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The Rice Market in East Africa

By:

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Invited paper presented at the 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia

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9 DECEMBER 2013

THE RICE MARKET IN EAST AFRICA

SECTOR REPORT

BY

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EXECUTIVE SUMMARY

Total rice production in East Africa is around 1.3m MT, with Tanzania overwhelmingly the largest producer; Uganda is also significant, with Kenya and Rwanda producing minimal volumes. In terms of growth, the region's two major producers, Tanzania and Uganda, have significantly increased output since 2005. In Uganda this increased by 10% annually (2005-10) and in Tanzania by 9% over the same period. However, this increase has been largely driven by an increase in acreage at constant yields, rather than by a rise in productivity.

On the demand side, rice is the staple crop for two-thirds of farmers who grow it – over three quarters of a million households, or around four million people. And in the urban areas, nearly as much rice is consumed as maize. Moreover, with consumption growing at an average of around 4% annually (and up to 7% annually in recent years), rice will only grow in importance as an urban staple necessary for the food security of the region's cities.

The primary social role of rice in the region, however, continues to be as an income generator for around 1.5 million smallholder households who grow it across the region. As discussed in the report, rice is the most important cash crop for over 80% of these farmers, and on average it brings in an income of around \$550 per household annually. Increasing that income by driving up yields and perhaps increasing the value share of the final milled product captured by the farmer would thus have a significant impact on poverty reduction across the region.

Unfortunately, East African production is still unsustainably dependent on tariffs and taxes which are likely to become progressively difficult to defend as urban consumers become more politically salient in the region. The priority for intervention to transform the EAC's rice market must be to support local production to become competitive with distortion-free imports. This means a significant rise in productivity, which if it can be achieved, will result in surpluses (primarily in Tanzania, but also to a lesser extent Uganda) which will need to find export markets if prices are not to collapse locally. Given current low levels of imports by non-EAC neighbours, and the size of the Kenyan market, this will involve a serious effort to create a genuine common market in EAC rice, with local production becoming competitive with Kenyan imports.

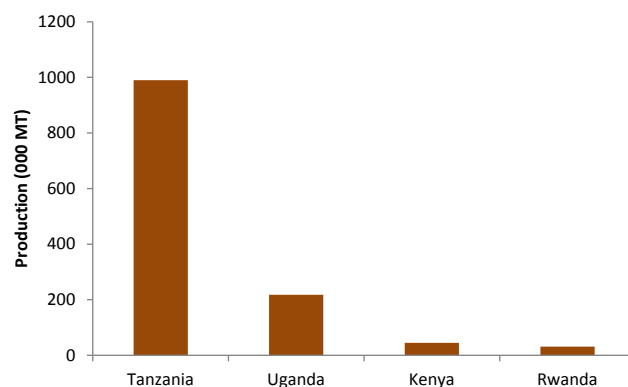
Achieving this may mean three things. Firstly, targeting regions in which farmers traditionally grow rice primarily for cash, and are prepared to invest in the crop, rather than regions where rice is seen as a good "hedging" crop offering both cash and food, depending on need. Rice is a high-investment crop, both in terms of cash and labour, and improving farmers' access to both is essential to boosting productivity. An understanding of the underlying competitiveness of different rice-growing regions in the EAC is also a priority for sector support. Secondly, given the weak supporting markets for agricultural finance, input supply (particularly seed) and value addition, major new investors prepared to support large numbers of farmers may be one of the region's best opportunities for providing this access necessary to drive up smallholder productivity and incomes. This is primarily an issue for output markets – increasing the number of millers who can support major outgrower programmes. But it is also an issue on the input market and finance side, where investors in input distribution or rural credit could address some of these issues. Yet at present, there is little likelihood of that happening, particularly on the output side. There remain major bottlenecks to investment in large off-taking businesses – particularly in Tanzania, the country with the largest market and the most available land for rice in the region.

CHAPTER I: SECTOR PROFILE

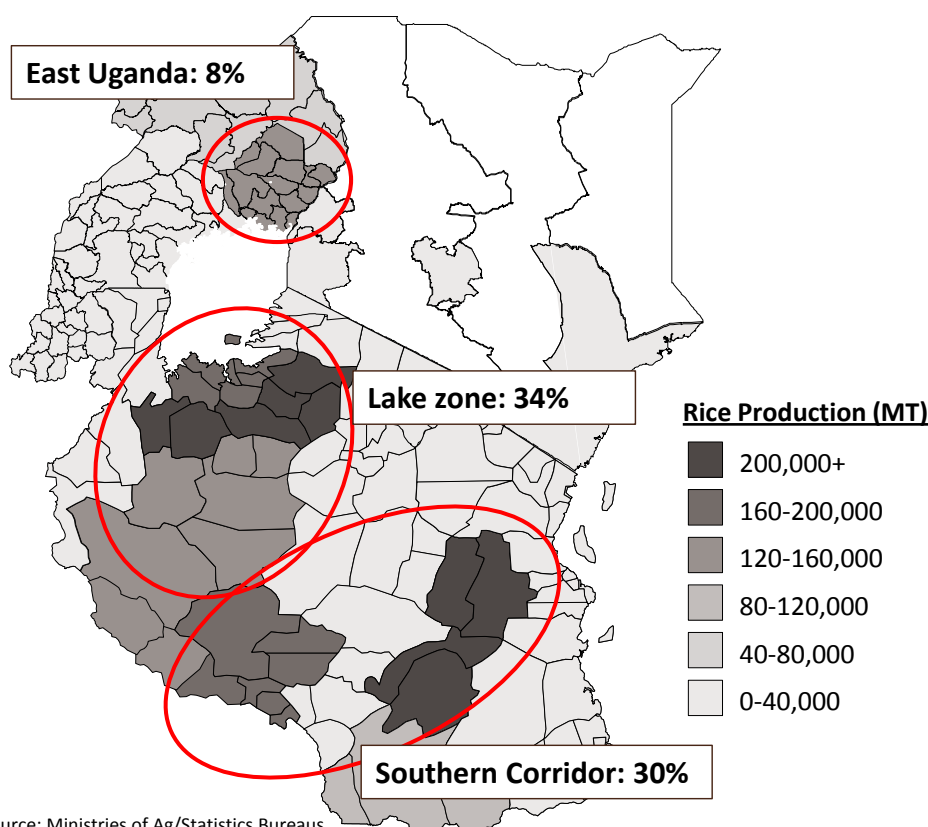
Geography and growth of production

Total rice production in East Africa is around 1.3m MT, with Tanzania overwhelmingly the largest producer; Uganda is also significant, with Kenya and Rwanda producing minimal volumes.

Milled Rice Production by Country¹



Within this national picture, production is heavily concentrated in a small number of key geographies. The map below shows the three regions which between them make up nearly 75% of the region's current production: Tanzania's Lake zone (Mwanza, Geita, Shinyanga, Simiyu and Tabora regions); the Morogoro and Mbeya regions in the "Southern Agricultural Growth Corridor"; and Eastern Uganda.²



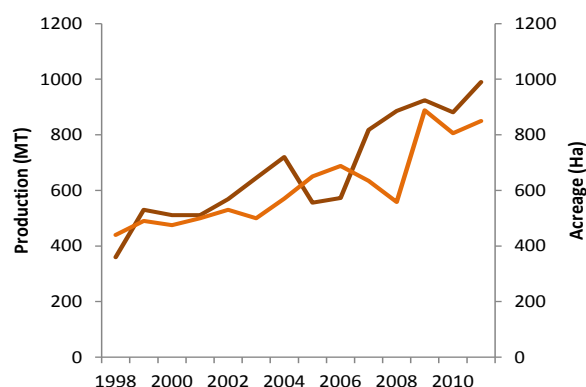
In terms of growth, the region's two major producers, Tanzania and Uganda, have dramatically increased output since 2005. In Uganda this has risen by 10% annually (2005-10) and in Tanzania by 9% over the

¹ Tanzania & Uganda: USDA-FAS, 2011. Kenya & Rwanda: National Ministries of Agriculture / Bureaus of Statistics, National Agricultural Census data: 2007-08 (Rwanda) & 2006-08 average (Kenya)

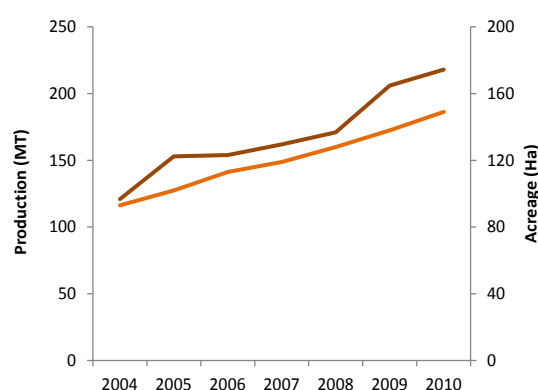
² National Ministries of Agriculture / Bureaus of Statistics, National Agricultural Census data: 2007-08 (Tanzania & Rwanda); 2008-09 (Uganda); 2006-08 average (Kenya). Subsequently quoted as EAC NBS (2006-08).

same period. However, as shown in the charts below, this increase has been largely driven by an increase in acreage at constant yields, rather than by a rise in productivity. Land area under rice cultivation has risen 8% annually in Uganda and by 4% annually in Tanzania.

*Tanzania Rice Production, 1998-2011*³



Uganda Rice Production, 2004-2010



The driver for this growth has in large part been the introduction of a major protective tariff on rice. In 2005 the EAC introduced a Common External Tariff of 75% on rice imports, making it much easier for local rice producers to compete in urban consumer markets. Growth figures suggest that the tariff has had the desired effect of increasing domestic production: in Tanzania, production has grown by 11.5% annually since 2005, compared to only 6.3% from 1999-2004.

However, where the tariff has failed – largely due to the lack of other supporting policies⁴ – is that it has not encouraged Tanzania to increase *productivity*; it has merely led to an increase *production*. Production growth has been driven by an increase in acreage, as producers see rising rice prices as a signal to commit more land to the crop, rather than by an increased investment in productivity. This failure to improve productivity under tariff protection is a major challenge for the future sustainability of the crop in the region, and is discussed in Chapter 3.

Conditions of production

Land allocation

Rice production across the EAC region is overwhelmingly carried out by smallholder farmers: In total, approximately 1.5m smallholder households grow rice across the EAC, with 1.1m of them concentrated in Tanzania.⁵ The survey conducted for this report indicated that these smallholder farmers allocate around 1.25Ha on average to rice, out of a total farm size of around 3Ha – although this varies somewhat across different major rice-growing regions, and rice farmers in some regions (particularly Mbeya) prefer to be far more heavily concentrated in the crop. The distribution of farm sizes within these averages is typical for a smallholder crop: 80% of rice farmers in the region allocate less than 1.5Ha to rice, and 94% allocate less than 3Ha.⁶

*Average rice farm sizes*⁷

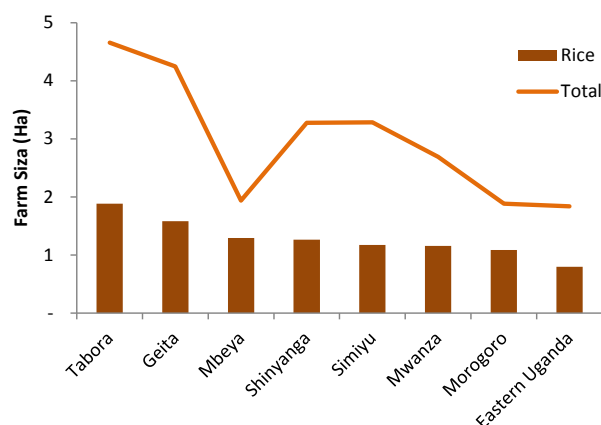
³ Source: USDA-FAS (brown line = production, orange line = acreage). Uganda's growth is less volatile largely because rainfall in the country is more reliable than Tanzania, so production is less vulnerable to annual fluctuations.

⁴ Therkildsen (2011) presents a detailed study of the political challenges behind this disconnect in policy

⁵ EAC NBS (2006-08)

⁶ Zaal (2012)

⁷ Zaal, Bymolt & Meertens, *Rice Production Survey Report: Tanzania & Uganda* (Royal Tropical Institute, Amsterdam: 2012), henceforth cited as Zaal (2012). The study surveyed 1464 smallholder rice farmers in the key production regions identified on p.5: the Southern Corridor, Lake Zone and Eastern Uganda.



If 1.25 Ha out of 3 Ha is put to rice, what are smallholders' other crop choices? Of the rest of the land put to crops, maize and cassava are by far the most important, confirming that many farmers (especially in Uganda) grow rice for cash and maize for food. The only other major cash crop grown by rice farmers is cotton, by farmers in the Lake Zone growing a mix of different cash and food crops to hedge their risk.

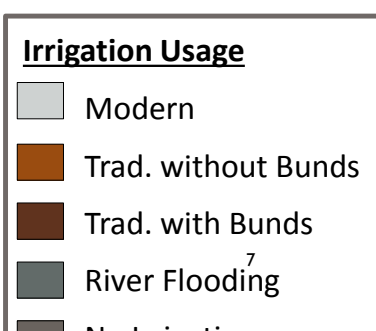
Water management

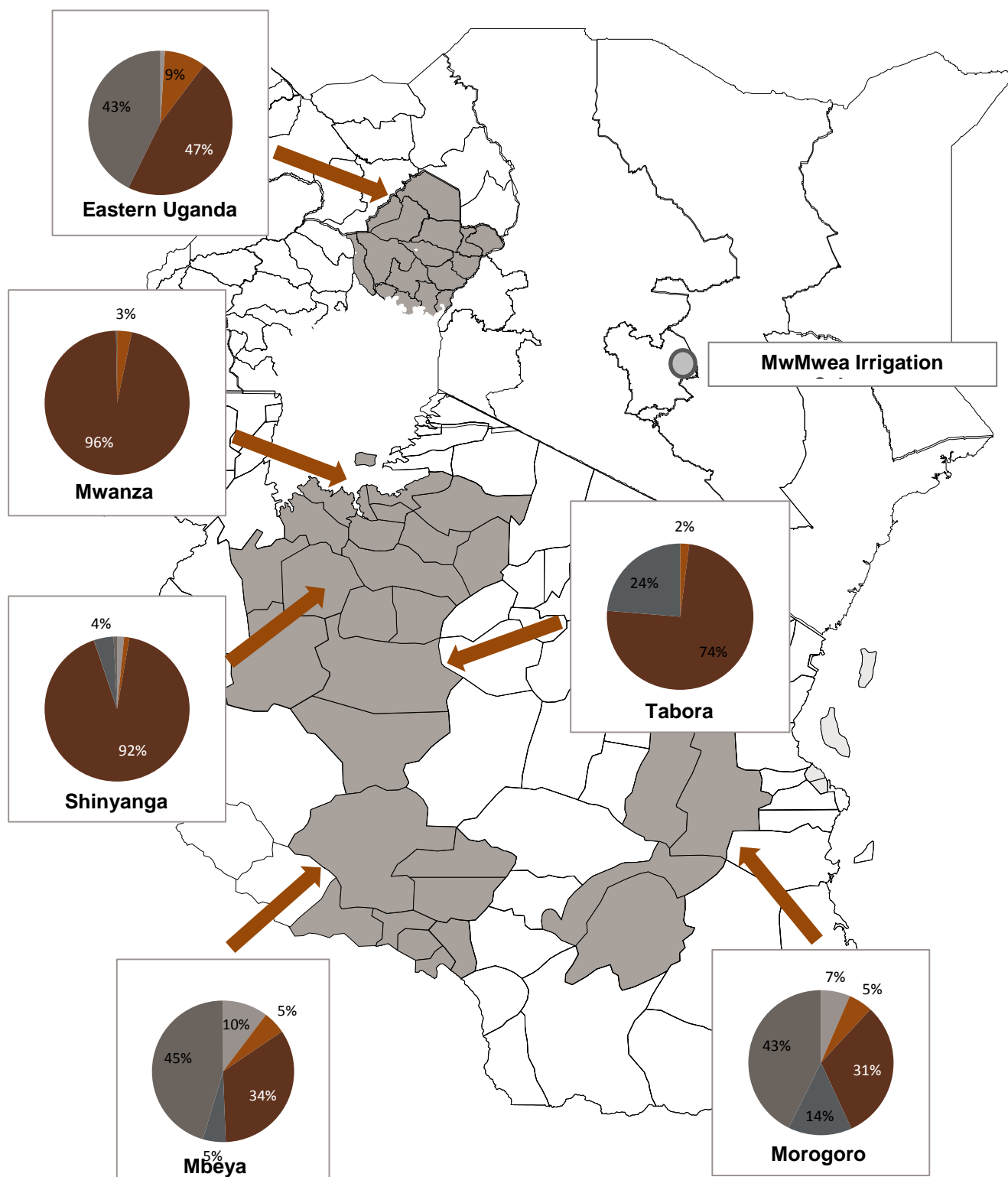
Rice is traditionally cultivated by flooding the rice field after the emergence, or transplantation, of young seedlings. Flooding is not mandatory for the cultivation of rice – around 20% of Ugandan rice is grown in upland, non-flooded conditions – but flooding reduces the growth of less robust weeds that cannot grow submerged, ensures reliable water to the crop, and deters vermin. Across the region, upland rice yields are around 20% lower than lowland yields. Approaches to managing the necessary water resources differ across the EAC, depending on local agro-climatic conditions and past investment in infrastructure.

Tanzanian rice is predominantly rain-fed. In the Lake Zone, farmers use lowland paddies with traditional bunds to catch rainwater in order to flood the rice fields, supplemented where possible with managed river flooding (especially in Tabora, which has more rivers than Mwanza and Shinyanga regions). In Mbeya and Morogoro, where rainfall levels are higher and more reliable than around the Lake, over 40% of farmers rely on rain only, with no irrigation; these regions also contain Tanzania's only large modern river-fed irrigation schemes. Tanzanian official data shows that nearly half of the country's rice is irrigated; but AfricaRice data suggest only 20% is, and our survey data give an even lower figure, around 5%.

Uganda's rice sector is split between irrigated (40%), lowland (40%) & upland (20%) agriculture. In the east, farmers predominantly use either traditional bunded irrigation or lowland rain-fed conditions similar to southern Tanzania, although there are also major irrigation schemes at Doho and Olweny. In the north and west, over the past 7-8 years the government has strongly promoted NERICA varieties for upland rain-fed agriculture, where rice is grown without paddies.

Kenyan rice is 80% irrigated, with rain-fed rice only grown along the coast. Rice growing is concentrated in a small number of large irrigation schemes, particularly at Mwea in Central region which, with approximately 4,000Ha of effectively irrigated land, produces around one-third of the country's output. Survey data from Zaal (2012) illustrates this distribution of irrigation patterns used by rice producers across the key production zones (Tanzania and Uganda only):

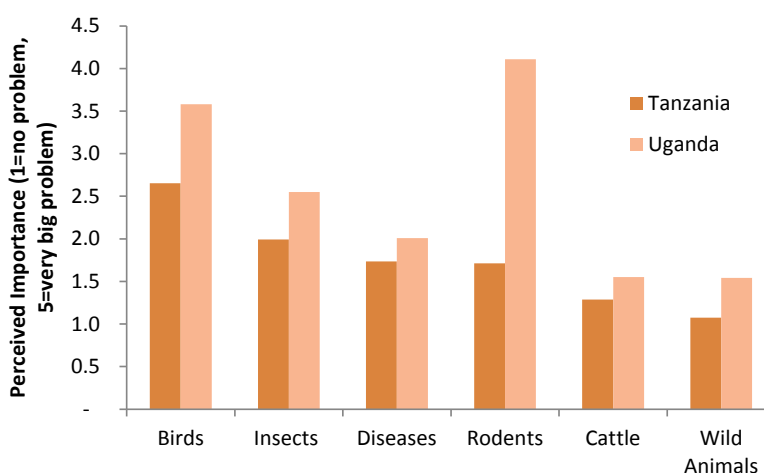




Pest & disease issues

The use of flooded paddies is usually an effective weed management technique. However, rice farmers do face a range of problems in achieving high yields. Birds' eating the rice grain is the main concern (although farmers surveyed in Uganda had a major problem with rodents). Rice is not as susceptible to insect pests as many crops such as maize or cotton: only three farmers in our survey of over 1,400 mentioned access to insecticides as the most important change that could improve their productivity. However, insects are still seen as an issue; followed by diseases such as rice blast.

Key problems in rice cultivation: farmer perceptions



Role in food security & cash generation

In EAC, rice is the second most important food crop after maize. However, since it is primarily consumed by urban, higher-income populations it does not play a major role in national food security (unlike, say, cassava, or maize in Tanzania and bananas in Uganda). In Uganda in particular it is not a major food security staple – even among rice farmers, only 5% see it as their main source of food.⁸ However in Tanzania, rice is the staple crop for two-thirds of farmers who grow it – over three quarters of a million households, or around four million people. And in the urban areas, nearly as much rice is consumed as maize.⁹ Moreover, with consumption growing at an average of around 4% annually (and up to 7% annually in recent years)¹⁰, rice will only grow in importance as an urban staple necessary for the food security of the region's cities.

The primary social role of rice in the region, however, continues to be as an income generator for around 1.5 million smallholder households who grow it across the region. As discussed in this report, rice is the most important cash crop for over 80% of these farmers, and on average it brings in an income of around \$550 per household annually.¹¹ Increasing that income by driving up yields and perhaps increasing the value share of the final milled product captured by the farmer would thus have a significant impact on poverty reduction across the region. Focus group discussions suggest that rice is favoured by farmers because it is a reliable crop for both cash and food. Crop failure is worse with rain-fed maize, cotton and other competing crops.

However, the demands of food security and cash generation are not aligned in current policy thinking, and in Tanzania this leads to a lack of coherence in policymaking. On the one hand, a 75% import tariff is designed to protect rice farmers who depend on the crop for cash generation – at the expense of consumers, who pay a significant premium for their rice over world prices. On the other hand, fears of a

⁸ Zaal (2012)

⁹ Stryker, *Study of Policy Options for Increasing Tanzanian Exports of Maize and Rice in East Africa While Improving Its Food Security to the Year 2025* (2011)

¹⁰ USDA-FAS data. This is discussed further in the next chapter.

¹¹ Zaal (2012)

rice shortage, and resulting price spikes, lead to repeated export bans: deterring producers from earning the best price for their crop in times of temporary shortage by forcing them to sell locally. Neither of these policies promote the necessary investment in rice productivity and trade which could provide the incentives and the resources to drive up productivity in farming and efficiency in distribution, promoting both cash generation and food security at the same time.

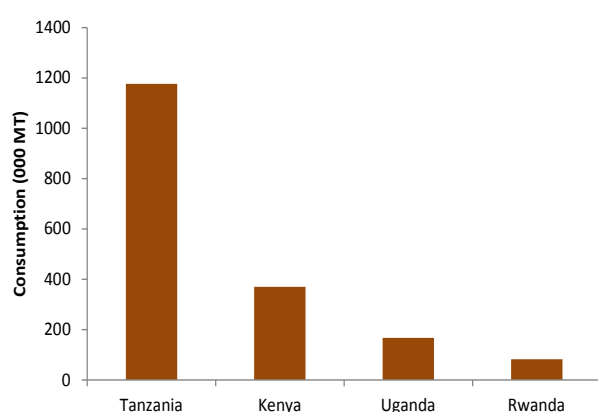
CHAPTER 2: MARKET DEMAND

Demand, growth and imports

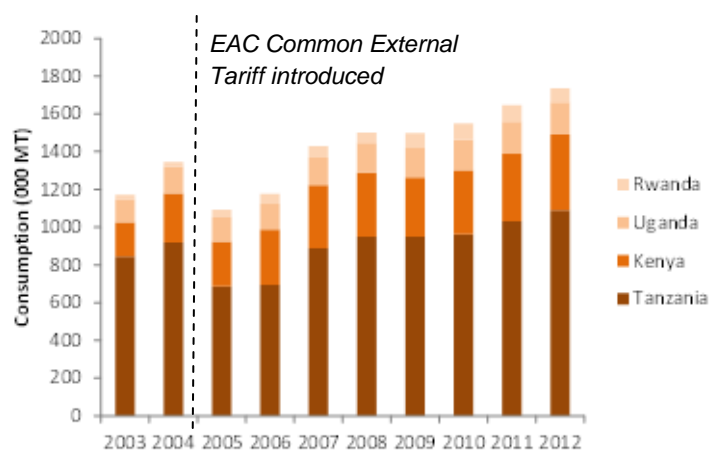
Tanzania is not only the largest rice producer in the EAC, it is by far the region's largest consumer. It has both the largest population and the highest per capita consumption rate in the region (around 25-30kg per person, depending on different estimates, compared to 10-18kg in Kenya, 5-7 kg in Uganda and 4kg in Rwanda and Burundi).¹²

Following a drop in 2004-05, when the introduction of the CET cut imports to Tanzania, regional consumption in the EAC has grown in line with GDP, at 7% from 2005 to 2010: far faster than growth in maize or wheat consumption. This is driven by a combination of population and income growth: as rice is an expensive staple, it is primarily consumed by the better-off in society, and hence consumption rises roughly in parallel with national per capita income. It is often correctly noted that rice is primarily consumed in urban areas; however, since urbanisation is linked to GDP growth, this should not be treated an independent driver of consumption.

Rice Consumption by Country¹³



EAC Rice Consumption, 2003-2012¹⁴



With GDP growth likely to continue in line with recent trends, this growth in consumption could be maintained in coming years.

As a result of this rapid consumption growth, the region as a whole remains dependent on imports to satisfy demand – despite the sharp increases in production described in the previous chapter. However, the dynamics of these imports – and the data available to understand them – is different in each country. For Kenya and Uganda, the level of imports is reasonably transparent, although there is under-reporting of import data for all EAC countries which makes trade analysis slightly imprecise. The charts on the following page illustrate how Kenya imports around 300 thousand MT per year, of which 75% comes from Pakistan, while Uganda imports around 70 thousand MT from a range of sources, including nearly 25% from Tanzania. Rwanda's import figures are much smaller: COMTRADE data suggests that total imports are around 25 thousand MT, of which 50% comes from Pakistan (half transhipped through Uganda) and 30% from Tanzania. However, again this data is not very reliable: a comparison of USDA consumption estimates and Rwanda's own production figures suggests a much larger import gap of 50 thousand MT, although this is probably because the Rwandan Ministry statistics underestimate production.

Kenyan Imports by Origin¹⁵

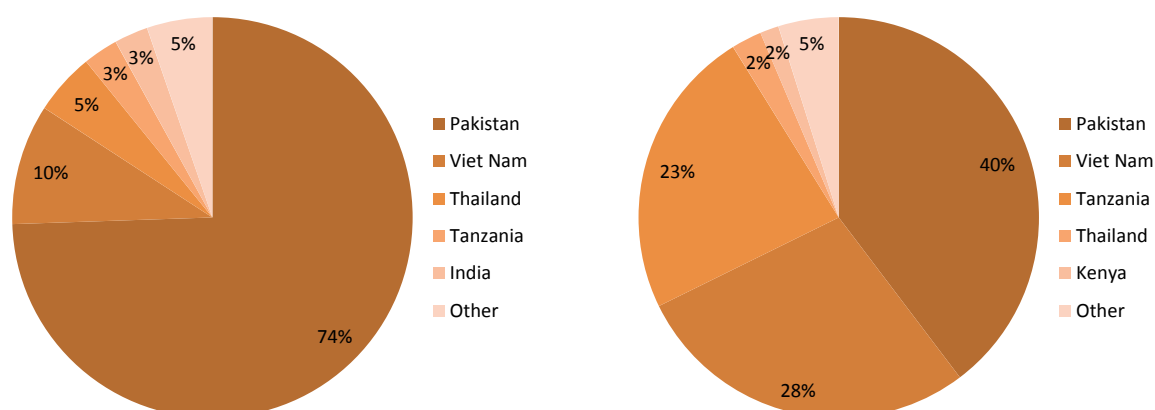
Ugandan Imports by Origin

¹² CARD (2010); Stryker (2011) for Tanzania consumption estimates.

¹³ USDA-FAS, 2009-11 average

¹⁴ USDA-FAS, data from 2003-12

¹⁵ COMTRADE, data from 2008-10



There is a difference in import use between Kenya and Uganda. Virtually all of Kenya's imports are for consumption, but 50% of Uganda's imports are for re-export: the country acts as a key transit corridor for shipping relatively cheap Pakistani or Vietnamese imports onwards to Rwanda, DRC and South Sudan. This pattern is discussed further in Chapter 4.

For Tanzania, the data is less transparent and there is some dispute as to the importance of imports. Based on official figures, some argue that the country is approaching self-sufficiency due to recent production growth combined with slowing consumption growth. There are three reasons to doubt this conclusion, and to believe that the gap between production and consumption is wider than official figures suggest:

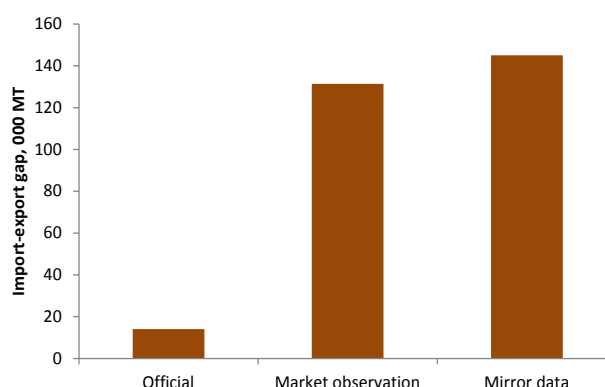
1. Direct observation: USAID estimate, based on observation in Dar es Salaam markets of the prevalence of local vs. imported rice, that as much as 75 thousand MT may be imported informally.¹⁶
2. Price dynamics: USAID argue that if the market were nearing self-sufficiency, in the presence of an export ban, then recent years would have seen prices soften as local rice began to compete head-on with cheaper imports – but this has not been observed.
3. Trading partner data: Gatsby's own commissioned research from Saana Consulting uses mirror data from exporting countries to Tanzania to suggest that an additional 80-90 thousand MT is imported over and above official figures.¹⁷ The same data suggests that Tanzania's reporting of the source of its imports is grossly inaccurate: while import data puts the US and Japan as the largest importers, mirror data suggest that Vietnam is by far the biggest exporter to the country.

On the other hand, interviews with some large millers suggest that a significant level of informal exports should be added into this picture, with more rice leaving the country than is usually accepted. Again, this picture is supported by Saana Consulting, who use mirror data from EAC trade partners to suggest that Tanzania's exports are over twice as high as officially stated. In other words, due to poor data gathering and perhaps some degree of official complicity, both imports to and exports from Tanzania are significantly under-reported.

¹⁶ Stryker, (2011). NAFKA argue that this volume is too large to be smuggled in through low-tariff Zanzibar, and that therefore there must be some degree of complicity by officials in allowing informal imports to be landed

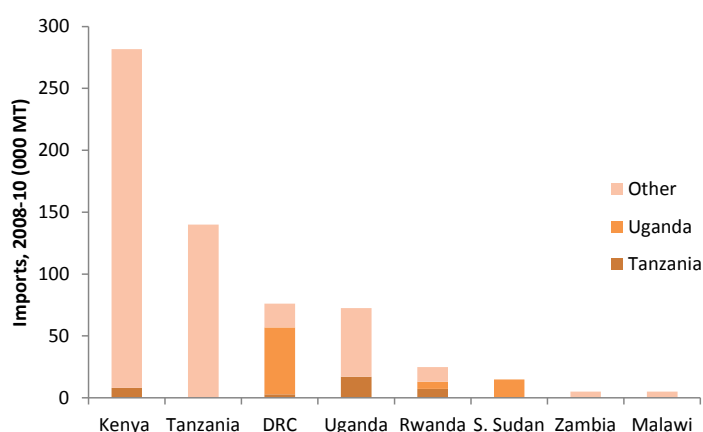
¹⁷ Saana Consulting, *Rice Trade in the EAC: Flows, Dynamics and Policy* (2012), p18-20. It is worth noting that mirror data from Kenya and Uganda does not show a similar picture – in both cases, self-reported imports match trade partners' export data fairly closely

Where does this leave the question of Tanzania's self-sufficiency in rice? The chart on the right shows how both the revision in the import and export data sets suggested by the use of mirror data, and the market research by USAID, suggest a view which differs significantly from the official position, with an import gap of around 140,000 MT.



There is even less reliable data on consumption or imports for either of the two major non-EAC importers in the wider region – DRC and South Sudan – although the chart below gives some estimates of import volumes. South Sudan is assumed to receive all its rice imports through Uganda, where Tilda Uganda, one of the few firms in the EAC with an interest in high-quality niche varieties of rice (both domestically produced and imported) reports a small but significant market for high-end product. Unofficial trade, especially across Lake Tanganyika into eastern DRC, may be significantly higher than official statistics suggest.

Rice imports by EAC and neighbouring countries¹⁸



Segmentation of demand

Rice demand in the region has two well-known key characteristics: it is concentrated in cities, and among higher-income consumers.

Survey data¹⁹ suggest that rural per capita consumption is only one-third that of urban consumers in Tanzania (a figure which corroborates similar USAID estimates²⁰) and is around half that of urban consumers in Uganda and Rwanda. Maize is always considered by far the region's most important staple – but nearly as much rice is now consumed in Tanzania's cities as maize.²¹ USAID suggest that that rice is six times more important as a share of total food consumption for top-quintile consumers than for bottom-quintile consumers.²² This report therefore segments demand based on these two characteristics: primarily by rural-urban; and within that segmentation, by income.

Rural demand

¹⁸ USDA-FAS and COMTRADE (2008-10)

¹⁹ All consumer survey data in this section from the Kilimo Trust 2012 survey of rice consumers. The survey methodology is outlined in Annex I.

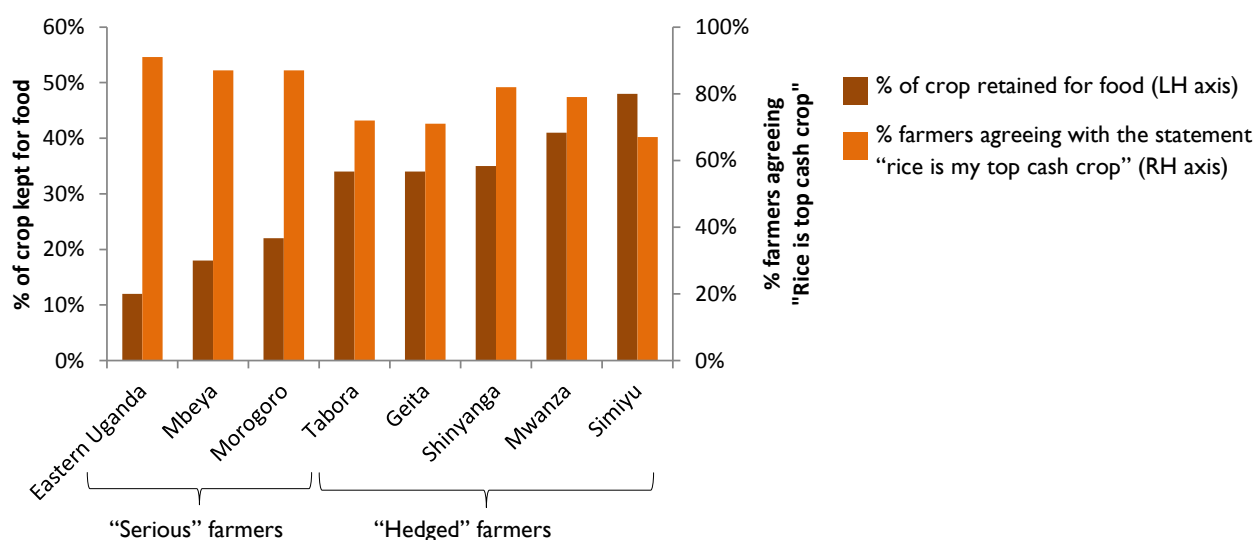
²⁰ Stryker (2011)

²¹ Stryker (2011)

²² SERA Policy Brief, August 2012

Rural consumption patterns differ by country. In Tanzania, the region's largest producer, rice is an important staple food for the rural communities where it is produced. Rural consumption is relatively high, and concentrated among the farmers who grow it. This can be quantified at a high level by smallholder survey data²³ which suggest that nearly 30% of rice produced is consumed on the farm by the producer household: a total of approximately 300,000 MT. Using analysis based on the 2001 household budget & consumption survey, Stryker (2011) estimates that only around 350,000 MT of rice was consumed overall in rural areas of Tanzania. Together, these figures suggest that over 85% of rural rice consumption is by the farmers themselves.

However, these overall figures mask significant differences between regions in which farmers traditionally grow rice primarily for cash, and regions where rice is seen as a good “hedging” crop offering both cash and food, depending on need. The chart below shows how farmers in Morogoro and Mbeya differ in that they almost all consider rice as their most important cash crop, and they sell a much higher proportion of their crop than in other major producing regions.²⁴



The chart also highlights that Uganda has significantly different rural consumption pattern to most of Tanzania. Farmers in Eastern Uganda, who produce around two-thirds of the country's rice, do not consume it themselves in significant quantities, retaining only 10% of the crop for consumption: they resemble the cash-crop oriented farmers of Mbeya and Morogoro, only more so. Consumer survey data for Uganda reinforces this picture, suggesting that among rural consumers, Uganda's per capita rice consumption is by far the lowest in the whole region – barely 30% of the EAC average.²⁵ Clearly for Ugandan rice farmers, rice is not grown to eat, but is primarily a cash crop which is sold to buy alternative food – maize & plantain.

As in Uganda, rural consumption in Kenya is much less significant than in Tanzania. In large part this is driven by a similar dynamic, where farmers (who are concentrated in Kenya's rice irrigation schemes) tend to see rice as a cash crop to be sold to buy other food. Kenyan per capita rice consumption in rural areas is the second-lowest in the region behind Uganda. However, there is some significant consumption of local rice in rural areas which shows up in consumer surveys. Rural consumers state a preference for local varieties – suggesting a “Tanzanian” pattern whereby rice is consumed in those areas which produce it, where local varieties are widely available. By contrast, urban consumers prefer cheap imported varieties, preferably branded and packaged professionally – a much less traditional market, much less reliant on local production. This difference between rural and urban preferences is

²³ All smallholder data in this section from Zaal (2012)

²⁴ In Eastern Uganda, very few farmers grow rice for food at all – production is almost always for cash.

²⁵ All consumer data in this section from Kilimo Trust (2012)

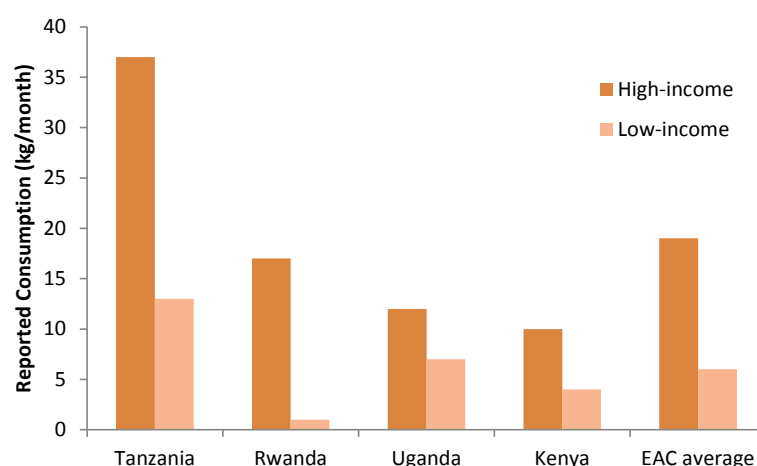
not seen in Uganda or Tanzania, where urban consumption is met primarily by domestic production, and therefore similar (local) varieties are preferred by urban and rural consumers alike.

Urban demand

Unlike in rural areas, where as we have seen, the vast bulk of rice consumption is by rice farming households themselves, consumption in urban areas is more biased towards high-income rather than low-income consumers.

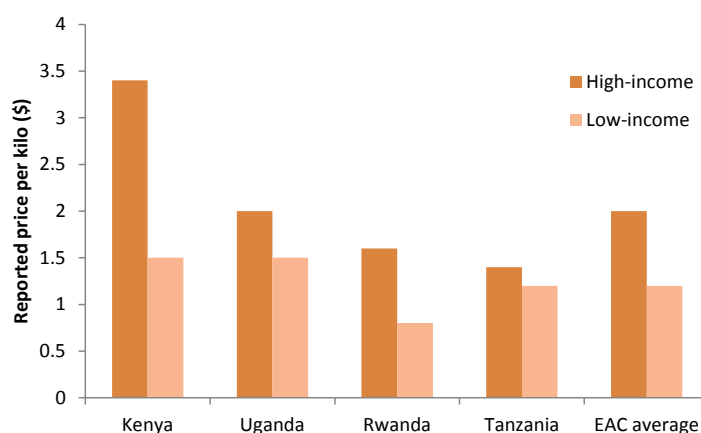
The consumer survey, which segments consumers into three income groups, estimates that the high-income segment buys 2-4 times as much rice (depending on the country) as low-income group. This is not surprising – there is a significant literature which stresses that rice is a preferred staple for those who can afford it – and on average, rice prices are 3-4 times higher than maize prices per kilo.²⁶

Consumption by income group



However, rice consumption patterns are not uniform for high-income and low-income consumers. Across the region, price sensitivity is a key dynamic shaping demand. 90% of consumers across all countries rate price as an important or very important factor they consider when buying rice, placing it above quality or taste characteristics; it is the most-cited driver of consumption volumes. Obviously this suggests a high income elasticity for rice, which implies that the behaviour of high-income and low-income consumers should be different. And indeed, prices paid by high-income consumers are significantly higher in all cases than those paid by low-income ones.

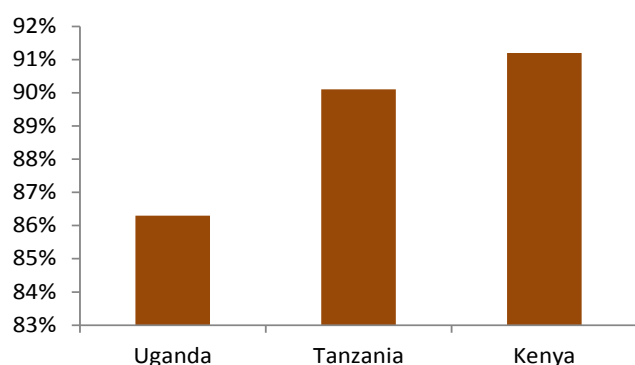
Reported rice prices by income group



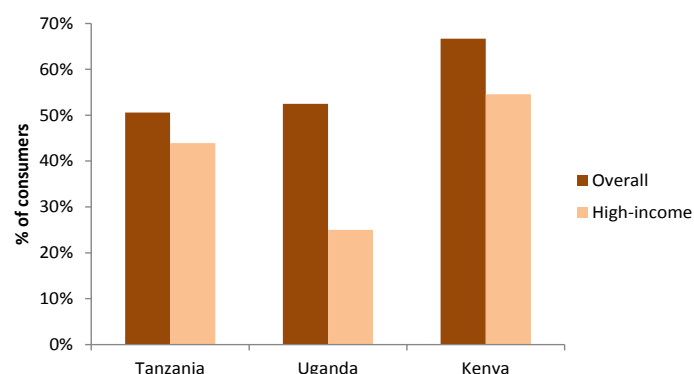
²⁶ RATIN price data from Dar es Salaam, Nairobi and Kampala, week of 18 Jan 2013

However, it is striking that most consumers - high-income consumers as much as low-income ones – suggest that the quantity they purchase is related to price (see charts). Kilimo Trust’s report notes that rice consumers in the EAC tend to be price sensitive and slight changes in rice price are likely to trigger a shift away from rice to substitute foods such as; maize flour, banana, sweet potato, cassava and Irish potatoes. Rice is not a staple in the region; rather, for the overwhelming majority of consumers, high- and low-income alike, it remains a luxury whose consumption fluctuates with price.

% stating affordability is “Important” or “Very Important” when choosing to buy rice

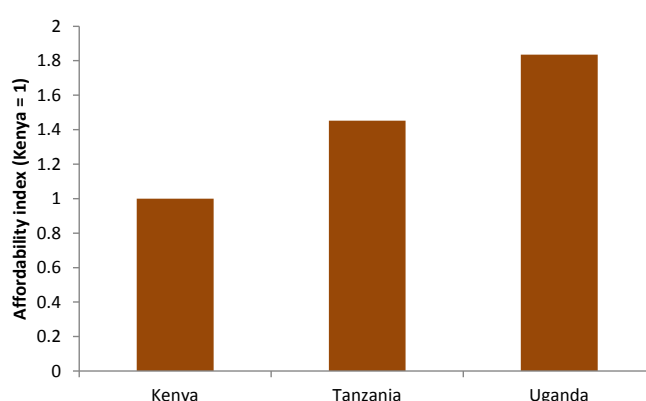


% of consumers stating they would reduce consumption if prices rise



It is apparent that these consumer responses above suggest that the level of price sensitivity is highest in Kenya. Three facts substantiate the consumer research on this. Firstly, it matches the consensus view of Kenya as a price-sensitive market among local experts, who stress that it is only the very rich of Nairobi’s middle class who do not exhibit a tendency to buy the cheapest rice available. Secondly, it is corroborated by an affordability analysis of market prices. As shown above, prices in Kenya are typically higher than those elsewhere in the region. However, if long-term average prices (as reported by the East Africa Grain Council’s RATIN data service) are re-based relative to per capita GDP, Kenyan prices are notably lower than those reported by its neighbours, as shown below.

Relative EAC rice price index (Kenya = 1)²⁷



Note that this does not mean Kenyan rice is cheaper than Tanzanian rice – Kenyan prices are around 10% higher than in Tanzania. But relative to incomes, Kenyans are much less willing to spend money on rice than Tanzanians or Ugandans.

Thirdly and most tellingly, it is corroborated by data on Kenya’s imports. As discussed below in the Trade section, rice consumption in Kenya is largely reliant on Pakistani imports, which comprise around two-thirds of total national consumption. No data is available on the Kenyan side regarding the segmentation of these imports, but data on Pakistani exports collected by the Rice Exporters

²⁷ Source: RATIN, World Bank. Rice prices are annual averages across all major urban markets

Association of Pakistan suggests that over the period 2010-2012, nearly 90% of exports were of the lowest grade, non-aromatic variety.

On a related issue, Gatsby's consumer survey also highlights that taste and aroma, vital market attributes for rice in Tanzania and Uganda, are far less relevant in Kenya. The difference between high and low season prices at consumer level is around 30% across Tanzania; it is slightly lower in Uganda, and negligible in Kenya, differences that are explained by two factors. Firstly, that rice is much less widely consumed in Kenya and Uganda than in Tanzania, and consumers therefore switch more readily to other products when rice is scarce, reducing pressure on prices. Secondly, imports (which are not seasonal, since world rice availability and price do not move in tandem with the East African rice season) play a much larger role in domestic consumption in Uganda, and comprise nearly 80% of consumption in Kenya.

In Tanzania, the price rises at high season seem to be passed directly back to the farmer: market differences translate into a farmgate price difference of around 30%. Farm-level data was not gathered in Kenya, but it would be surprising if Kenyan farmers retained much pricing power in the face of Pakistani imports.

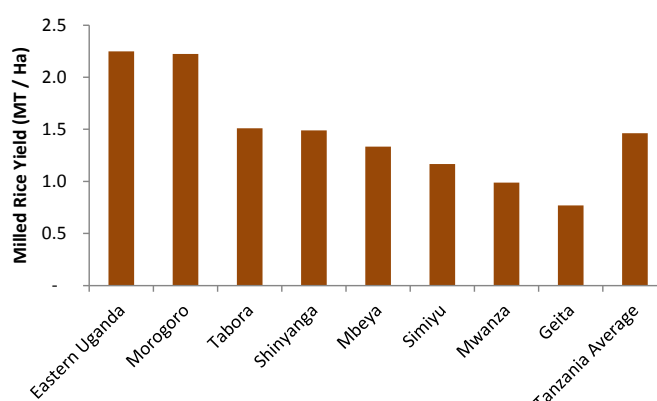
Retail market structure

Rice consumers in the EAC purchase rice from a variety of sources including open markets, retail shops, supermarkets, farm-gate, rice processors, mini-supermarkets and wholesale shops. The urban high income consumers purchase rice mostly from open markets and retail shops while rural consumers mostly purchase rice from open markets, retail shops, wholesale shops and rice processors. Consumer preference for point of purchase was influenced by distance to the seller, affordable prices and variety of rice products on offer. Purchase of branded rice in Burundi is minimal unlike in Kenya where branded rice is purchased highly by the medium and high income earners in the urban areas. This is also true of consumers in Tanzania and Uganda where mostly the urban medium and high income earners purchase branded rice from supermarkets.

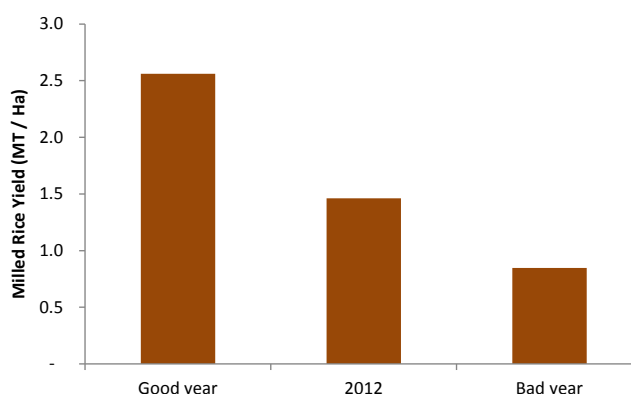
CHAPTER 3: MARKET SUPPLY: PRODUCTION & COMPETITIVENESS

Current sector productivity

Yields in the key rice-growing areas of East Africa are currently around 1.5MT of milled rice per hectare. This varies significantly between regions: Eastern Uganda has higher yields than Tanzania in general, and within Tanzania yields range from over 2MT/Ha in Morogoro to less than 1MT / Ha around Lake Victoria.



Yields also vary significantly by year: while 2012 was an average year for productivity, farmer recall data suggest that yields in good years are on average 75% higher and in bad years can be halved, or worse.



These East African yields are universally low by world standards. Global average milled rice yields are a little over 4MT/Ha, and smallholder rice growers in China and Vietnam achieve 5-6 MT/Ha. In East Africa, smallholders using high-input, labour-intensive agronomy can achieve 7-8MT/Ha – although this primarily only happens under the few areas where the System of Rice Intensification (“SRI rice”) is being promoted, which requires significant levels of support from private sector buyers to smallholder outgrowers. SRI rice is discussed further below.

Value chain structure and competitiveness

Marketing was not frequently mentioned as a major issue of concern for farmers in the producer survey. Only 5% of farmers mentioned markets, marketing or price related issues as the most important problem in the sector that they would like to see addressed. Nevertheless, it is important to have a closer look at value chain issues: they affect the eventual competitiveness of rice in the region, and they shape how intensive production efforts are translated into income and livelihood benefits.

Farmgate marketing

For all regions in Tanzania, a fairly consistent 10-20% of farmers sell milled rice, and another 10-15% barter paddy with their neighbours for other goods. The proportion who sell their paddy, however, varies widely by region. For example in the Lake Zone where rice is less commercially grown, only

around 50% of farmers sell paddy – leaving a significant proportion of farmers who do not sell rice at all, but only grow it for home consumption. In Mbeya and Morogoro, by contrast, almost all farmers sell something: as a result, in these regions more than 70% of farmers sell paddy. (As discussed in Chapter 2, 25-30% of rice is eaten by the producing households).

Informal conversations with farmers suggest that the low proportion of milled rice sales is because milling rice for sale is not seen as economically worthwhile; either the mills are some distance away, milling quality is poor (resulting in high losses), or the fees are too high. Data suggests that marketing is also an issue: of those who do mill their rice, about 30-50% of them, (depending on the region) immediately sell it back to the miller, thus adding little through the milling process to their eventual take-home income. This is a rational decision only in the absence of alternative buyers.

Farmers in Eastern Uganda take a different approach: here, 80% of farmers reported selling milled rice in what is clearly a strategic approach to marketing, despite being further from mills on average than Tanzanian farmers (although again, this rice is largely sold back to the miller, so the value to the farmer is questionable). It may be necessary to establish what explains this difference in the two countries.

There is a related difference in Tanzania between the southern corridor and the lake zone in the structures of the markets into which farmers make these sales. In the south, where as noted above the market is more developed, around 90% of paddy is sold through traders. Around the lake, the trading network is less developed; informal channels are much more common – around 25% sell to, or through, neighbours – and millers buy a large proportion directly.

Milling

Across the region, the milling sector is extremely fragmented. In Uganda there are only two major milling companies: Tilda, which has a major presence and is estimated to mill around 20% of the country's output, and Pearl Rice, which operates at a smaller scale. In Tanzania, barely 10% of the national crop is processed by large, modern milling businesses. Of these, most are in Mbeya: Wela Mills, Rafael Millers and Mtenda Kyela Rice Supply, which all focus on milling operations; and Mbarali Rice Farm, Kapunga Rice Plantations (Kapunga), Export Trading Group (ETG) and Highland Estates (Highland) in Mbeya, who combine milling businesses with estate rice growing – mostly on privatised irrigation schemes previously run by NAFCO, the Tanzanian national farm company. The biggest rice miller in the country is Kilombero Plantations Ltd, based in Morogoro (KPL). The KPL, however, only has processing capacity equivalent to 3% of the country's rice consumption.²⁸ A few other major processors exist across the EAC – notably Dominion Farms in Kenya – and BMGF estimate that perhaps another 10% in Tanzania is milled by medium-scale urban mills.²⁹ But in general, the vast majority of the crop is processed by small-scale mills, often at village level. This market structure presents a significant barrier to the development of the rice industry. Small mills have little working capital to invest in farmers' productivity; they have low paddy conversion rates, reducing industry profitability; and the quality of output is poor, with a high percentage of dirty, broken rice. The only competitive strategy for the milling industry is to compete on cost, with very low milling prices of around \$0.02-0.03 per kg in Uganda and Tanzania³⁰ adding little to the cost of the final product. This lack of investment in productivity has a major impact on the competitiveness of the sector as a whole.

Drivers of competitiveness

As with other traditional smallholder crops in East Africa, low productivity in the rice sector has similar roots across all three countries. It is primarily driven by a) poor seed quality; b) low input use and c) labour constraints, usually leading to limited adoption of best agronomic practices. A lack of modern

²⁸ Milling capacity estimates from BMGF, *Developing the rice industry in Africa: Tanzania assessment* (2012).

²⁹ BMGF (2012)

³⁰ Zaal (2012)

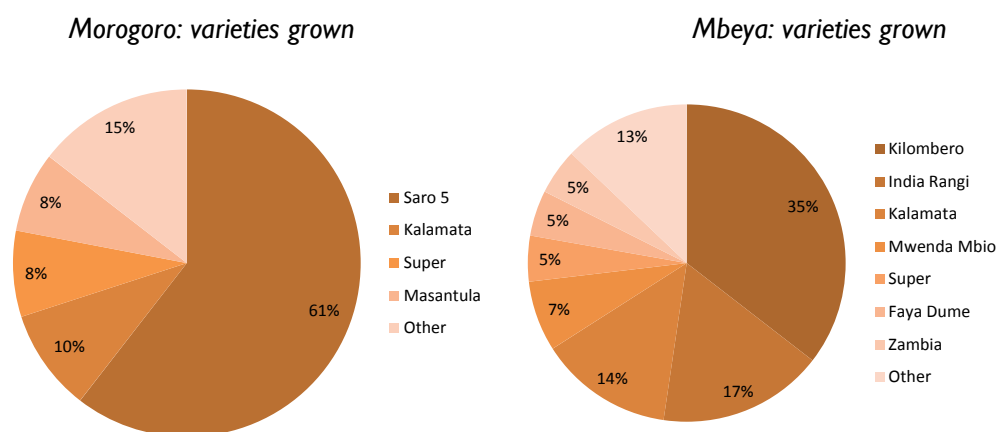
irrigation also has a major impact on yields, although the cost / benefit of investing in modern irrigation is open to question.

Seed³¹

Almost none of the seed varieties used by farmers in East Africa are improved, quality declared seeds. The available varieties are either landraces, or varieties introduced many years ago and then adopted by the farmers without regular renewal. The most common example is the Super variety, introduced to Tanzania in the 1960s and now the preferred rice for Tanzanian consumers due to its aroma and good taste. It is a tall, aromatic cultivar with extra-long grains, adapted to lowland irrigated conditions, which takes 125-140 days to mature, tends to lodge and is very susceptible to Rice Yellow Mottle Virus and rice blast. Since farmers have been cultivating the Super variety for over 40 years now without renewing the seeds regularly, private sector millers estimate that the yield potential under local irrigation is now only 3MT/Ha at best.³² Due to its popularity it was introduced in many parts of Tanzania and Uganda, and has been mixed informally by farmers with other local seeds: as a result, farmers surveyed for this report gave 15 different variety names including the word “Super” (Super Kilombero, Super India, etc.) – these varieties have much lower yield potential than the original Super variety itself.

The only improved, quality declared seed widely available in the region³³ is the Saro 5 (TXD 306) variety, released in 2002 by the Dakawa Research Centre following cross-breeding and back-crossing of Super with an improved variety from Korea (KM-67). Saro 5 is less aromatic than Super (and associated “Super” varieties), and has a lower milling quality which means it fetches 200 TShs less per 90 kg bag at harvest. However, it is equally well-adapted to lowland banded irrigation, and has a shorter growing season (110-125 days); has a shorter stem, less likely to lodge; and is somewhat less susceptible to Rice Yellow Mottle Virus (although it is equally vulnerable to other diseases such as sheath rot, rice blast and bacterial leaf blight). As a result, much higher paddy yields (up to 5-6 tons/Ha) can be attained under smallholder conditions.

This variation in the strengths & weaknesses of different seed varieties is reflected in farmers’ preferences, and in regional yields. A comparison of Mbeya and Morogoro is instructive. Farmers grow very different varieties in the two regions, with Saro 5 much more common in Morogoro (due to the presence of the Dakawa Research Centre in the region).



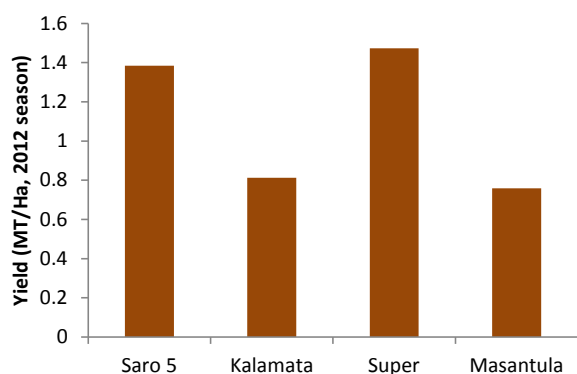
³¹ This section is largely drawn from Zaal (2012)

³² It is even doubtful if the seed stock of “Super” available at Dakawa and Kilosa Agricultural Research Institutes in Morogoro region is still the original Super germplasm.

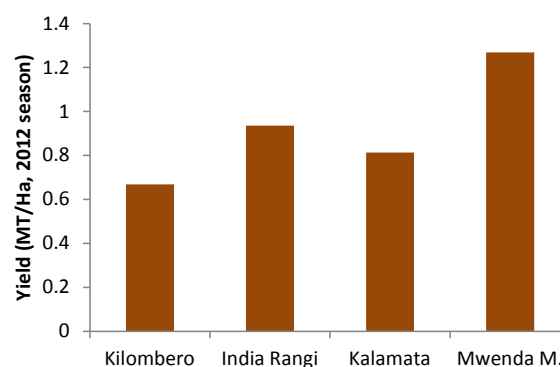
³³ A few other improved varieties have been released in Tanzania (TXD85, TXD88), but are not widely used because they are disliked by consumers on grounds of quality or taste. NERICA varieties have been promoted in Uganda for upland rice farmers, but are not popular elsewhere due to consumers’ dislike of their taste & aroma; in any case they are of limited yield benefit relative to traditional varieties in lowland growing conditions more typical of the EAC

In terms of yields, it is striking how different are the performances of these different preferred varieties. As shown below, varieties preferred in Morogoro – particularly Saro 5 – tend to have much higher yields than those preferred in Mbeya.

Morogoro: yields of key varieties



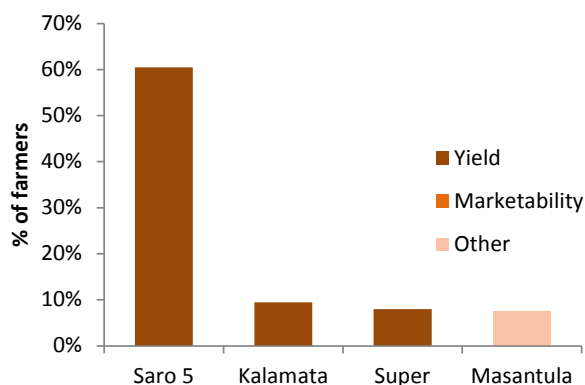
Mbeya: yields of key varieties



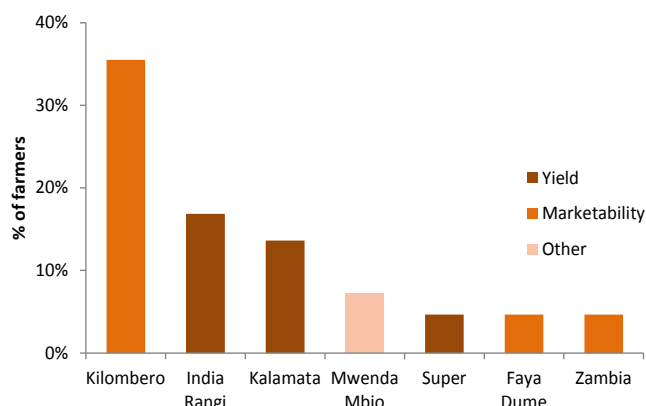
It is notable that Saro 5 is also the top varietal choice for farmers in Tabora, the region with Tanzania's second-highest yields. Seed is thus a major likely driver of low yields in Mbeya.

However, the reasons for this difference in farmer behaviour over seed choice are mixed. Saro 5 is certainly less widely available in Mbeya, but farmers there may also be making a deliberate choice to grow varieties they believe are better suited to the market. A comparison of the reasons for farmers' choice of variety shows how Morogoro farmers focus on yield, where Mbeya's farmers are more interested in varieties suited to marketing: good taste, or a high farmgate price:

Morogoro: reasons for farmer seed preference



Mbeya: reasons for farmer seed preference



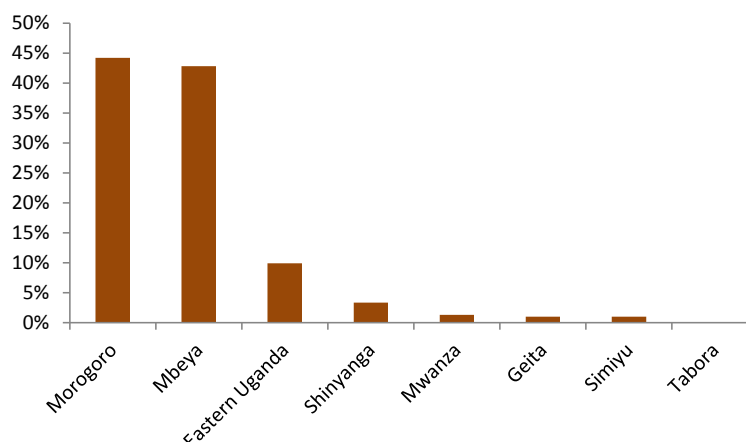
Perhaps partly as a result, “Mbeya rice” has the strongest consumer brand in Tanzania, synonymous with the highest quality aromatic rice. A similar pattern is seen in Uganda, where the most popular brand (Kaiso) is also one of the highest-yielding, and is selected for that trait. But in the market, Kaiso is regarded as a low-quality brand mainly consumed by the poor.

The lesson from the farmer preference data is therefore that any intervention in the sector will need to take careful account of the reasons behind farmers' current choices – in particular, the high marketability of some low-yielding varieties – if and when deciding to promote alternatives.

Input use

In common with most smallholder crops across East Africa, use of inputs to boost productivity in rice is low. Only 20% of rice farmers use fertiliser across the region – a percentage that is overwhelmingly concentrated in Morogoro and Mbeya:

Fertiliser use by region³⁴

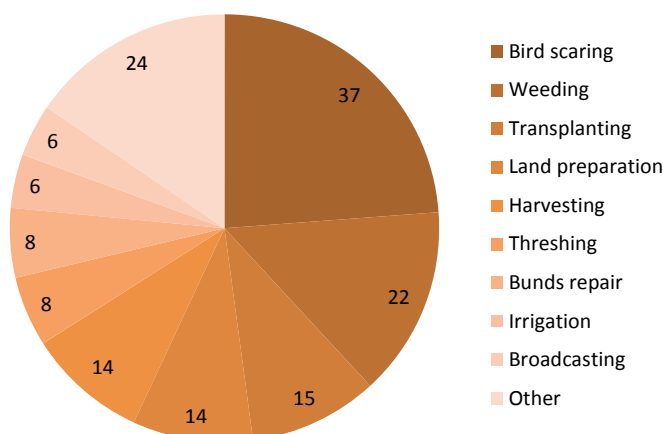


Similarly, only 16% of farmers use any form of herbicide for weed control, and again these farmers are all concentrated in Mbeya and Morogoro. One challenge here – discussed further in Chapter 7 – is the affordability of such inputs, which comprise the second-largest item of investment for smallholder rice farmers.

Agronomic practices – and labour costs

As discussed in Chapter 1, rice is a relatively labour-intensive crop, requiring investment in planting, weeding and pest control – as well as longer-term investment in maintaining irrigation where necessary. A breakdown of labour requirements by days is as follows:

Days spent growing rice per acre, by activity³⁵



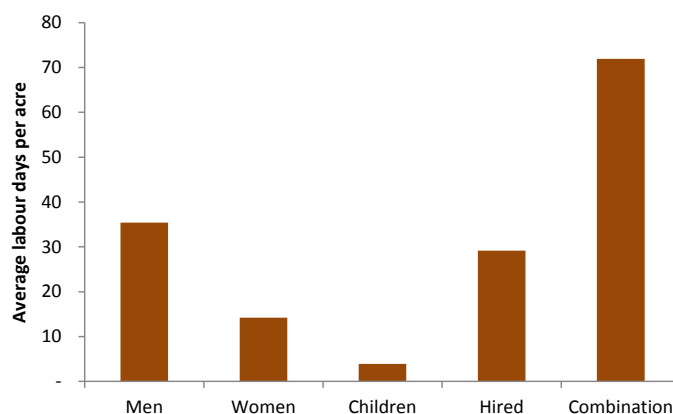
Most work is done by a combination of all family members; although much of the work is done by men, who spend on average over twice as many days cultivating the crop as women.

Labour type used³⁶

³⁴ Zaal (2012). Refers to use of mineral fertiliser only. Only 5% of all farmers use organic fertilisers

³⁵ Zaal (2012). "Other" primarily includes post-harvest activities: transport of the harvested crop, drying, winnowing and marketing

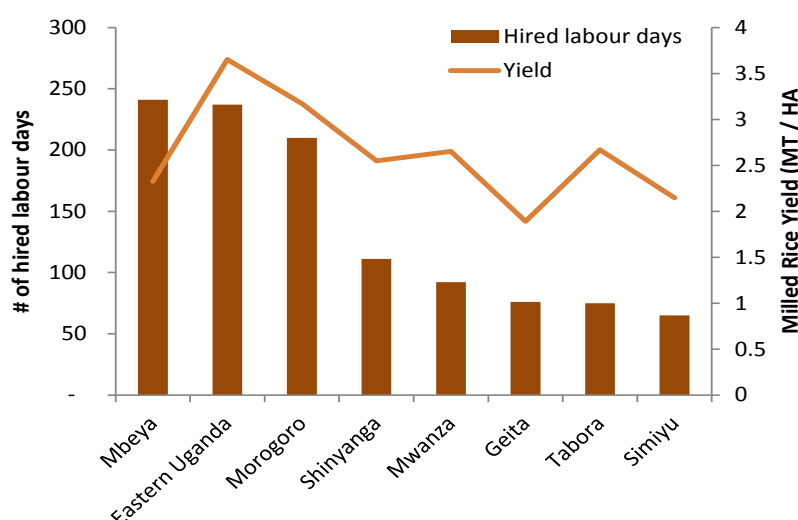
³⁶ Zaal (2012)



However, with a total of 154 man-days per acre, on average, required to grow rice, labour is a significant constraint even with all the family contributing. One effect of this is that uptake of improved practices is limited. Across the region, less than two-thirds of rice is transplanted (an activity which, as shown above, takes over twice as long as the alternative of broadcasting the seed) – even though transplanting enables a much better crop density and thus higher yields per acre.

A second effect is that productive farming tends to require investment. A significant proportion of the total labour days – particularly for the back-breaking jobs of land preparation, transplanting and weeding – are done by hired labour. As with inputs, the regions where rice is grown more commercially (Mbeya, Morogoro and Eastern Uganda) use far more hired labour than farmers in the Lake Zone, who both reduce the number of days used in total and dramatically reduce their investment in labour by increasing their family share. With a couple of notable exceptions (Mbeya and Tabora – where we have seen that seed choice plays a major role in productivity) this variance in investment has a clear impact on yields:

Use of hired labour vs. yields, by region³⁷



SRI Rice

One frequently-cited approach to improving agronomic practices is the System of Rice Intensification, or SRI. Exact practices differ in different circumstances, but broadly it requires farmers to use fertiliser; grow seedlings carefully in high-nutrient environments; and transplant them carefully according to well-defined spacing. It typically does not involve flooding the rice – due to the method of transplanting – which in turn increases the weeding burden. In other words, it is a high-input, labour-intensive approach

³⁷ Zaal (2012). Labour days refers to total labour days, not days per acre as in the previous charts, and hence can sum to more than 154 as most farmers have more than one acre of rice. Total days, not days per acre, is a better guide to total investment.

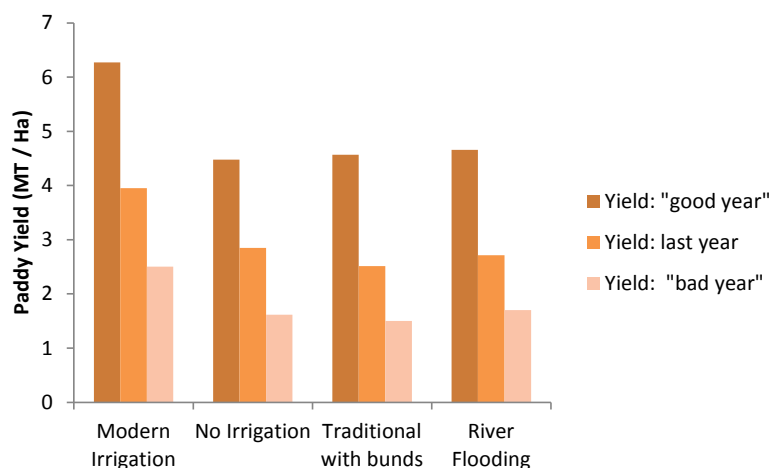
to agronomy. Returns are high – yields can be up to 8 MT/Ha – but farmers need to have access to credit, and to be encouraged by a strong market buyer to treat the crop commercially.

It is worth noting that AfricaRice, the leading rice research institute on the continent, has done research which suggests that SRI rice per se is no more productive than a range of other high-input, high-labour approaches to agronomy. Their conclusion is that different practices have different strengths, and allowing farmers to adapt them to local growing conditions may be a more effective approach than promoting one particular methodology. Whichever is practiced, the main driver of productivity is likely to remain a commercial attitude to investing time, inputs and effort in the crop. This in turn is typically dependent on strong value chain linkages.

Water availability

As noted in Chapter 1, irrigation is a key component of rice cultivation, and survey data suggests that modern irrigation schemes do have a major beneficial effect on yields, ranging from a 35% gain in good years to over 55% higher yields in bad years. Where farmers do not have access to such schemes, however, they seem to vary their approach to water management to suit local conditions – not investing labour in irrigation where rainfall is sufficient, but otherwise using rivers where possible, or bunds to catch limited rain – in order to achieve very similar results:

Yields by irrigation type



However, whether large-scale investment in irrigation is a necessary part of the solution remains a question for further analysis. Some past investments in modern irrigation have led to disastrous mis-use of water resources, in some cases including drying up major rivers downstream for long parts of the year.³⁸ High yields have been obtained across the region by smallholders on rainfed systems, given the right seeds and support. And at costs of around \$3000 / Ha for new irrigation systems, it is not clear whether irrigation is an efficient use of public investment.

How competitive can EAC rice farmers be?

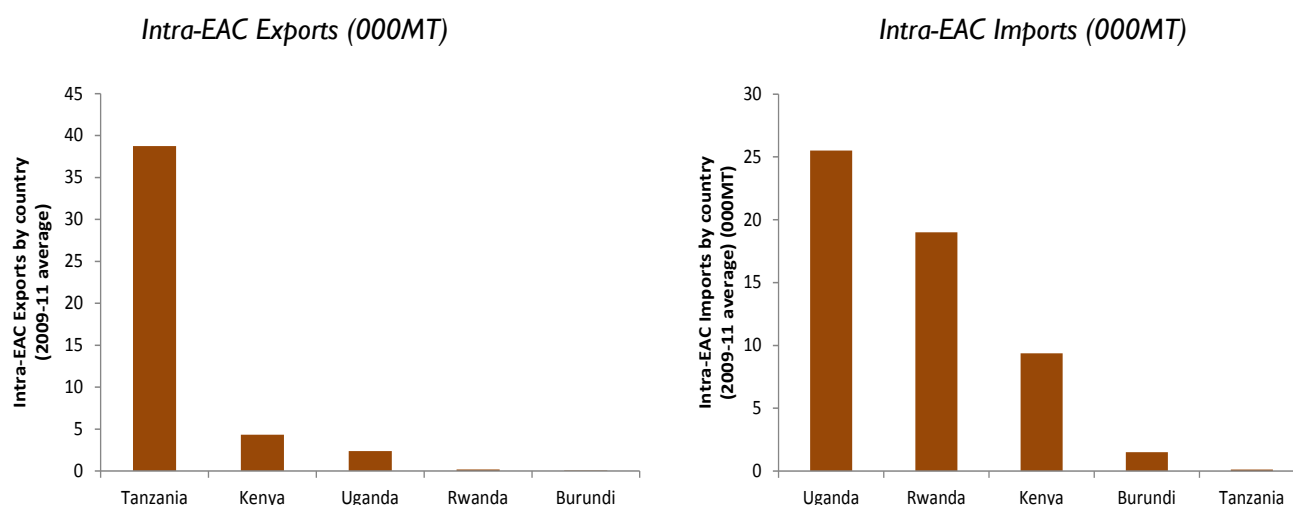
A key question for our Phase 2 research will be to determine the potential capacity supply and value of rice in the EAC. This will include further analysis of the level of access to credit, and willingness to invest, against the requirements of high-yielding practices such as SRI. It will also involve an evaluation of the geographic areas that are really suitable for high-input, high-output rice, reviewing agro-climatic maps and smallholder data to identify key areas for investment.

³⁸ Lankford, B.A. et al, *Red Routes on Blue Rivers: Strategic Water Management for the Ruaha River Basin* (Water Resources Development, 2001); and *Irrigation improvement projects in Tanzania; scale impacts and policy implications* (Water Policy, 2003)

CHAPTER 4: OPPORTUNITIES FOR REGIONAL TRADE

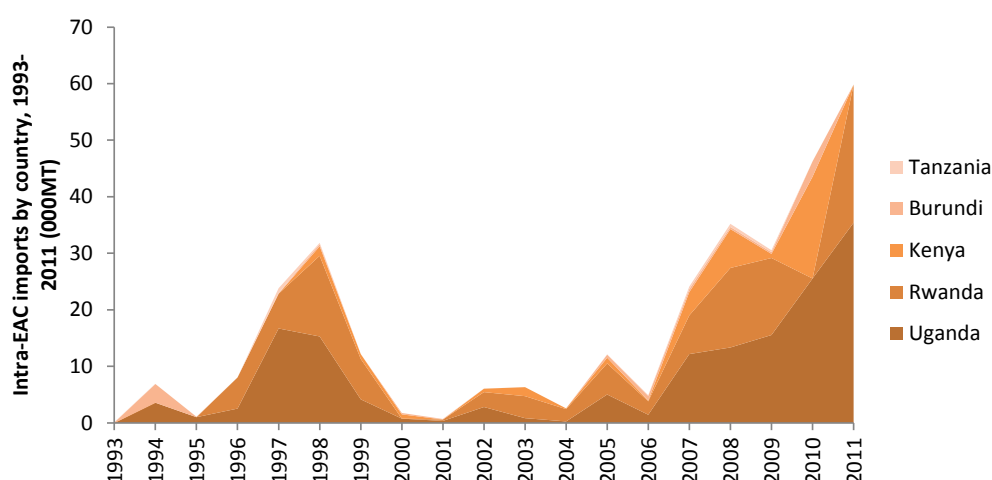
Current intra-regional trade trends

Intra-regional trade is primarily comprised of Tanzanian exports to its neighbours – particularly Uganda and Rwanda – although there is a significant flow from Kenya to Uganda of re-exported Asian rice:



On aggregate this trade is currently at a very low level compared to regional production: total exports within the region are around 60,000 MT, less than 5% of the region's total output. However, it is expanding rapidly (over 30% annually since 2005), driven primarily by recent growth in Tanzanian exports to Uganda, but also (to a lesser extent) to Rwanda:

Intra-EAC Imports by country, 1993-2011 (000MT)



Besides these formal flows, rice is also exported by small-scale traders, both formally and informally and both within the EAC region and to its neighbours. Most of these are based in the importing country (Kenya, Rwanda, DRC) and travel to Uganda or Tanzania in order to purchase rice, perhaps having a comparative advantage in successfully navigating border processes. Quantifying these cross-border flows is by their nature a difficult task – however, it is likely that cross-border flows from Tanzania into DRC are much higher than those formally recognised.³⁹

In addition to informal exports, the only major export trade from the region is from Uganda to South Sudan, a dynamic discussed already. A small part of this trade is high-end exports to the emerging middle class in Juba; but the vast majority is re-exports of cheap Asian rice imported through Kenya.

³⁹ Saana Consulting (2012), p.10

Future trade potential

The potential for future trade is dependent on the potential for future productivity growth. As summarised by Stryker in a recent USAID study: “because of rapidly growing domestic demand, Tanzania will have a hard time achieving and sustaining an export surplus in rice [given current production growth rates]. However should the rice sector reach a 10% rate of growth, continuing and sustained export surpluses would ensue. On the other hand, if the rate of growth should slide back to 5%, one could expect ever growing trade deficits.”⁴⁰

Currently, supply and demand are roughly in balance in Tanzania, and are growing at a similar rate; a sustained increase in productivity would generate surpluses which would, if not successfully exported, drive down farmgate prices in Tanzania to the detriment of smallholder rice growers.

USAID go on to say that “in summary, on the demand side, there is no serious constraint on Tanzania’s exports of either maize or rice within the eastern African region. The constraints are only on the side of supply.” This is true, but it over-simplifies the issue slightly. The important question for producer countries in the region – Tanzania and Uganda – is what type of supply they should be aiming for. The potential for future trade in the region depends not only on increasing productivity on the supply side, but also producing the type of product Kenyans want to consume, at a price they are willing to pay. This is a challenge discussed further below.

Imports and the competitiveness challenge

There are two key competitiveness issues in East Africa’s rice sector which go to the heart of the discussion about the sector’s future growth and sustainability. Firstly, whether Tanzanian rice can be competitive with its own domestic imports in the absence of the current protective tariff. And secondly, whether Tanzanian rice – or to a lesser extent Ugandan rice – can be sufficiently competitive with cheap Kenyan imports to open up a new market that would absorb the output of any significant productivity gains.

Tanzanian import competitiveness

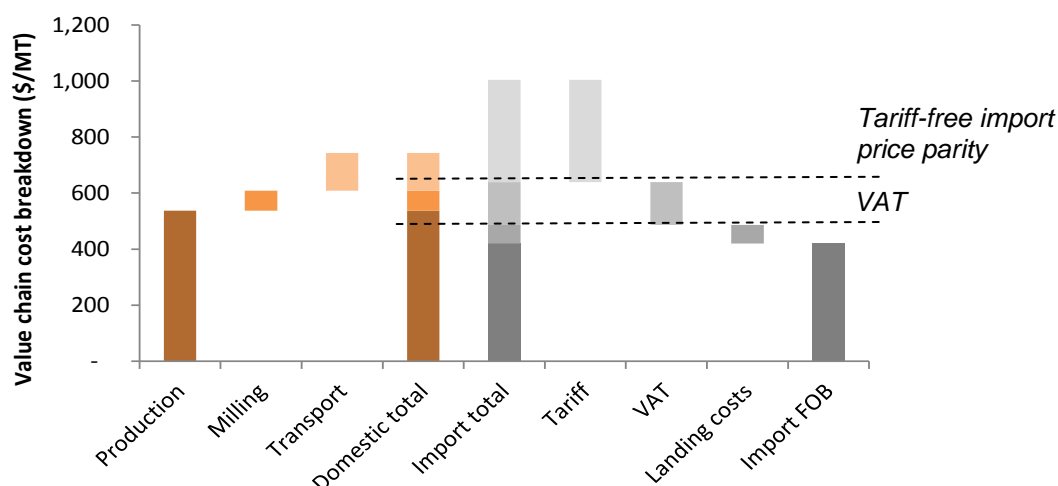
Looking at value chain costs in Tanzania it is clear that at present, local rice would not be competitive without the 75% EAC import tariff: at current productivity, Tanzanian rice is 16% more expensive than tariff-free imports would be. However, the tariff is not the only form of protection applied to domestic production. Tanzania also applies a 20% VAT rate to imported rice, which local rice is effectively not subject to: if VAT were applied equally, and there were no tariff, Tanzanian rice would be 53% more expensive than imports.⁴¹

*Value chain cost breakdown vs. imports, Tanzania: I*⁴²

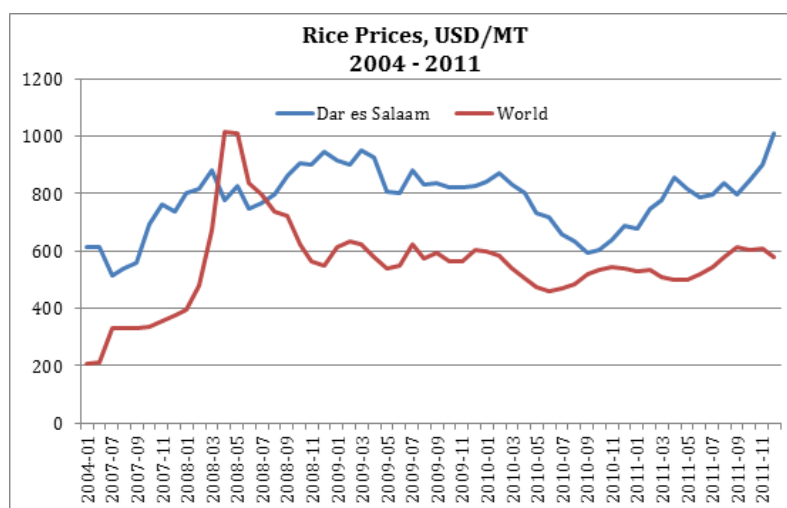
⁴⁰ Stryker (2011), p14-15

⁴¹ The VAT Act (1997) exempts all *unprocessed* cereals from 20% VAT. It exempts informal market sellers, who are not VAT-registered and who sell unpackaged rice. It does apply to the formal retail sector: one reason why formal retail of cereals in supermarkets is less developed in Tanzania than Kenya, which exempts all food from VAT.

⁴² Gatsby analysis from data from BMGF (2012), Saana Consulting (2012), NAFKA (2010) and World Bank (2009).



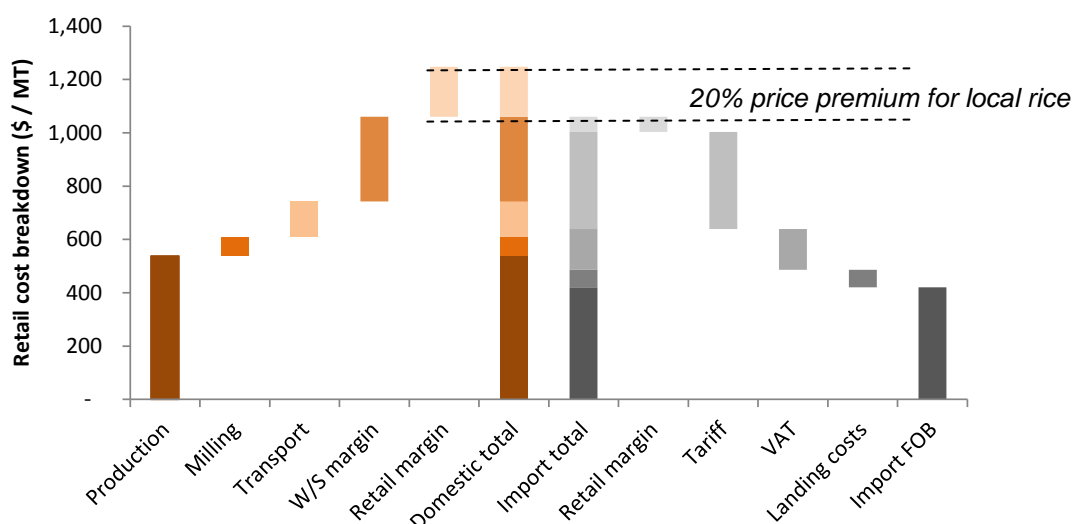
However, this cost breakdown does not present the full picture of Tanzania's import competitiveness. Although with the tax advantages in place it would appear that Tanzanian rice could out-compete imports on cost, in practice market observation suggests that Tanzanian rice commands approximately a 20% premium over imports.⁴³



The final cost breakdown to retail level is shown in the next page. Taking into account the market premium paid in Dar es Salaam, this suggests that either the value chain in Tanzania is extremely inefficient, with margin captured by many fragmented players, or there is a degree of oligopoly power at wholesale level which is absorbing much of the benefit from the tariff protection. Expert interviews suggest that both of these factors are important.

⁴³ Data compiled by Therkildsen (2011)

Value chain cost breakdown vs. imports, Tanzania: 2

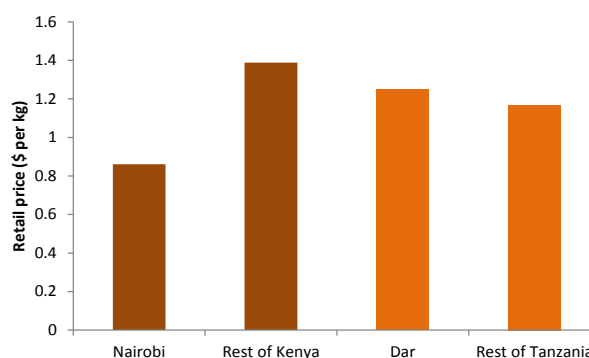


More work is needed here to tease out the value chain dynamics: the “wholesale margin” may comprise multiple margins for small, fragmented transporters, wholesalers and storage companies across the value chain. More work is also needed to validate transport costs, and to take this analysis further to cover cross-border trade in rice rather than simply presenting the value chain within one country.

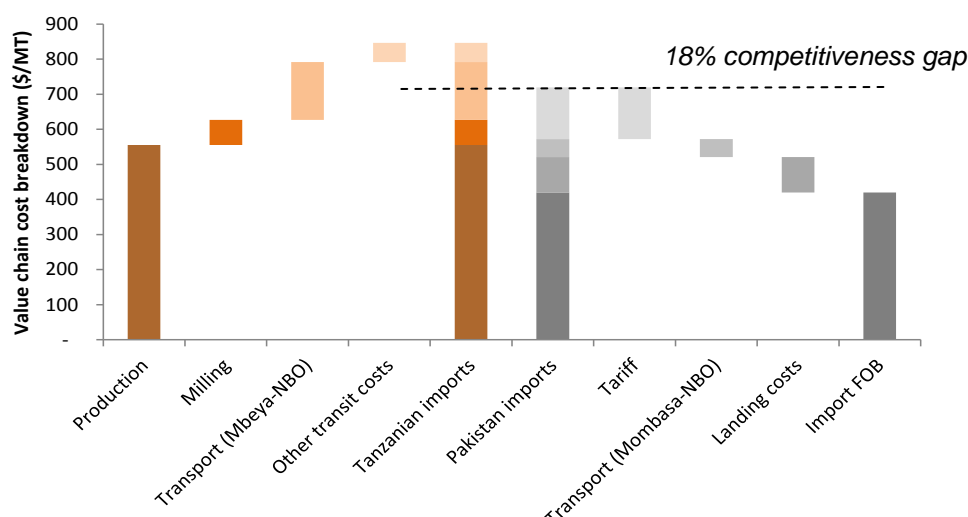
Kenyan import competitiveness

This fact, combined with the dominance described earlier of the Kenyan market as the key export opportunity in the region, leads to two hypotheses for an export-led growth strategy. The first, preferred hypothesis is that any ambitious effort to transform Tanzania’s rice sector needs to see cost competitiveness as the end goal. Kenyan consumers demand moderate-quality, low-cost rice in large, growing volumes: Tanzania can serve this market only by improving its cost competitiveness.

How far would competitiveness need to improve? The first point to note is that Kenyan prices in Nairobi, which are dominated by Pakistani imports and which benefit from the most efficient supply chain, are 40% lower than those in the rest of Kenya (where transport is more expensive and local, more expensive rice is widely consumed) and 30% lower than in Dar es Salaam. It is useful to note that prices in the rest of Tanzania are slightly cheaper than Dar, because there is no similar effect of cheap imports as in Kenya.



A similar value chain cost breakdown can then be compiled, based on Nairobi prices, suggesting that at current yields, Tanzanian rice currently costs around 20% higher than imported Pakistani rice in Nairobi, making it uncompetitive

Tanzanian vs. Pakistani imports to Nairobi⁴⁴

However, if yields rise to 2.2 MT/Ha – the level necessary to compete domestically with tax-free imports – the picture shifts significantly. Tanzanian rice at that level of productivity is almost exactly competitive with cheap Pakistani imports under Kenya’s 35% tariff. Were that tariff to be removed, of course, the situation for Tanzanian importers becomes more challenging: only exporters who could average over 3 MT/Ha, or significantly improve milling yields, could compete. Policy work to support the tariff in Kenya while East African producers gain market share would be a necessary complement to on-farm work to improve productivity.

Even such competitiveness gains would be unlikely to be sufficient, however. Kenyan consumers are much more sophisticated than Tanzanians or Ugandans, prioritising branding and packaging much more highly and being much more likely to buy through formal channels (discussed further below). It is important to recognise that a “cost-competitiveness” strategy is not the same thing as a low-quality strategy. A successful, large-scale export industry targeting Kenyan consumers will require serious professional investors who have control over quality, reliable production volumes and a professional approach to retail – even while maintaining a low cost base.

Is it also useful to note that, due to the dominance of Pakistani imports whose price does not fluctuate seasonally as much as local prices, not only are Nairobi prices lower, but there is much less opportunity to arbitrage off-season price rises.

A second hypothesis for export to Kenya is encouraged by USAID: namely, that Tanzania could become a niche exporter of high-value rice to upper middle class markets around the region. This is possible: certainly Tanzanian rice is potentially cost-competitive with high-end Kenyan rice. However, since Tanzania already commands 25% of the market in Uganda and Rwanda – and the Kenyan consumer does not show much demand for Tanzanian-branded rice as a premium product – it is not clear that there is much room for growth with this strategy. Even Tilda, which is well-placed geographically in Eastern Uganda to export high-end rice to Nairobi, and has the expertise to compete in this market, prefers to export to less competitive markets in South Sudan.

The preliminary conclusion is therefore that the premium niche may present an opportunity for a minority of mills who have the right quality control and market connections, but at a national level it will not be a strategy for smallholder rice. More analysis is required to tease out the size of this market, to understand whether it presents a serious opportunity for the sector.

⁴⁴ Gatsby analysis from data from BMGF (2012), Saana Consulting (2012), NAFKA (2010) and World Bank (2009). Assumes 2008-09 yields of 1.6MT / Ha

CHAPTER 5: CURRENT SECTOR TRAJECTORY

Key sector trends: investment

While interest in investing in the rice sector is high, particularly in Tanzania, the number of actual completed deals is extremely low. BMGF highlight eight publicly announced deals in the rice sector in Tanzania, totalling a potential 200,000Ha, that have been announced since 2008: only one of these, for a relatively tiny 300Ha, is known to have been completed.⁴⁵ Kilombero Plantations, a 5,000Ha farm in the Kilombero Valley in Morogoro, is the largest recent new investment in rice, dating back to 2008. Export Trading Group, a major commodity trader based in Nairobi, have recently begun a rice production and milling operation in Mbeya, but have cautious expansion plans.

The SAGCOT Centre in Tanzania has prioritised rice as a key value chain for attracting FDI. However, although three investment sites have been identified in principle, there is widespread scepticism among donors and investors alike about the availability of land and the practicalities of negotiating investment with local communities. The government, with support from DFID and the World Bank, is discussing approaches to registering large areas of land in order to define ownership rights more clearly – prioritising the SAGCOT region – but the scope and timeframe of the task are both massive.

Given the weak supporting markets for agricultural finance, input supply (particularly seed) and value addition, major new investors prepared to support large numbers of farmers may be one of the region's best opportunities for driving up smallholder productivity and incomes. At present, there is little likelihood of that happening.

Key sector trends: trade

Trends in trade have been discussed in the previous chapter. Recent growth in trade has been impressive, and the withdrawal of Tanzania's export ban is a very positive sign if it is maintained while many traders expect world rice prices to rise in 2013.

However, recent growth has been from an extremely low base. Conversations with traders suggest they are still not convinced of the business case behind a strategy of intra-regional trade – certainly not between the region's largest producer (Tanzania) and its largest importer (Kenya), without which regional trade is always going to be of secondary importance either from a food security or smallholder income perspective.

Potential future threats

The rice sector currently stands at a potential crossroads. Recent growth in output has been strong, due to an expansion in land area dedicated and supportive world prices which have encouraged farmers to commit to the crop. Matching growth in consumption is likely to continue, given secular trends in urbanisation and per capita income growth. The current sector trajectory appears positive.

However, this growth is dependent on tariffs which in the long run – or sooner – are likely to become unsustainable. Falling consumer prices would drive many farmers to reduce their land allocation to rice, or push them out of the crop altogether, limiting livelihood choices and endangering regional food security. Managing this threat over the coming years is a priority if recent growth is not to be short-lived.

⁴⁵ BMGF (2012)

CHAPTER 6: POTENTIAL SOCIAL IMPACT

Smallholder wealth creation

Smallholder farmers are the group most likely to benefit from a major rice programme in the region. If current average yields could be brought up to the level of the top 20% in the region, that would represent an income gain of 150% - before any potential benefits in price from developing more efficient supply chains.

The breadth of this impact is difficult to estimate. At one end of the spectrum, all 1.5m smallholders growing rice in the region could be potential beneficiaries, especially of interventions designed to improve access to high-yielding seed varieties and other inputs. However, rice is unlikely to be a competitive cash crop for all these farmers – particularly if tariffs come down. Further research into agro-ecological conditions is necessary to come to any conclusions on who and where these farmers might be. Even within this more limited group of beneficiaries, farmers will need better access to finance – and stronger distribution channels – to improve their yields dramatically. This will limit numbers to those who can be reached by innovations such as improved agro-dealer networks, new rural financial services and deeper seed markets.

And at the other end of the spectrum, those farmers who will benefit most will be those who can access not only new inputs but also new techniques and markets because they are linked in to structured value chains managed by private sector processors with capital and expertise. Chapter 4 noted that at present the number of such firms in the region is very limited; high-level plans by the few relatively large millers in Tanzania only include a cumulative total of around 30,000 rice farmers. Investment by 5-10 new large millers could raise this number closer to 200,000 – still a small percentage of all the region's farmers, but perhaps a significant proportion of those for whom rice is a commercially competitive crop in a post-tariff world.

A more defensive, but perhaps more realistic way to frame this is to consider the livelihoods that may be lost from the medium-term conflict between urban food security and rural production. With population growth and urbanisation, pressure from urban consumers will grow on governments across the region to reduce tariffs on imported rice, in order to reduce household food bills. This in turn will threaten current producers a dramatic loss of income, by making much of the local rice uncompetitive overnight. Enabling those smallholders to compete effectively in a no-tariff scenario is probably the most important potential impact a programme can have.

Food security

The flip side of this threat to smallholder livelihoods is a gain for urban consumers. As discussed above, if VAT were applied equally, and there were no tariff, Tanzanian rice would be 53% more expensive than imports. The abolition of the existing CET would in theory cut consumer prices significantly, making rice a more affordable alternative staple food and improving food security for low-income urban consumers. It is worth noting that this effect assumes an efficient market in which the tariff reduction would be passed on to consumers; as noted earlier, the current data on imports and prices suggest that the market is by no means that efficient, and there may be significant political economy issues to work through to achieve this social impact.

As discussed in Chapter 2, rice is also a major rural food security crop in Tanzania in particular, among rice-producing communities who depend on the crop for food: over a million farming households. Food security would be increased for these households in two ways. Firstly, by increasing local incomes among competitive rice farmers who can sell their crop for cash, improving the asset security of their households. Secondly, reducing the risks involved in rice production – such that yields in bad years were

higher than at present – would improve food security for poorer subsistence rice farmers who are currently threatened by poor rains and crop disease.

Employment

The employment impact of a value chain strategy focussed on upgrading value chain efficiency would be mixed. Although high-quality jobs would be created through investment in new rice mills, jobs at existing low-cost, small-scale milling SMEs would be lost. Similar effects would be seen elsewhere in the value chain. The main positive impact would be at village level, where increased disposable income would create employment opportunities outside of the rice chain far more significant than the balance of job adjustments within the chain.

CHAPTER 7: CONSTRAINTS ON SECTOR DEVELOPMENT

Competitiveness constraints: farm-level productivity

Chapter 3 outlined four key drivers of competitiveness at farm level: seed, input use, labour and water availability. Each of these is constrained to some degree in the region.

Rice seed markets currently do not provide the sector either with a regular supply of new, improved varieties, or a comprehensive system to allow farmers to access them. In the maize sector, an increasingly robust seed market is emerging with a mixture of private investment, public support (e.g. from AGRA's seed systems initiative) and impact investment (particularly from AAC and its related funds) to provide farmers with access to improved varieties. No similar investment has been forthcoming from these emerging seed businesses with regard to rice seed. With the exception of some interest in NERICA varieties in Uganda, which have been heavily promoted by the government, the private sector has largely ignored the rice seed market. There are three main reasons for this:

1. Firstly, our literature review did not indicate that any research has been done into hybrid rice seed on the continent. The only improved seed to have received major public backing have been the NERICA varieties, which are not hybrids, and which have limited market appeal as they do not have the right taste attributes for local consumers. Improved rice varieties in the region – including NERICAs, and the seeds developed by Gatsby's MozSeeds business in Mozambique – are all open-pollinated varieties. Developing a new hybrid rice seed product is expensive and time-consuming.
2. Such improved open-pollinated varieties as have been developed can be marketed by the private sector; however, these are typically re-used by farmers for several years without purchasing new seed, even though they rapidly become susceptible to disease if not regularly replaced. This lack of repeat custom means different markets must constantly be targeted, increasing the costs of distribution, marketing and farmer extension. As such they do not present a reliable, recurrent market in which seed companies can invest. Some seed companies in Uganda have invested in NERICA, where the high level of public support these varieties have received makes the investment attractive.
3. By contrast, the market for hybrid maize seed is large and growing rapidly. Maize remains by far the biggest staple food in the region and there are a range of hybrid maize seeds on the market. With this sector offering an easy expansion opportunity for seed companies, the smaller, more difficult rice opportunity offers only marginal growth opportunities and thus there is limited incentive to invest.

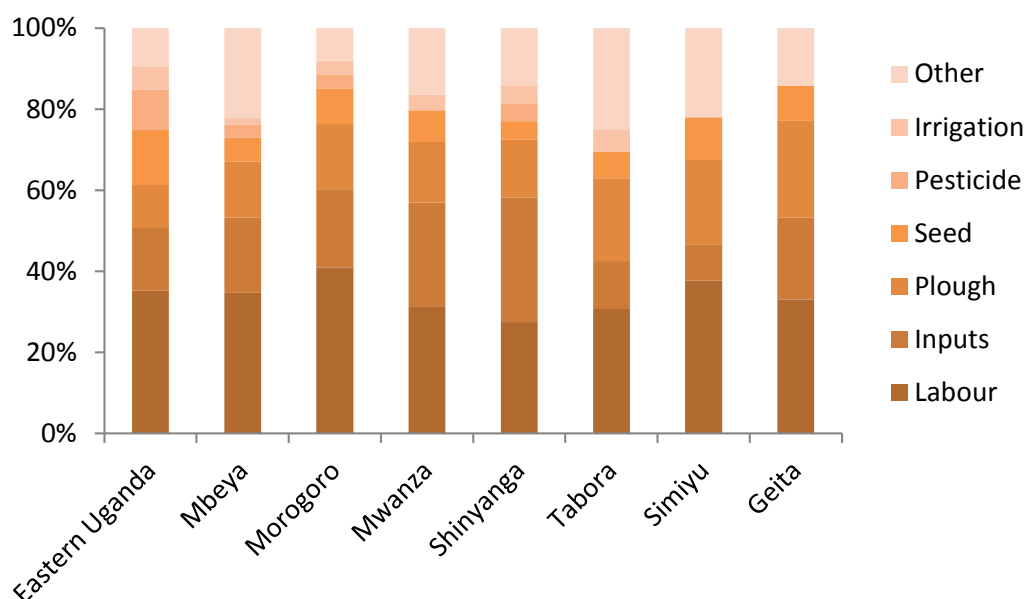
However, it is essential to recognise that this may not be solely an East African problem. Even in Asia, it is estimated that only around 5% of farmers purchase new seed every year: the majority re-use part of the harvest. Only in Egypt and China have hybrid rice seeds been widely taken up. Public research and publicly-managed distribution systems (or farmer recycling of seed) tend to dominate major rice sectors around the world.

There therefore does not seem to be a clear model for a private sector-led rice seed system in East Africa; yet governments do not currently have the ability to step into the resulting vacuum (although Uganda has demonstrated more capacity than Tanzania). Integrated value chain approaches based on output markets, where large-scale millers distribute improved seed in exchange for higher throughput and quality, may be more practical approaches than trying to develop commercial seed markets.

Access to inputs is the second major constraint. Here, the barrier is only partially one of availability or distribution – although networks of input dealers remain weak in most of the region. Access to finance to afford to buy inputs is a more serious challenge. The dynamics of the labour issue are similar: there is not a shortage of labour willing to work, but the number of days required and the high unit costs of

labour mean that labour is the single biggest cost item for rice farmers, with major inputs (fertiliser and herbicide together) being the second biggest cost in most regions:

Contributors to average production cost⁴⁶



This suggests two major constraints: access to finance to increase investment in the farm, and access to machinery, to reduce labour costs. The two issues overlap: for example, increased availability of herbicide might reduce the labour needed for weeding, which is currently the second-largest time requirement for rice farmers. Similarly land preparation, which is the fourth most time-consuming activity, could be reduced by mechanisation; but at present, 57% of farmers use ox-ploughs for land preparation and a third of farmers are still tilling their soil by hand. Only 7% have access to any form of mechanised tillage.

In some cases it may be possible to address these issues through building supporting value chains (in rural microfinance, equipment micro-leasing and similar innovations). In others, working through major off-takers to provide finance and equipment services to outgrowers may be more efficient.

The final constraint is on water availability. As discussed in Chapter 3, only the presence of modern irrigation seems to have a major impact on yields; traditional irrigation does not improve yields further than can be achieved with rain-fed rice, in areas where there is enough rain. More analysis is needed to understand the cost/benefit trade-off of investments in modern irrigation: the World Bank in Tanzania is currently conducting a study to understand this issue further by reviewing the impact of past investments in irrigation in the country.

Competitiveness constraints: value chain costs

Data on transport and milling costs from the World Bank and from the Gates Foundation suggest that post-harvest value chain costs are not a particularly major contributor to the final market price of rice (as highlighted in Chapter 4). However, the competitiveness of the sector in a wider sense is undoubtedly affected by inefficiencies in the value chain. Poor quality equipment, intermittent electricity black-outs and a lack of spare parts all contribute to low milling out-turn, high breakages and high levels of dirt in milled rice from most SME millers, which depresses prices and prevents rice being more

⁴⁶ Zaal (2012). There are some regional differences: farmers in Tabora, Simiyu and Geita spend little on inputs, and have larger farms requiring more ploughing cost.

effectively targeted at export markets. Competitiveness in the value chain needs to be primarily conceptualised in terms of quality, and only secondarily in terms of cost.

Systemic failures – and solutions

As discussed already, the biggest systemic failure in rice markets in the region at present is the fragmentation of value chains. This lies behind many of the value chain competitiveness constraints described above – with knock-on effects on farmers, who are unable to negotiate prices transparently, to benefit from economies of scale or from quality improvements which might improve market access and end market pricing. More importantly, it also presents a barrier to addressing a number of the farmgate competitiveness constraints. As earlier explained in the chapter, without the ability to use millers as value chain hubs for finance, inputs and services, farmers are dependent on public seed supply and struggle to find the cash to afford the cost of inputs and labour.

Upgrading SME millers may address the first of these issues – although the cost and logistics of improving the SME milling sector at scale across the region are daunting. However, it will not enable farmers to benefit from an off-taker “hub” which can provide them with the investment to improve their productivity and incomes. Only increased investment by larger firms with the throughput needs and balance sheet strength to build large networks of outgrowers will provide this.

A second systemic failure may lie in the seed system. However, as discussed above, it is not clear that private seed markets are an achievable goal. Understanding this issue more thoroughly is a key component of our Phase 2 work.

CHAPTER 8: CURRENT GOVERNMENT & DONOR RESPONSE

Key government policies & programmes

Each EAC government has a 10-year National Rice Development Strategy (NRDS): broad and high-level documents which cover all aspects of sector development from research and seed dissemination to input and equipment finance and irrigation, to post harvest handling and marketing. However, there is little technical analysis underpinning these strategies, and implementation – specifically funding – remains a key obstacle to genuine progress. As a recent review of Kenya’s NRDS comments, “whereas the NRDS implementation framework specifies what needs to be done to address the difficulties, including broad timelines and estimated budget, it does not indicate any sources of funds”.⁴⁷ The equivalent study in Uganda concludes by highlighting a similar problem: “The rice strategy has been put in place and is being implemented by a secretariat that has managed to bring all stakeholders together, [but is] faced with challenges of sustainable funding.”⁴⁸ Interviews with industry experts and traders carried out by the Gates Foundation suggest a similar conclusion in Tanzania – the overwhelming expectation is that “even if the [NRDS] policy is announced by the Government, it does not mean that it will occur.”⁴⁹

Government investment in the sector thus continues to be low, and – in Tanzania – heavily focussed on infrastructure spending, rather than technical, policy and market-related aspects of sector development. Further work is needed in Phase 2 to engage with the relevant public stakeholders to see where there is capacity, and the political will, to change this situation.

Key donor projects & initiatives

⁴⁷ CARD-IFAD, *Mapping of Poverty Reduction Strategy Papers, Sector Strategies and Policies related to Rice Development in Kenya* (2010), p.24

⁴⁸ CARD-IFAD, *Study on mapping out of Poverty Reduction Strategy Papers (PRSP), Sector Strategies and Policies related to rice development in Africa: The case of Uganda* (2010), p.14

⁴⁹ BMGF (2012)

There is a range of donor support for rice across the region, but much of it is focussed on the research component of the value chain, rather than on wider farmer productivity issues, marketing and trade.

In Tanzania, the World Bank and the Chinese government have both invested in support of the Tanzanian rice research centre at Dakawa, Morogoro. The World Bank's Rice Centre of Excellence (a \$30m project over five years) acts as a regional centre for the EAC for providing access to improved germplasm and training rice researchers. The Sino-Tanzania agro-technology demonstration center showcases China's comparative advantage in irrigation infrastructure and paddy rice, but is not yet linked to other donor-supported work in the region nor is it clear that the Tanzanian research establishment has a clear vision of how this new centre will support the sector.⁵⁰ JICA and IRRI both provide direct budget and technical assistance to research centres in the country.

The largest value chain programme in the country is the USAID-funded Feed the Future (FtF) initiative, which has rice as one of its three focus crops and is targeted at Morogoro. FtF has several components: a value chain partnership with Kilombero Plantations working with 5-10,000 farmers; support for improved seed uptake through NGO distribution channels; technical assistance to SME rice millers; and a major infrastructure component looking at investment in irrigation and rural roads. Smaller initiatives focussed on farmer productivity improvement are underway managed by the Aga Khan Foundation (south-east Tanzania), Oxfam and RLDC (Lake Zone) and AfricaRice (Morogoro).

Beyond this there are two major funding initiatives which are currently in development. The World Bank will be providing support to the Ministry of Agriculture for rice through the general budget support framework, but the target of this funding is not yet defined. And a range of donors (in particular DFID, World Bank, USAID and UNDP) have committed to support agricultural development in the Southern Agricultural Growth Corridor (SAGCOT), with rice as one of three target sectors – but the nature of this support, which is likely to have several different modalities, is still a work in progress.⁵¹

In Uganda, sector-specific donor assistance programmes for rice – as well as most government efforts to promote the crop – have all mostly focussed on the dissemination of NERICA seed for upland rice growing, with money from JICA, FAO and USAID in particular. The most recent UNDP value chain programme, managed by Kilimo Trust, has also selected rice as one of its priority sub-sectors, and has now entered the implementation stage. However, rice has not been a priority crop for donors in the country: the recent IFAD-CARD study mapping donor initiatives in rice lists a range of broader pan-agriculture support initiatives but very few programmes focussed on the rice sub-sector in particular.⁵²

In Kenya and Rwanda, the situation is very similar. Although rice is a major staple in Kenya it is not a significant crop produced in the country; as a result, while rice falls under a range of wider agricultural support programmes to a limited extent, the IFAD-CARD review only mentions one major programme focussed on rice. This is a 6-year, \$150m infrastructure initiative to expand the rice-growing area of the Mwea irrigation scheme – a major programme but not one designed to transform the value chain in the country.⁵³ In Rwanda, rice is not a traditional crop although it is popular in some low-lying areas. The only programmes currently focussed on rice are run by JICA and FAO, promoting improved agronomic practices among rice farmers; there is also a major \$43m water management programme backed by IFAD and the WFP, where rice is one of 5 crops covered.⁵⁴

⁵⁰ Deborah Brautigam, *Chinese Agricultural And Rural Engagement In Tanzania And Ethiopia* (IFPRI, 2011)

⁵¹ Details based on interviews with donor partners

⁵² CARD-IFAD *Uganda* (2010)

⁵³ CARD-IFAD *Kenya* (2010)

⁵⁴ CARD-IFAD, *Mapping of Poverty Reduction Strategy Papers, Sector Strategies and Policies related to Rice Development in Rwanda* (2010), p.27-28

CHAPTER 9: CONCLUSION

Key conclusions

This initial research suggests three main hypotheses. Firstly, that import tariff protection is unlikely to be sustainable in the medium term, and that Tanzania, and to a lesser extent Uganda, therefore need to improve their competitiveness significantly if their rice sectors are to sustain recent growth that has been based on expanding acreage, not productivity. Analysis of current value chain costs suggests that this will require production to rise by around 30% from current levels, and value chains to become significantly better-organised. Secondly, that this competitiveness is largely driven by access to improved seed and to the labour required to manage the crop effectively – whether through traditional or SRI agronomy. And thirdly, that if competitiveness improves, the resulting surpluses will need to find a regional export market – which will in turn require investment in building the supply chains, and addressing the consumer preferences, needed to compete successfully in that market.

The report also highlights the main structural hurdle for any attempt to address these issues: namely, that current rice value chains in the region are extremely fragmented. Large-scale millers control barely 5% of the market in Tanzania, and perhaps 10% at most in Uganda. There are currently no local seed companies with a significant interest in producing and marketing improved rice seed, and no hybrids available in the region aside from upland NERICA varieties, which are not necessarily suited to Tanzania's traditional rice basket zones. In other value chains, such as tea or cotton, integrated value chains offer a way to address supply-side challenges and target a market efficiently. The lack of such integration in the rice sector makes intervention to address the market opportunities more challenging.

Initial recommendations

Given this picture in the sector, three tentative suggestions seem sensible:

1. The first is that to achieve real sector-level change, it is necessary that supply chains become much more integrated to drive up productivity and improve the marketing of Tanzanian rice. In the absence of a significant formal rice milling sector at present, Tanzania and Uganda need to attract significant new investment, and expand the capacity, scale and reach of the investments that currently exist; yet several investment initiatives announced over the past 2-3 years are yet to come to fruition. A rice programme needs to find a way to address this issue
2. Secondly, if productivity and hence competitiveness is to rise there is a need to create sustainable distribution channels for high-quality seed. There has been some research into improved open-pollinated rice seed in East Africa and further afield, but there is a lack of commercial or semi-commercial business models for distribution; there may also be a long-term need for investment in hybrid rice varieties to increase productivity more significantly. Farmers may also need to be encouraged to adopt new, non-traditional and higher-yielding varieties.
3. Thirdly, if productivity can be upgraded to make East African smallholders competitive at farm-gate level, there may be an opportunity to work with TradeMark East Africa to address downstream barriers to trade, including non-tariff barriers, infrastructure and market awareness.

ANNEX I: METHODOLOGY

Sampling Methodology and sample Size Selection for the Rice Consumer Survey

- 1) Kilimo Trust used data and information to produce this report, including; (a) secondary data obtained from desk review of published and grey literature extracted from the EAC. (b) primary data collected at regional level on the rice sector ; and (c) primary survey data collected from the EAC countries.
- 2) Sample size of individual respondents for the primary data collection: the sample size was determined using precision criterion determination of the sample size which assumes that the dominant characteristics of the study would occur if the confidence interval is set at 5% margin of error.
- 3) A total of 4,278 respondents were selected to the survey conducted for the rice consumers, and distributed as shown in Table I below.
- 4) Multistage sampling strategy was used since the survey involved a large population across the Five (5) EAC countries. The entire population per country was divided into naturally-occurring clusters and sub-clusters from which respondents were selected as follows; -
 - a. First stage - Each country was clustered in terms of regions or provinces based on the consumption patterns obtained from secondary literature.
 - b. Second stage – A random sample of districts or communes was selected, which were segmented in terms of urban and rural. The urban consumers were mainly drawn from the major cities while the rural consumers were randomly selected from the rural districts.
 - c. Third stage – A random sample was selected in terms of wards, villages, sectors, cells, locations, sub-locations, sub-counties and parishes depending on the specific country description.
 - d. Fourth stage - a random sample of supermarket consumers, urban consumers, rural consumers, rural market vendors, urban market vendors, rural and urban retailers and institutional buyers.
- 5) Target respondents were classified in terms of rural and urban consumers, the sampling unit size was as follows;
 - i) Urban
 - a. 5 supermarkets per city each sampling 6 consumers
 - b. 5 urban markets per city each sampling 6 consumers
 - c. 5 urban markets per city each sampling 6 food vendors
 - d. 12 urban retailers per city
 - e. 5 urban institutional consumers per city
 - ii) Rural
 - a. 2 supermarkets per district/commune each sampling 3 consumers
 - b. 3 markets per district/commune each sampling 3 consumers
 - c. 3 rural markets per district/commune each sampling 3 vendors
 - d. 10 retailers per district/commune
 - e. 6 institutional consumers per district/commune

Table I: Sample selection and size

| Country | Region/province | Districts/commune | Sample size |
|----------------|------------------------|--------------------------|--------------------|
| Burundi | Bujumbura city | Bujumbura city | 109 |
| | Cibitoki | Murwi | 40 |

| | | | |
|------------------|-----------------------|----------------------------------------------|--------------|
| | Makamba | Mabanda Nyanza Lac | 40 |
| | Muyinga | Muyinga | 40 |
| | Muranvya | Gatabo | 40 |
| | Bubanza | Mpanda | 40 |
| | Kirundo | Bugambalangwe | 40 |
| | Gitega | Gitega | 40 |
| Sub-total | | | 389 |
| Nairobi | Central | Mwea | 40 |
| | Nairobi | Nairobi City | 109 |
| | Coast | Mombasa | 109 |
| | Nyanza | Kisumu, Ahero, Kisi, Nyamera | 229 |
| Sub-total | | | 487 |
| Rwanda | Central | Kigali city | 109 |
| | North | Musanze | 80 |
| | South(former western) | Nyamagabe | 80 |
| | East | Kirehe | 80 |
| | South | Muhanga | 80 |
| Sub-total | | | 429 |
| Tanzania | Dar es salaam | Dar es salaam city | 109 |
| | Mbeya | Mbeya urban, Mbarali, Rungwe, Kyela | 229 |
| | Arusha | Arusha city, Arusha municipal Arumeru Muduli | 229 |
| | Kilimanjaro | Moshi urban Moshi rural Hai Rombo | 229 |
| | Tanga | Tanga municipal Muheza Lushoto | 229 |
| | Kagera | Bukoba City Muleba | 149 |
| | Mwanza | Sengerema Magu Ilemela Nyamagana | 229 |
| | Shinyanga | Shinyanga Urban Kahama, Maswa | 189 |
| | Morogoro | Morogoro urban, Kilombero, Matombo | 189 |
| Sub-total | | | 1,781 |
| Uganda | Western | Mbarara, Kabarole, Ibanda, Bushenyi, | 378 |

| | | | |
|---------------------|----------|----------------------------------|--------------|
| | | Masindi and Kyenjojo | |
| | Central | Masaka, Nakasongola and Kayunga | 189 |
| | Eastern | Mbale, Bududa, Sironko and Busia | 298 |
| | Northern | Lira, Gulu and Arua | 327 |
| Sub-total | | | 1,192 |
| Total Sample | | | 4,278 |

Sampling Methodology and sample Size Selection for the Rice Producer Survey

KIT employed a sampling procedure for the Rice Production Survey which used a three-stage cluster sample framework. At the first stage, four production zones were identified on the basis of their importance in rice production. One of these is in Uganda (Eastern region), and three are in Tanzania (Morogoro, Mbeya and Mwanza/ Shinyanga/ Tabora). However, during our fieldwork we found that some regions in Tanzania had recently split up. Thus, we adopted a new regional set-up still based on the original production zones (see below). Using the previous regional boundaries, the survey has included more producers than planned in Uganda, the intended number of producers as planned in the Mwanza-Tabora area, and a slightly lower number of producers than planned in Mbeya and Morogoro. The latter was caused by unexpected fuel shortages in the Mbeya area during the survey, delaying the research team on several occasions. The following numbers of surveys were conducted (Table 2).

Table 2 Number of surveys planned and realised

| | Eastern Uganda | Morogoro | Mbeya | Geita | Mwanza | Shinyanga | Simiyu | Tabora |
|----------|----------------|----------|-------|-------|--------|-----------|--------|--------|
| Realised | 284 | 264 | 314 | 100 | 150 | 151 | 100 | 101 |
| Planned | 270 | 300 | 325 | 605 | | | | |

The total number of interviews completed was 1464, 36 below the initial target of 1500.

At the second level, based on a map of the production zones and the basic networks of roads and market towns, we selected villages in areas that may be considered fairly typical for the larger part of these zones in terms of climate, land qualities, social characteristics and cropping system, with differences in terms of distance to main infrastructure and markets (Table 3).

In Morogoro region, the following districts and villages were visited (Table 3). This choice was based on previous material collected on regional rice production and discussions in the field with the Morogoro Regional Agricultural Officer, Mrs. Eulalia F. Minja, on the rice sector situation in Morogoro region.

Table 3; Selected Districts and Villages in Morogoro

| Region | District | Villages |
|----------|----------------|-------------------|
| Morogoro | Mvomero | Komtonga |
| | Kilosa | Mvumi |
| | Kilombero | Mkula, Kisawasawa |
| | Ulanga | Minepa |
| | Morogoro rural | Kiroka |

A discussion with the Assistant Administrative Secretary for Economic and Productive Sectors for Mbeya Region, Dr. Phillip Mwaisobwa, the Regional Agricultural Officer, Mr. Nyasebwa, and the Regional Livestock Officer, Mr. Mpoki, confirmed that Mbarali and Kyela districts are the main rice producing areas in Mbeya region. Table 4 presents the adjusted village selection for Mbeya region after the discussions at the regional office.

Table 4; Selected Districts and Villages in Mbeya

| Region | District | Villages |
|--------|----------|----------------------------------------|
| Mbeya | Mbarali | Kongolo Mkola, Uturo, Ilaji, Nsonyanga |
| | Kyela | Ngana, Tenende, Kikusya |

After a meeting with Mr. Khanafi I. Mohamed, who represented the Mwanza Regional Administrative Officer, we found out that there have been new regions added since July 2012. Geita district, previously located in Mwanza region, forms now together with the Bukombe district, previously located in Shinyanga region, the new Geita region. The former Maswa and Bariadi districts of Shinyanga region form now the new Simiyu region. Table 5 presents this new situation in the Lake Zone area, and the final selection of villages after discussions with the district agricultural offices.

Table 5: Selected Districts and Villages in the Lake Zone

| Region | District | Village |
|-----------|-----------------|-------------|
| Mwanza | Nyamagana | Kishili |
| | Misungwi | Inonelwa |
| | Kwimba | Nyambiti |
| Geita | Geita | Nyangwhale |
| | Bukombe | Maguta |
| Simiyu | Maswa | Shishiyu |
| | Maswa | Bukangilija |
| Shinyanga | Shinyanga rural | Nyida |
| | Kahama | Butende |
| | Kahama | Lowa |
| Tabora | Nzega | Upambo |
| | Igunga | Igurubi |

In Uganda, a discussion with the National Agricultural Director in Kampala confirmed that the Regional selection and District was correct, though the administrative set-up in Uganda is different from the one in Tanzania. Below the level of the districts are the sub-counties, and the parishes. Below that are the villages, but these are similar in size than the sub-villages in Tanzania. The parishes resemble the villages in Tanzania, though they are more dispersed, not having gone through the same process of villagisation as in Tanzania. Table 6 gives the details.

Table 6: Selected Districts and Villages in Eastern Uganda

| Region | District | Villages/Parishes |
|---------|----------|-------------------|
| Eastern | Tororo | Magola |
| | Tororo | Kidera |
| | Bugiri | Buuni |
| | Bugiri | Namasere |
| | Bugiri | Bupala |
| | Bugiri | Luwoko |
| | Iganga | Nawangisa |
| | Iganga | Minani |
| | Iganga | Bulunguli |
| | Iganga | Kalalu |

The third level of the sample framework was the household. In each village, about 50 households were selected for the survey. The households were initially to be selected based on a list of households in the village. However, we frequently found that these lists were not available or did not exist and so we opted instead for a selection based on transects through the village, to avoid spatial and wealth biases related to location of the household. In the various sub-villages along such a transect, all available households were surveyed. Before the survey proper took place, basic characteristics are established: whether the household had land under rice during the past season, and how much land they had. A range of household holding sizes in the sample, various distances to infrastructure and market towns, and gender representation, informs issues of rice production and constraints.

The survey took about an hour on average to administer for each participant. This is in keeping with experiences that keeping survey participants for more than one hour can result in frustration and possibly lower quality data if the survey is rushed. All persons surveyed were asked to formally consent prior to the survey taking place. The person interviewed either signed or put his/ her thumb print on the separate consent form with his/her name. The survey data are thus anonymous as the survey and the personal details of the respondent are kept separately.

The survey data and the consent form are linked by the use of an enumerator code. The data collected in the Rice Production Survey refers to the last season the respondents harvested rice (surveys took place in the period October - November 2012). For most farmers this referred to the rainy period between late December 2011 and May 2012. (Depending on the actual location seasonal timing and length differs).

ANNEX II: NEXT STEPS

Data gaps

o Assessment of what data is available on sector and how recent/relevant/reliable

- Identification of key experts, companies
- Activity plan to fill the gaps
- Primary analysis from team
- Commissioned market analysis
- Timescales and costs