption reached about 16 kg per person per year in 2010. This provides 156 kcal of energy per day (or about 8 percent of total daily calorie intake), making rice the third most important source of energy in Tanzania after maize (33 percent) and cassava (15 percent). Rice is used almost entirely for human consumption. The increase in demand for rice has not only stimulated increased domestic production but also increased imports (see Figure 28 below).

The marketing system

Rice is marketed in a variety of ways in Tanzania (see Appendix C, Appendix D, Appendix E). The primary systems are described in Section 3.5.2 ('Marketing') of the main report. There are major differences in the way paddy/rice is marketed in smallholder and large-scale systems. As a proportion of production, more rice is marketed than other staple food crops. According to the 2002/2003 National Agricultural Sample Census, 42 percent of rice production is marketed compared to 28 percent of maize and 18 percent of sorghum. These figures are, however, somewhat misleading because larger rice growers account for the bulk of sales. A survey of small scale rice farmers found that only 13 percent of them sold any rice (NBS 2007, 2012).

Figure 28: Rice supply and consumption in Tanzania, 2003 —2013



Tanzania imports and exports rice. Imports averaged 71 000 tonnes between 2005 and 2007 (see Table 15) and mainly came from Asia, representing about 8 percent of apparent domestic consumption. Exports over the same period were about 10 000 tonnes mostly to other countries in the region. Imported rice is generally considered inferior to local rice by Tanzanian consumers and thus sells at a lower price than domestic rice. As recently as 2000, Tanzania imported 15 percent of its domestic requirements but, with rising local production, imports fell to 11 percent over the period 2005 –2007. This means that domestic prices are less subject to world price volatility, though more vulnerable to variation in domestic production (Minot 2010).

Table 15: The production and trade of food staples in Tanzania

Commodity	Production (‘000 tonnes)	Imports (‘000 tonnes)	Exports (‘000 tonnes)	Imports as a % share of apparent consumption	Exports as share of production (percent)
Maize	3 405	116	70	3.4	2.1
Cassava	6 099	0	1	0.0	0.0
Rice	817	71	10	8.1	3.1
Sorghum	780	1	1	0.0	0.1
Wheat	96	643	31	90.9	32.4

Source: FAO Production and Trade Yearbooks, 2009 (data refer to average of 2005 – 2007)

N.B. Apparent consumption is – production PLUS imports MINUS exports and non-food uses

Grades and quality criteria

In theory the retail price of rice is related to ‘quality’. Quality is determined by the appearance of the rice, the percentage of broken grains in the product and — most importantly in Tanzania — the ‘aroma’ or ‘perfume’ which can loosely be translated as ‘taste’.

Based on these prescriptions there have been formal attempts to assign quality grades to rice as:

- Poor — perfumed and non-perfumed rice with 20 —100 percent broken grains (15 percent of national consumption);
- Medium — non-perfumed with 20 percent or less broken grains (10 percent of national consumption);
- Good — perfumed with 20 percent or less broken grains (70 percent of national consumption); and
- Premium — perfumed and non-perfumed with 5 percent or less broken grains (5 percent of national consumption). (BMGF 2012).

‘Good’ rice is often referred to as the standard’ grade. In practice, many mills in Tanzania are not equipped to grade rice during the milling process. In many others, the grading unit is not used or several possible grades are combined into one unit. Some large-scale traders ask for rice to be graded for a particular market.

It is often difficult to distinguish between grades through visual inspection or handling at urban traditional retail outlets where rice is presented in 100 kg bulk sacks. This is especially the case for grades 1 and 2, but in some cases it is possible to differentiate between grade 1 and grade 3 and lower grades. Grades 1 (often designated as ‘*supa*’) and 2 are usually aromatic varieties. The number of grades offered for retail sale at traditional outlets varies from two to six (see Figure 29). There does not appear to be a formalized system of grading based on grain type (size and shape) and the percentage of broken grains except for ‘*chenga*’, which is 100 percent (or approaching 100 percent) broken grains. (The latter would be known as ‘tailings’ in formalized grading systems for wheat, and in the United Kingdom in the late nineteenth and first half of the twentieth centuries would have been reserved for farmhouse poultry).

By-products of the milling process are hulls, bran and polishings. The hull and the bran is usually removed in one operation in Tanzania: this combined product has nominal monetary value and is a major environmental contaminant around mills (see Figure 30), though some of it is used to make bricks or as a soil conditioner. Polishings (see Figure 30 again) have some value as animal feed, primarily for pigs and poultry.

More sophisticated presentation of rice is made at non-traditional outlets such as supermarkets and some specialist shops. These presentations include pre-packaging in various sizes (from 500 g to 25 kg), differentiation between imported and locally-produced rice, and branding according to the geographical or producer origin (see Figure 31).

Figure 29: Traditional rice retail outlets offering various grades of rice for sale: five grades plus 'chenga' in Iringa (top left); four grades in Tandale, Dar es Salaam (top right); two grades in Tanga (bottom left); a single grade in Kisutu, Dar es Salaam (bottom right)



Figure 30: By-products of the milling process: hulls and bran contaminating the environment at Rujewa in Mbeya Region; close up of hulls, bran and polishings at a mill in Morogoro (below)



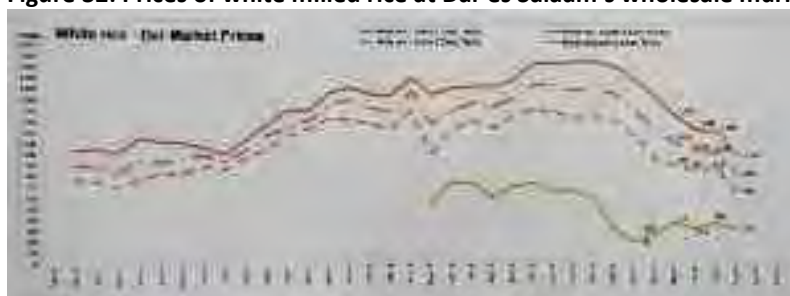
Figure 31: Imported brown rice repackaged in Dar es Salaam (left), and value added repackaging of local rice in Arusha (right)



Prices

Farmgate, wholesale and retail prices for a given ‘grade’ vary from year to year (Figure 32), within a year and between locations (Table 16). Within year prices are lowest in the harvest and postharvest period, and highest in the period when supply is low but demand high. In periods of low supply, prices may be 50 percent higher than in supply-surplus periods. Most rice is, nonetheless, marketed at the harvest and postharvest period because producers need cash and lack adequate storage facilities. Over three years — from late 2010 to late 2013 — Dar es Salaam retail prices doubled before dropping back again (Figure 32).

Figure 32: Prices of white milled rice at Dar es Salaam’s wholesale markets, 2010—2013



Source: courtesy of KPL

Table 16: Paddy and ‘standard grade’ rice prices at various stages of the market chain and at different seasons (2009 data)

Location (commodity)	Price per kilogramme (Tanzania shillings)	
	High season (June, July, August)	Low season (September - May)
Farm gate (paddy)	350	500
Miller (paddy)	450	700
Wholesale market (rice)	900	1 100
Retail market (rice)	1 000	1 400

Source: RLDC, 2009

In reality, the data in Table 16 would be more comprehensible if it were presented as ratios. In addition, adjusting the price of rice at a wholesale and retail level to take into account the 35 percent loss incurred during milling would give a clearer picture of the status of prices (see Table 17). Inspection of the price ratios indicates that the greatest benefits accrue to wholesalers during the high season (although this segment has the highest transport costs) and to retailers during the low season.

The domestic wholesale price in all markets is considerably higher than the international price of the standard Thai Super A1 broken rice (see Section 2.1 of the main report entitled ‘The national market’, as well as Figure 6). This helps to explain why Tanzania is a regular importer of rice. The lowest domestic prices are to be found in Songea (a rice surplus zone), followed by Singida (which is located near the production zones of Mwanza and Shinyanga). Dar es Salaam and other deficit markets have higher prices: the average difference between prices in Songea and those in Dar es Salaam is almost US\$ 100 per tonne.

Between 1992 and 2002 the price of rice was consistently higher in Dar es Salaam than in Morogoro (a rice surplus region c. 200 km from Dar): on average about TSh 4 000 per 100 kg or 14 percent higher (see Gjolberg et al 2004). In contrast the average difference in maize prices was TSh 1 700 per 100 kg (a 20 percent difference). Interviews with traders indicate that on average, transport costs are about TSh 1 000 per 100 kg between the two cities. Time-series regression analysis indicates that large price differences persist over several months. In conclusion, the differences between prices in Dar es Salaam and Morogoro are wider than can be explained by marketing costs, indicating

inefficiencies in marketing. Rice markets also appear to be less efficient than maize markets, possibly because of the smaller volumes traded.

Table 17: Price ratios at various stages of the market chain and at different seasons for 'standard' grade rice, and adjusted for milling losses

Location (commodity)	Price ratio per kilogramme	
	High season (June, July, August)	Low season (September - May)
Farm gate (paddy)	100	143
Miller (paddy)	129	140
Wholesale market (rice)	257	220
Wholesale market (rice adjusted for milling loss)	167	143
Retail market (rice)	285	280
Retail market (rice adjusted for milling loss)	185	182

Source: compiled by Trevor Wilson

Domestic food prices are closely related to the extent to which commodities are traded. For internationally-traded commodities, domestic prices are likely to follow world prices unless there are significant trade barriers. If the commodity is not traded internationally, domestic prices are largely determined by domestic supply and demand. Recent trends in domestic (Tanzania) and international (world) rice prices show a similar pattern. The wholesale price of rice in Dar es Salaam started rising in August 2007, several months before the international price began to rise. In April 2008, when the international price was still rising towards its peak, the domestic price dropped sharply. Since May 2008 the international price has fallen about 40 percent from its peak, whereas the domestic price rose from US\$ 600 per tonne to over US\$ 800 per tonne.

The prices of paddy and milled rice in various parts of the country in August and September 2013 varied according to the location, rice variety, scale of operation, incidental costs (Appendix F) and 'grade' (Table 18). One official source (RLDC 2009) has stated: "While the quality of rice can be determined by the type of seed as well as the mill, the quality of rice is highly determined by the type of mill used. The small local mills, which are the majority in the central corridor, are using old machinery and technologies which produce lots of broken rice, whereas the larger modern mills have less broken rice. The grades are defined as 'grade one' (with not more than 15 percent broken) while 'standard' has between 30 and 50 percent broken grains. Most of the rice sold is not graded and is quite often mixed in terms of origins and varieties. Graded rice is found in some of the stalls and with imported rice." The majority of this statement is manifestly untrue, since rice *is* usually sold by 'grade', at wholesale and retail levels. These grades do not conform to accepted definitions and it is usually difficult to distinguish between grades. In this context it is probably appropriate to consider sales as 'price bands' and not as 'grades'.

Table 18: Price data for paddy and rice for various grades at several locations in Tanzania, August—September 2013

Location	Paddy (farm-gate)	Wholesale (milled rice)					Retail (milled rice)					
		Grade 1	Grade 2	Grade 3	Grade 4	Cheng a	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Cheng a
Mbeya	700	1 350	1 100	900		600	1 500					
Usangu Plains	417 – 583	1 000	900	800								
Mafinga (urban mill)							<----- 1 200 ----->					350
Iringa (ex Mbeya)		1 300	1 200	1 100		600	1 400	1 300	1 200	1 100	1 000	700
Iringa (ex Mbeya)		1 600	1 400	1 300	1 150	400						
Iringa (ex Pawaga)		1 050	900			300						
Pawaga	400 – 500											
Tanga (ex Mbeya)		1 300					1 400					
Tanga (ex Morogoro)		1 250					1 300					
Kilombero	348											
Morogoro							1 200	1 000				
Dar es Salaam (Tandale ex Mbeya)							1 700	1 600	1 400	1 300	1 200	700
Dar es Salaam (Kisutu ex Mbeya)		1 700	1 300				2 000	1 800				
Dar es Salaam (ex India Brown packed as 2kg)							4 400					
Arusha (cleaned Mbeya repacked as 1kg)		2 000					2 500					

Source: compiled by Trevor Wilson from a field survey

There is no consistent information on the relative proportions of the grades or price bands in relation to total sales either at a wholesale or retail level. A brief survey of transporters operating on the Morogoro-Dar es Salaam axis appears to indicate that the proportions of grades moved from one city to the other are: 23.75 percent of Grade 1 ('Supa'), 50 percent of Grade 2 and 26.25 percent of Grade 3 (see Table 19). Often, however, due to the lack of mills with graders, all grades are lumped together and called Grade 2.

Table 19: Proportions of 'grades' transported from Morogoro to the main consuming markets as reported by millers, October 2013

Reporting mill	Amount (tonnes) and overall proportion (percent) despatched		
	Grade 1 'supa'	Grade 2	Grade 3 and below
Buzelengule	2 000	4 500	3 500
Mwendomdundo	3 000	5 000	2 000
Lumande	2 500	5 000	2 500
Bwashee	2 000	5 500	2 500
Total tonnes	9 500	20 000	10 500
Proportion of total	23.75	50.00	26.25

Source: Information provided by Thobias Sijabaje

In a wider context there appears to be more than one system of classification of grades (it has not been possible to find an objective classification from TBS). The absence of objective standards, the lack of any kind of inspection system at wholesale and retail level, and the preference of consumers for specific 'geographic origins' or 'aroma' results in an almost total lack of transparency in terms of 'grades'. This accounts for the difficulty of identifying grades at the retail level.

Trading and broking

The rice value chain is dominated at several points by traders and brokers, who buy and sell rice and have a strong influence on supply and prices. Many are reluctant to discuss their operations whereas others are more open (Appendix G). Traders and brokers operate on different scales: some are very large and operate throughout the year; others operate on a medium or small scale at certain times of the year (not only in the main sales period which is around and immediately after the harvest). Most operate on a cash basis, and are independent business people who do not belong to any formal group. Few receive any price and quantity information from 'official' sources although their networks are exceedingly efficient in operating in the traders' and brokers' own interests. Most have had no training in business or technical matters but rely on their innate skills to make a success of their operations (Appendix H).

Rice stocks at the end of September 2013

A bumper crop of rice was produced in 2012/2013. The amount of paddy available in the Kilombero valley was at an all time high, resulting in a major drop in farmgate prices. There was 3 000 tonnes of paddy in stock at KPL in January 2013 (from the 2012 harvest). Stocks rose to 15 859 tonnes in September 2013, following the 2013 harvest. At the same time, there were 8 000 tonnes stocked in Kilombero, 15 000 tonnes in Mbarali, 4 200 tonnes in Iringa and 3 800 tonnes in Shinyanga (all in warehouses assisted by RUDI). According to RUDI field officers, the 31 000 tonnes of paddy held in these four warehouses was less than 5 percent of the total paddy being stored in private warehouses and at individual houses. If these figures are correct, the amount of paddy in store in Tanzania at the end of September 2013 would exceed 620 000 tonnes.

Rice imports and tariffs

As a member of the EAC, Tanzania is obliged to adopt the external tariff structure of the community. Under this regime, tariff rates are set at 0 percent, 10 percent and 25 percent except for commodities deemed to be 'sensitive.' The EAC declared rice a sensitive commodity and

implemented a 75 percent tariff on imports from outside the community. This policy has created friction between Kenya (which has a very small domestic rice industry and relies to a large degree on imports) and Pakistan. Thus, when the new tariff was announced, Pakistan threatened to retaliate and slowed the processing of Kenyan tea exports (24 percent of which goes to Pakistan). In late 2006 Kenya was forced to revert to the original import tariff of 35 percent, and Tanzania did the same. This highlights the sensitive nature of rice import tariffs, and the conflicts between proponents of trade liberalization and consumer interests on the one hand and advocates of rice farmers on the other. It is to be noted that a higher tariff benefits Tanzanian rice producers farmers in two ways: first, it creates increased local demand for local rice since it reduces imports; second, it expands the market for Tanzanian rice into Kenya (since Kenya's production capacity is much smaller than Tanzania's). In other words, the rice tariff taxes Tanzanian and Kenyan rice consumers, but *benefits* Tanzanian rice growers.

In May 2013, the Deputy Minister for Agriculture, Food Security and Cooperatives, Adam Malima, told the National Assembly that Tanzania produces enough rice to be self-sufficient and export a surplus. He went on to say that the country is, however, forced to continue imports because of large-scale hoarding by rice traders. Malima said that Tanzania's current rice production capacity stands at around 1.2 million tonnes of which around 300 000 tons is exported to other countries. According to USDA estimates, however, Tanzania's rice *production* in 2013/2014 will be about 990 000 tonnes, its total *supply* — of around 1.23 million tonnes (which includes the amount produced + 140 000 tonnes of imports) — will therefore be higher than consumption estimates of about 1.1 million tonnes. The Deputy Minister said that Tanzanian rice is of high quality and there is enough in the country to meet domestic demand, but hoarders cause artificial shortages on a regular basis to increase prices. He contended that prices (in local currency) increased in the four months from August to December 2009 mainly due to hoarding — from TSh 1 800/kg to TSh 2 800/kg (or US\$ 1 076 to US\$ 1 675 per tonne). The Government thus has to import rice to avoid price spikes due to artificial shortages, and in spite of the country's potential to increase rice production to 3 million tonnes and become a major rice exporter in Africa⁵.

⁵

See www.oryza.com/content/self-sufficient-tanzania-imports-rice-due-rampant-hoarding-says-minister#sthash.7unktdec.dpuf.

Appendix A. Terms of Reference for a Tanzania market research study

The Tanzania rice market is not well understood by the government, donor agencies, civil society or the private sector.

The official price data reported by the Ministry of Industry and Trade and the East African Grain Council's *ratin.net* reflects only the top prices in the market. However, the prices in the wholesale market can vary by as much as 40 percent across roughly 3 'grades' of traded rice. No one knows the approximate quantities of each grade traded or, thus, the price that most accurately reflects the majority of rice traded in the country.

In January 2013, erroneous price reporting led to an extreme Government intervention in the market that had a disastrous impact on wholesale prices and producers. The Government of Tanzania granted large traders a 100 percent exemption from the 75 percent Common External Tariff of the East African Community and flooded the markets overnight, dropping wholesale prices well below the cost of production for both smallholder and commercial farmers.

An independent, comprehensive study of the rice market in Tanzania is needed to establish the approximate quantities of each grade traded, in order to convince the government to modify its price reporting methodology so that the government will base any future interventions on more accurate data. It is hoped that any future interventions will be measured and appropriate. Such a study would also benefit members of the proposed Tanzania Rice Producers Association by providing contact information for brokers and traders across the country. The study should engage the price monitors of the East African Grain Council who have some knowledge of the brokers and traders in wholesale grain markets across Tanzania.

Ideally, the study would include all major regional wholesale grain markets:

1. Dar es Salaam - Tandika, Tandale, Mbagala, Buguruni, Mwananyamala & Kawe
2. Tanga
3. Lindi
4. Mtwara
5. Songea
6. Mbeya
7. Iringa
8. Sumbawanga
9. Kigoma
10. Bukoba
11. Mwanza
12. Musoma
13. Shinyanga
14. Tabora
15. Singida
16. Dodoma
17. Arusha
18. Moshi
19. Morogoro
20. Ifakara

The study would take the form of questionnaires, which would include:

- Name of broker
- Mobile telephone number
- Location within market
- Commission TSh/kg
- Cost TSh/kg of loading/unloading one 100-kg bag
- Number of 100-kg bags currently in stock
- Prices & quantity of Grade 1, 2, 3 and paddy if possible
- Prices & quantity of imported Asian rice
- Discounts TSh/kg for 10 ton, 20 ton, 50 ton purchase
- Estimates of quantity moved per week, per month
- Transport cost to Dar es Salaam
- Peak periods of rice trading
- Source of rice
- Destination of rice
- Name & phone number of any large traders with godowns in the area
- Name & phone number of large buyers

The study should include a separate survey of retail prices in each city.

The study should be conducted twice, once after harvest and once in Jan/Feb (the peak price period). The follow up study could be done remotely if reliable informants are identified in each city.

One expert consultant could coordinate teams of Tanzanian surveyors. Following the teams, the consultant would visit a selection of cities.

Appendix B. Tanzania Rice Market Survey Questionnaire

Tanzania Rice Market Survey — August 2013	
Name of broker	
Telephone Number	
Location within market	
Are you a registered company/SME, an agent, or part of a larger operation?	
Are you part of any formal or informal trading group?	
Do you pay any taxes?	
How do you conduct your deals: by word of mouth, handshake, scrap of paper, email, SMS, formal contract?	
How do you move money around: cash, cheque, MPESA...?	
Commission TSh/kg	
Cost TSh/kg of loading/unloading one 100-kg bag	
Number of 100-kg bags currently in stock	
Prices & quantity of paddy and Grade 1, 2, 3	
Prices & quantity of imported Asian rice	
Discounts TSh/kg for 10 tonne, 20 tonne, 50 tonne purchase	
Estimates of quantity moved per week & per month	

Transport cost to Dar es Salaam	
Peak periods of rice trading	
Source of rice (individual farmer, farmer group, another trader)	
Is rice sold on to another larger trader, a miller, or?	
Destination of rice — where is the rice going?	
Do you obtain any information (from newspapers, radio, the government) about rice quantities and prices? If so, is it useful?	
Have you heard of SHFSP, Kilimo Kwanza or SAGCOT? If so, what do you know and think about them?	
Have you ever received any training (in business, storage or quality assessment)?	
Do any of the big traders (METL, Export Trading etc.) operate in your area? If so, what is their impact on the market?	
Name & phone number of large traders with godowns in area	
Name & phone number of large buyers	

Appendix C. Large-scale rice trading out of Mbeya

The Raphael Group deals in rice milling, rice farming, maize, animal feeds, sugar, warehousing and transportation as well as import I export of rice and groundnuts. It was established in 1995. It has a large compound and warehousing facilities 15 km north of Mbeya on the main Tanzania-Malawi/Zambia Highway. The company is registered with TRS: when asked if they paid taxes the production Manager laughed: “No business of this size can operate without doing that.”

The company buys paddy (*‘mpunga’*) directly from farmers, some of whom are contracted, and small traders, and most of whom are women. It hires its mill to individuals so that they can mill their paddy, they are then free to either take away the rice (*‘mchele’*) or sell it to their company. All deals are in cash with no formal contracts. The only exception to this is with contract farmers (it is not clear even in this case if contracts are in written form) who receive seed, fertilizer and other inputs (depending on need) with these costs deducted from the final value of their delivered paddy.

In 2013 farmers were paid TSh 700/kg paddy at the farmgate to which should be added TSh 153/kg for handling and transport costs to the factory. After milling ungraded *‘mchele’* is sold at TSh 1 100 — 1 200. Grade 1 (*‘supo’*) rice comprises 80 percent of the total output after milling and sells at TSh 1 350/kg wholesale (for lots of greater than 2 tonnes; there are possible discounts for much larger lots) and TSh 1500/kg retail; Grade 2 yields 10 percent at TSh 1100/kg; Grade 3 sells at TSh 900 and small broken grains (*‘chenga’*) sells at TSh 600/kg (the latter two combined make up the remaining 10 percent of the rice yield). Transport from the mill to Dar es Salaam costs TSh 80 000 per tonne (TSh 80 per kg) using the company’s own transport; from there it is sold to smaller wholesalers and dealers or through Raphael’s own retail outlet. Transport costs to Arusha and Moshi (the two other main destinations) are *pro rata*. The high season for purchase and trade is between May to August. On the day visited by the survey team there were 800 tonnes of paddy on site. The average annual turnover is 22 000 tonnes (which means that stock stays on site for 10—11 days on average).

The group is not a member of any trading association and feels there has been increasing competition from both Kapunga and Mbarali Rice Farms (located about 120 km to the north) since they were privatized. Little use is made of formal sources of information through written and oral media but the company keeps abreast of demand and prices from its market contacts. They have never heard of SHFSP nor of SAGCOT but are aware of *‘kilimo kwanza’* and believe it has potential if it is properly operated. The Production Manager has participated in several FAO courses in Dar es Salaam (so perhaps SHFSP should adopt a higher profile), which he found very useful.

At the regional *‘Nane-Nane’* exhibition in early August, the company was presented with a first prize during the fair. There is already some *‘branding’* of products, including village or ward names on some retail sales packets. (There was no awareness that this is effectively a geographical *‘Indication of Origin’*; it was done because customers “prefer rice they know and like”). A newly designed and more-distinctive logo is being introduced and the retail product range is being expanded to provide a choice of types and weights.

Figure 33: Yard showing paddy being unloaded and women traders waiting to make a deal (left), milling machine with grader (middle), 20-kg retail pack with grade and geographical 'Indication of Origin' (right)



Appendix D. The rice mill grouping at Rujewa, Mbarali District, Mbeya Region

Rujewa, on the edge of the Usangu Plains, is Mbarali District's administrative centre. The wetlands are a major producer of rice from both large-scale and smallholder farms. Kapunga Rice Farm, a former state farm now owned by the Export Trading Group, is the largest in Mbeya Region and the second largest in the country. Mbarali Rice Farm, owned by Southern Highland Estates, is the second largest in the region and thus the third largest in the country. Thousands of smallholder farmers produce rice in the Usangu wetlands, mostly under irrigation by traditional methods. Only 5.1 percent of smallholders grow improved varieties on their farms (which range in area from 0.1 to 0.9 hectares).

In spite of the low output per unit area, the Plains produce enormous quantities of paddy (*'mpunga'*). This primary product is converted to rice (*'mchele'*) by seven privately owned mills. These are provided with paddy primarily from small traders — most of whom are women — who buy a few sacks from the producers and transport them to the mills for de-husking and polishing.

Seki Kiwanga is a part-time housewife for much of the year and a full time trader for about four months from May to August. She buys threshed paddy from farmers at TSh 50 000—70 000 per 120 kg sack (TSh 417—583 per kg). The sacks have recently been standardized by law to prevent abuse, particularly of much heavier loadings, and are purchased for TSh 800 at local outlets. Seki hires a *'kubota'* (a small Chinese two-wheeled tractor with trailer) that can load 10 sacks at TSh 40 000 per trip and averages about 10 loads per week during the high season. At the mill the 120 kg of paddy is dehusked to 70—80 kg of ungraded rice, giving a yield of 58—67 percent paddy rice. Seki pays the mill TSh 70 per kg for milled rice. Most of her rice is sold onto larger town traders for TSh 1 000 per kg for Grade 1 (*'supa'*), TSh 900 for Grade 2 (*'wakati'*, literally 'in the middle') and TSh 800 for Grade 3.

The seven mills each operate two to three milling machines of various capacities but generally capable of milling 15—30 tonnes per hour. They work 24 hours a day in the high season of harvest and immediate postharvest, and a shorter period — usually of 12 hours — in the low season from September to April. Robert Andachuka's mill is properly registered with the Tanzania Revenue Authority and pays all the usual taxes and charges. Electricity to run the mill, which is constructed from metal sheeting with a concrete floor, is from the national grid. Other outgoings mainly relate to labour, which is mostly employed on a casual basis. Income derives entirely from the TSh 70 per kg milling charge, with output from the two working milling machines of about 45 tonnes per day in the high season. There are no charges to the mill for the environmental problems it creates from the husks and bran (*'pumba ya mpunga'*) and polishings (*'plushini'*) that it blows out into the air. Local entrepreneurs make some use of the husks by incorporating them into standard kiln-fired bricks or sun-dried mud blocks. The polishings are collected free of charge by traders from Somalia who transport them back home for camel feed.

Figure 34 Paddy prior to milling at Rujewa (left) and rice bran ('polishings') bagged for export (right)



Appendix E. The small- and medium-scale rice trail from Pawaga via Iringa to Dar es Salaam

Umoja wa Kilimo Cha Umwaligiaji Luganga Pawaga (UKULUPA) is a cooperative of rice growers made up of 163 members of the Pawaga irrigated rice scheme. It was formed in 1997 in order to obtain water rights from the Rufiji Basin Authority to whom it pays TSh 988 169.60 per year to provide water for its combined 300 hectares of paddy fields. One rice crop a year is grown: the crop takes 150 days to mature (a dry season crop of maize being taken on the same land). UKULUPA does not act as a cooperative when selling, and each farmer strikes his or her own deal with traders who come to the area.

Martin Mwingi buys paddy from the producers of the irrigation scheme at Pawaga (west of Mbeya on the Great Ruaha) at TSh 45 000 per bag of 85—90 kg. Transport to Iringa costs him TSh 4 500 and he pays cess of TSh 500 to Iringa Rural District and of TSh 2000 to Iringa Municipality. He accumulates lots of 100 bags and makes two or three trips per week. The milled paddy yields 50—55 kg of rice (64—67 percent) and he pays a TSh 60 per kg milling charge to the mill based on the output of rice (not the input of paddy). Once milled, Martin sells his rice to buyers from Dar es Salaam at TSh 1 050 per kg for Grade 1, TSh 900 per kg for Grade 2 and TSh 300 per kg for '*chenga*'. The bran from his paddy is taken away free by local brick makers. The polishings become the property of the mill owner and he sells these for TSH 2 000 per sack to local poultry or pig owners, or in lots to buyers from Dar es Salaam.

Samuel Nyamba is a typical medium-scale trader operating on the Iringa-Dar es Salaam axis. He buys from the smaller local traders such as Martin Mwingi and bulks up lots of 32 tonnes twice a week. He hires space on lorries belonging to others and travels by bus to and from Dar es Salaam at a cost of TSh 18 000 each way. He buys Grade 1 rice at TSh 1 150 per kg, Grade 2 rice at TSh 1 000 and '*chenga*' at TSh 400 per kg. He pays TSh 1 000 for the sack in which this rice is contained. Loading in Iringa costs him TSh 500 per sack and unloading in Dar es Salaam costs TSh 700 per sack. Transport charges are TSh 60 per kg from Iringa to Dar es Salaam. He sells rice wholesale at TSh 1 400 per kg for Grade 1 rice in Dar es Salaam and at TSH 1 300 per kg for Grade 2. All transactions are on a cash basis. He is registered with the TBS but, because he does not keep detailed accounts, the Tanzania Revenue Authority takes a lump sum from him assessed at TSh 320 000 per year.

Along the street of rice mills there is constant activity and dealing. Local traders buy a dozen sacks, get them transported in handcarts holding 8—10 sacks at TSH 1 000 per sack, and take a small profit once in town. Individual retailers also buy and sell rice sacks in front of their shops for a bewildering range of prices, and for what appear to the untrained eye — and nose — a rather standard product.

Figure 35: Left to right: Pawaga rice cooperative, Rice Mill Street in Iringa; and a retail outlet in Iringa town centre



Appendix F. Some miscellaneous costs associated with rice marketing

Item (location)	Cost
Milling paddy (Morogoro)	TSh 25/kg
Milling paddy (Pawaga Cooperative)	TSh 60/kg
Milling paddy (Rujewa)	TSh 70/kg
Milling paddy (Mafinga urban)	TSh 120/kg
Empty sack (Rujewa) (standard 120 kg)	TSh 800/unit
Empty sack (Iringa) (standard 100 kg)	TSh 800/unit; TSh 1000/unit
Rice bran (Mafinga urban)	TSh 3500/100 kg
Polishings for poultry feed (Iringa)	TSh 2000/100 kg (to mill owner)
Polishings for poultry feed (Morogoro)	TSh 5000/80 kg (to mill owner)
Market fees for retailers (Dar es Salaam urban)	TSh 200/day
Bus fare (Dar es Salaam > Iringa)	TSh 18 000/one way journey
Transport (Pawaga > Iringa)	TSh 4500/100 kg
Transport (Iringa > Dar es Salaam)	TSh 6000/100 kg
Transport (Mbeya > Dar es Salaam)	TSh 8000/100 kg
Local Authority cess	TSh 2000/100 kg Iringa Rural: TSh 500/100 kg Iringa Urban
Load rice to lorry (Iringa)	TSh 500/100 kg
Unload rice from lorry (Dar es Salaam)	TSh 700/100 kg
Rotary tiller (Pawaga)	TSh 60 000 —80 000/acre
Irrigation water (Pawaga)	TSh 71 000/10 000 litres
Water licence (Pawaga to Rufiji Basin Authority)	TSh 988 162.60
Small/Medium Enterprise registration (to BRELA)	TSh 500 000 one off
Trading Licence (Arusha Municipal Council)	TSh 300 000/year

Appendix G. Rice market survey example of completed questionnaire

Tanzania Rice Market Survey - August 2012	
Name of broker	
Telephone Number	
Location within market	
Are you a registered company, SME, an agent or part of a larger operation?	agent
Are you part of any formal or informal trading group?	no
Do you pay any taxes?	yes
How do they conduct their deals: word of mouth, handshake, a scrap of paper, email or SMS, formal contract?	contract (written) used handshake after no formal contract
How do you move the money: cash, cheque, MPESA...	
Commission Tsh/kg	
Cost Tsh/kg of loading/unloading one 100-kg bag	cost to farmer Tsh 1500
Number of 100-kg bags currently in stock	800 tonnes
Prices & quantity of paddy and Grade 1, 2, 3	<p>Myung 800 in the field + 1500 in the market</p> <p>Milaka 1000 in the field + 1500 in the market</p> <p>Grade 1 1000 in the field + 1500 in the market</p> <p>Grade 2 1000 in the field + 1500 in the market</p> <p>Grade 3 1000 in the field + 1500 in the market</p>
Prices & quantity of imported Asian rice	<p>1st grade 1000 in the field + 1500 in the market</p> <p>2nd grade 1000 in the field + 1500 in the market</p> <p>change 600 (124)</p>
Discounts Tsh/kg for 10 ton, 20 ton, 50 ton purchase	No
Estimates of quantity moved per week, per month	22 000 tonnes / year
Transport cost to Dar es Salaam	80 000 sh / tonne
Peak periods of rice trading	May - September

Source of rice (individual farmer, farmer group, another trader)	individual farmer
Is rice sold on to another larger trader, a miller, or ??	NO
Destination of rice - which place is the rice going to	to a mill, market, etc.
Do they obtain any information from newspaper, radio, government about rice quantities and prices AND is it useful	None
Have you heard of SHESP, Kilimo Ewanza or SAGCOT and if so, what do you know/think about it/them	NO SHESP Kilimo Ewanza had some success NO
Have you ever received any training for business, storage or quality assessment	YES Short University / CDE PAC courses
Do any of the Big Traders (METI, Export Trading, ...) operate in the area. If so, what is their impact on the market?	YES NO Export Trading Agency from they are trading
Name & phone number of large traders with godowns in area	
Name & phone number of large buyers	

Appendix H. Compiled results of market survey questionnaire of rice traders

Please note: some columns with no answers (or standard answer) have been removed from the original questionnaire for the purpose of this compilation

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
KILOMBERO																			
Galus Mtimafwile		Entrepreneur	No	Yes	Oral	Cash		1 500	125	50 000	10 t/m	15 000	May – Dec	Farmer	Miller	Ifakara	Other		
Elasto Selafimasheyo		Entrepreneur	No	Yes	Oral	Cash	10 000	1 500	30	50 000	5 t/m	15 000	Jun – Aug	Farmer	Miller	Dar es Salaam	Other		
Moris Mudamu		Entrepreneur	No	Yes	Oral	Cash		1 500	100	50 000	10 t/m	15 000		Farmer	Miller	Ifakara	Other		
Titus A Ngololo		Entrepreneur	No	Yes	Oral	Cash		600	500	70 000	1.5 t/m		Aug – Dec	Farmer	Miller	Dar es Salaam	Other		
Anzibert Ngonyani		Entrepreneur	No	Yes	Oral	Cash	2 000	700	10	50 000 (A) 40 000 (B)	50 – 70 t/w	12 000	Apr – Aug	Farmer	Miller	Dar es Salaam, Arusha, Mt wara, Lindi	Radio		
Dan Kibeku		Entrepreneur	No	Yes	Oral	Cash	1 500 – 2 000	700	40	50 000 (A) 45 000 (B)									
William Ngedu		Entrepreneur	No	Yes	Oral	Cash	500 – 2 000	1 000	30	40 000 (A) 30 000 (B)	30 – 35 t/w	12 000	Apr – Jul	Farmer	Miller	Dar es Salaam, Arusha, Mt wara, Lindi	Radio		

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
Musa Kazungu		Entrepreneur	No	Yes	Oral	Cash	2 000 – 2 500	500		55 000 (A) 50 000 (B) 40 000 (C)	10 t/w	12 000	Apr – Oct	Farmer	Miller	Ifakara, Dar es Salaam	Radio		
Athuman Kayanda		Entrepreneur	No	Yes	Oral	Cash	2 000 – 2 500	500		55 000 (A) 50 000 (B) 40 000 (C)	250 – 300 t/w	12 000	Apr – Oct	Farmer	Miller	Ifakara, Dar es Salaam	Radio		
Yohana Mtondwe		Entrepreneur	No	Yes	Oral	Cash		500		55 000 (A) 50 000 (B) 40 000 (C)	250 – 300 t/w	12 000	Apr - Nov	Farmer	Miller	Dar es Salaam, Arusha, Lindi	Radio		
Kasuluba Joseph		Entrepreneur	No	Yes	Oral	Cash	2 000 – 3 000	500			200 t/w	12 000	Apr – Sep	Farmer	Miller	Dar es Salaam, Mtwara, Tanga, Moshi	Radio		
Samwel Mwanjile		Entrepreneur	No	Yes	Oral	Cash	2 500	500		55 000 (A) 50 000 (B) 40 000 (C)	250 – 300 t/w	12 000	Apr – Nov	Farmer	Miller	Dar es Salaam, Mtwara, Tanga, Moshi	Radio		
Sadick Ndudi		Entrepreneur	No	Yes	Oral	Cash	1 500 – 2 000	800	25	45 000 - 50 000	80 – 100 t/w	10 000 - 12 000	Apr – Jul	Farmer	Trader	Dar es Salaam, Mtwara, Tanga, Moshi	Newspaper, Radio	Kilimo Kwanza	

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
Justine Mhaku		Entrepreneur	No	Yes	Oral	Cash	Negotiable	700	25	45 000 (A) 40 000 (B)	60 t/w		Apr – Aug	Farmer	Trader	Dar es Salaam, Mtwara, Tanga, Moshi	Other	Kilimo Kwanza	
John Gervas		Entrepreneur	No	Yes	Oral	Bank/Mpesa	T	500	0	>80 000(A) >70 000(B) >65 000(C)	10 – 30 t/w	7 000 – 8 000	May – Feb	Farmer	Miller	Dar es Salaam, Mtwara, Tanga, Moshi	Radio	Kilimo Kwanza	
Omary Kassim Mwam asanga		Entrepreneur	No	Yes	Oral/ Phone	Bank/Mpesa	T	700	4 000	70 000 (A) 60 000 (B) 50 000 (C) 30 000 (D)	30 – 35 t/w	7 000 – 10 000	Aug – Feb	Farmer		Dar es Salaam, Mtwara, Tanga, Moshi	Other	Kilimo Kwanza	
Busele ngule		Entrepreneur	No	Yes	Oral	Bank/Mpesa	T	700	4 000 (debe)	48 000	100 t/w	7 000	Oct – Nov	Farmer + Trader	Miller + Trader	Dar es Salaam	Radio	Kilimo Kwanza	
Mmas umbuko Shage mbe		Entrepreneur	No	Yes	Oral/ Phone	Bank/Mpesa	T	500 – 700	0	100 000(A) 95 000 (B) 90 000 (C) 80 000 (D)	22	7 000	Feb – Mar	Farmer	Miller	Dar es Salaam	Other	Kilimo Kwanza	
Athum an Elias		Entrepreneur	No	Yes	Oral	Mpesa	T	500 – 700	12		t/w	7 000	Nov – Dec	Farmer	Miller	Dar es Salaam	Radio		
Charles Kabela	0786 119 423	Entrepreneur	No	No	Phone	Bank		Negotiable	0	Negotiable	t/w	Negotiable	Dec – Mar	Farmer	Miller	Dar es Salaam	Radio	Kilimo Kwanza	

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
Peter Nampunja		Entrepreneur	No	Yes	Oral	Cash	T	500 – 700	0	100 000(A) >90 000(B) >60 000(C)	3	7 000	Feb – Mar	Farmer	Miller	Dar es Salaam, Mtwara, Tanga, Moshi	Radio	Kilimo Kwanza	
Lumwand Ek Lumwand		Entrepreneur	No	Yes	Oral	Bank		500 – 700	10 000	>50 000 (paddy) >80 000 (rice)	49 t/w		Dec – Mar	Farmer	Miller	Dar es Salaam	Radio, TV	Kilimo Kwanza	
Bwash ele		Entrepreneur	No	Yes	Oral	Bank/ Mpesa		700 – 1 000	450	110 000(A) 90 000 (B) 70 000 (C) 50 000 (D)	28 t/w	7 000	Jun – Feb	Trader		Dar es Salaam, Mtwara, Tanga, Moshi	Radio	Kilimo Kwanza	
Augustino M Msofa		Entrepreneur	No	Yes	Oral	Bank/ Mpesa		700 – 1 000	450	110 000(A) 90 000 (B)	70 t/w	7 000	Jun – Feb	Trader		Dar es Salaam, Mtwara, Tanga, Moshi	Radio	Kilimo Kwanza	
Mary Mikael msofe	0689 972 85	Entrepreneur	No	Yes	Oral	Bank/ Mpesa		700 – 1 000	450	110 000(A) 90 000 (B) 70 000 (C) 50 000 (D)	70 t/w	7 000	Jun – Feb	Trader		Dar es Salaam, Mtwara, Tanga	Radio	Kilimo Kwanza	
Prova Mujon	0787 053 367	Entrepreneur	No	Yes	Oral	Bank/ Mpesa		700 – 1 000	450	110 000(A) 90 000 (B) 70 000 (C) 50 000 (D)	70 t/w	7 000	Jun – Feb	Trader		Dar es Salaam, Mtwara, Tanga, Moshi		Kilimo Kwanza	

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
ULANGA																			
Tendus Ndeule	0783 522 533				Oral	Cash		500 – 800	90	50 000 (paddy)			May - Dec		Miller	Ifakara	Other	Kilimo Kwanza	
Freddy Lyaheja	0682 267 983				Oral	Cash		500 – 800	90	50 000 (paddy)			May - Dec			Ifakara	Other	Kilimo Kwanza	
Lucian Mchan ya	0683 033 966				Oral	Cash		500 – 800	90	50 000 (paddy)			May - Dec			Ifakara	Other	Kilimo Kwanza	
Patrick Kaduuga	0683 911 819				Oral	Cash		500 – 800	90	50 000 (paddy)			May - Dec			Ifakara	Other	Kilimo Kwanza	
MBEYA																			
Raphael Group	0735 767 187	BRELA	No	Yes	Oral	Cash	No		8 000	30 000 (paddy) >12 000 (ungraded)	2 000 t/w	8 000	May – Sep	Farmer s	No	Dar es Salaam, Arusha, Moshi		Kilimo Kwanza	SHFS
MOROGORO																			
Sefu Omari	0715 970 972	Not registered		LA Cess	Oral	Cash	No	700	0		1.5 t/w		Jan – Mar	Farmer s	Miller	Dar es Salaam, Arusha, Tanga	Radio		
Awadi Abdallah	0718 098 733	Not registered	No	LA Cess	Oral/SMS	Cash	Negotiable	1 000	50		1.5 t/w		Feb – Mar	Farmer s		Tanga, Arusha, Morogoro	Ear to ground		
Rajab Masati Sozi	0655 672 595	Registered	No	LA Cess	Oral/SMS	Cash, cheque	Negotiable	800	1 000	120 000(A) 110 000(B) 90 000 (C)	15 t/w	1 700	Sep – Jan	Farmer s	traders	Dar es Salaam, Morogoro	SMS		

Name	Phone	Registration	Trading group	Pay taxes	Conduct business	Move money	Commission (TSh/100kg)	Loading/unloading	Stock (100kg)	Price/100kg	Movements	Transport to DSM/100kg	Peak period	Source of rice	Sell to	Destination	Source of information	Knowledge	Training
Hamidu Jarlan	0712 185 259	Not registered	No	LA Cess	Oral/SMS	Cash, cheque, Mpesa	Negotiable	500	0	130 000	1 t/w	1 500 – 2 000	Nov – Dec	Farmer s	Traders	Dar es Salaam, Morogoro	SMS		Minimal

