

Southern Agricultural Growth Corridor of Tanzania

Appendix IV:

Value Chain and Market Analysis

Draft

Wheat
Sunflower
Soybean
Rice
Maize
Livestock
Irish potato
Citrus

Value chain analysis – Wheat

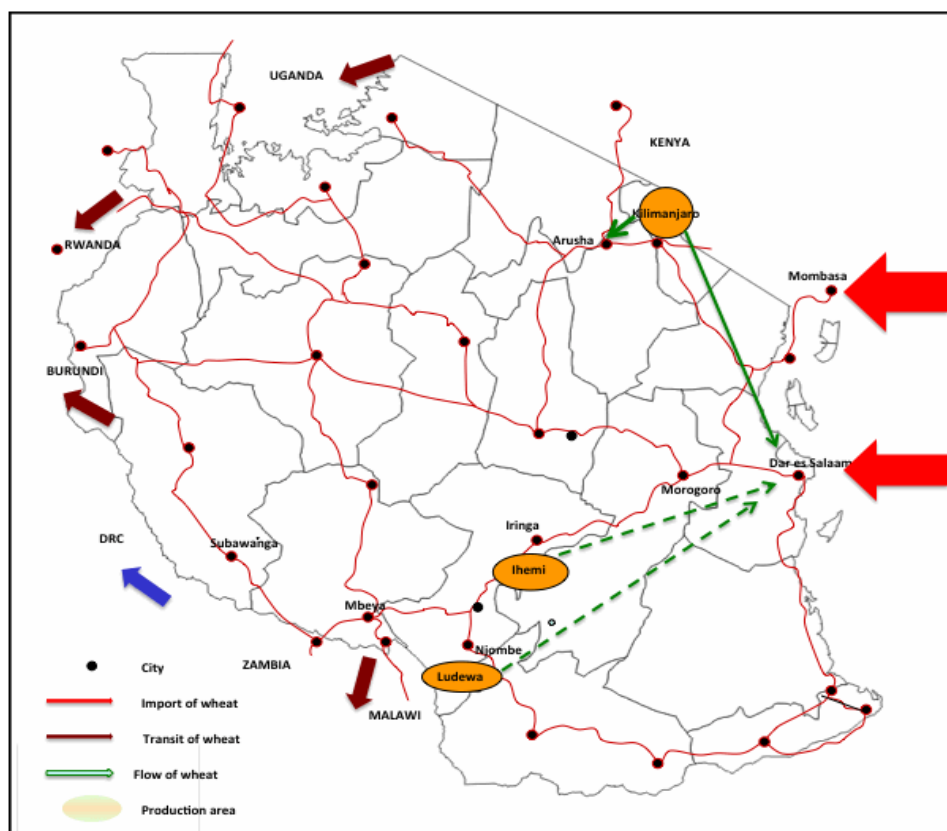
Potential clusters

Wheat may be included as a core crop in the Ihemi, Ludewa and Sumbawanga / Northern Zambia clusters.

General background to commodity

Total wheat production in Tanzania is estimated to be around 100,000 mt annually. It is only produced in the Southern Corridor to a small extent, and predominantly by smallholder farmers (SHF) with a few acres of wheat each. Wheat from the Southern Corridor must compete with wheat produced from FSU, Canada, Australia, USA and Germany, which is imported by the millers through Mombasa and Dar es Salaam. Bakhresa, the largest miller and importer, also transits wheat to its mills in neighbouring countries and wheat flour to the DR Congo. There is some wheat produced in the northern part of Tanzania which is sold to the millers in Arusha and Dar es Salaam.

Figure 1: Wheat trade flows in Tanzania



Farmers in southern Tanzania plant wheat in February – March during the long rains and harvest in August – September. Many smallholders immediately plant potatoes

after the wheat harvest and clear their fields prior to wheat planting. This crop rotation has the benefit of maximizing the land holding and reduces costs, as the field is already cleared for planting wheat. Those smallholders planting wheat have on average 1 to 2 acres and the yield varies between 6 and 10 bags of 100 – 140 kg¹ per bag assuming fertilizer is applied. Those smallholders who achieve 1 mt per acre (close to 2.5 mt per hectare) are doing comparatively well. Without fertilizer the yield is only some 3 bags per acre making the production virtually un-profitable.

Wheat prices have surged 65% since July 2010, driven mostly by market uncertainty over supplies from the Black Sea region. The wheat crops in both Russia and Kazakhstan have been devastated by drought while the crop in Ukraine also suffered from adverse weather conditions. Russia's export ban and Ukraine's export slow-down combined with production shortfalls, have created uncertainty and contributed to market volatility. However, prices are still well below the record average price of USD 368/mt recorded in 2007/8.

¹ Small holders farmers trade in debe, which is estimated to weigh around 20 kg. A bag fits around 7 debe, however sometimes less or more, depending on how much the bag is extended. Traders wish to continue with trading per volume unit as this is to their advantage.

Figure 2: Regional Wheat Imports, Production, Consumption and Stocks

Thousand Metric Tons						
	2006/07	2007/08	2008/09	2009/10	Aug 2010/11	Sep 2010/11
TY Imports						
North America	7,279	6,475	7,128	6,782	6,200	6,200
Central America	1,582	1,460	1,489	1,464	1,525	1,525
South America	13,855	13,109	13,161	13,182	13,115	13,015
European Union	5,233	6,933	7,740	5,500	6,000	6,000
Other Europe	1,485	1,932	1,670	1,685	1,785	1,750
Former Soviet Union - 12	5,986	6,105	6,502	5,534	5,875	7,150
Middle East	12,089	11,997	28,465	22,768	19,175	19,125
North Africa	16,400	21,742	23,466	21,275	20,900	20,900
Sub-Saharan Africa	11,431	10,269	13,724	15,533	13,830	14,160
East Asia	11,894	11,277	11,322	13,743	11,100	11,050
South Asia	10,949	8,215	10,747	7,394	6,610	6,510
Southeast Asia	12,377	11,483	12,233	13,814	12,975	12,725
Others	2,636	2,777	2,638	2,746	2,815	2,700
Total	113,196	113,774	140,285	131,420	121,905	122,810
Production						
North America	77,722	79,468	100,627	91,129	86,491	88,491
South America	21,222	25,435	19,616	18,576	20,387	20,387
European Union	124,870	120,133	151,114	138,312	137,506	135,130
Other Europe	4,313	4,405	4,712	4,609	3,900	3,800
Former Soviet Union - 12	84,904	92,447	115,453	113,839	87,210	84,560
Middle East	41,965	40,153	32,340	37,287	38,295	38,295
North Africa	18,576	13,948	14,352	20,231	17,550	17,950
Sub-Saharan Africa	5,724	5,547	6,103	6,100	5,688	5,688
East Asia	109,669	110,590	113,776	116,161	115,825	115,825
South Asia	95,881	105,070	103,298	111,233	109,430	109,430
Oceania	11,099	13,846	21,697	22,777	23,277	23,277
Others	160	143	171	175	176	176
Total	596,105	611,185	683,259	680,429	645,735	643,009
Domestic Consumption						
North America	46,126	40,901	48,329	43,783	45,527	46,128
South America	24,193	24,372	24,528	24,275	24,610	24,510
European Union	125,500	116,536	127,500	125,500	124,500	122,000
Other Europe	5,270	5,400	5,595	5,595	5,640	5,605
Former Soviet Union - 12	72,551	74,856	76,316	80,475	87,170	84,975
Middle East	51,330	50,947	52,489	53,684	54,950	54,625
North Africa	34,105	35,674	37,564	39,475	40,250	40,350
Sub-Saharan Africa	16,742	15,678	18,337	19,998	19,493	19,648
East Asia	113,938	117,556	117,438	117,580	117,625	117,600
South Asia	105,066	109,488	104,554	113,941	117,715	118,315
Southeast Asia	11,719	11,009	12,004	12,939	13,035	12,660
Oceania	8,535	7,388	7,720	8,005	8,165	8,130
Others	3,267	3,400	3,303	3,346	3,515	3,450
Total	618,342	613,205	635,677	648,596	662,195	657,996
Ending Stocks						
North America	19,690	13,108	24,729	35,022	31,241	30,688
South America	3,652	4,569	3,140	3,483	3,529	3,405
European Union	14,171	12,429	18,461	15,273	10,080	13,403
Other Europe	1,397	1,576	1,858	1,757	1,454	1,437
Former Soviet Union - 12	11,115	12,923	20,813	22,897	12,938	12,932
Middle East	12,130	10,557	12,803	15,006	11,965	12,439
North Africa	9,764	9,482	9,397	11,223	9,090	9,538
Sub-Saharan Africa	1,387	1,208	1,886	2,741	2,543	2,171
East Asia	40,846	41,788	48,276	59,225	66,043	66,010
South Asia	8,357	9,727	16,951	21,109	18,906	18,034
Southeast Asia	2,791	2,784	2,685	3,156	2,656	2,871
Oceania	4,224	3,912	3,800	4,781	4,091	4,583
Others	292	256	275	300	228	281
Total	129,816	124,319	165,074	195,973	174,764	177,792

Source: USDA 5/10

In total, Sub Saharan Africa produces relatively small amounts of wheat compared to other countries (see table 1). Imports are substantial, with a projection of 14 million mt for the 2010/11 season. Tanzania imports of wheat have increased over the years and presently stand at around 1 million mt against local production of around 100,000 mt annually.

Figure 3: Tanzanian Wheat Imports

Year/Imports	Volume (kg)	CIF Value (Tshs)	USD (mean)
2000	331,860,262	40,524,857,852	50,030,700
2001	410,636,303	55,452,822,297	58,362,800
2002	406,878,106	59,185,155,207	62,291,000
2003	499,296,427	81,044,412,845	85,297,300
2004	1,713,350	296,447,492	
2005	495,355,113	99,930,488,269	85,630,200
2006	651,100,199	152,456,170,204	116,923,000
2007	4,009,086	833,523,618	
2008	466,031,488	217,314,935,171	161,339,000
2009	969,995,584	337,533,549,651	250,591,000

Source: Board of External Trade Tanzania

The above figures do not make a distinction between soft and hard wheat but according to industry insiders over 70% of the imports are soft wheat. Most of the soft wheat comes from FSU while hard wheat is mainly sourced from the USA, Canada and Australia. The increase in wheat imports is primarily caused by increased processing capacity of the main millers, i.e. Said Salim Bakhresa & Co. and increasing demand from its customers.

Value chain dynamics

The sub sector / value chain map of wheat flour and bakery products is depicted below. It is divided into three sections:

- the left side shows the small-scale production and processing of wheat flour that is typical in the Southern Corridor;
- the middle segment is the integrated channel by smaller scale producers in Njombe; and
- the right side shows the large commercial transactions with a clear market leader, Bakhresa.

Figure 4: Value Chain Map for Wheat Subsector

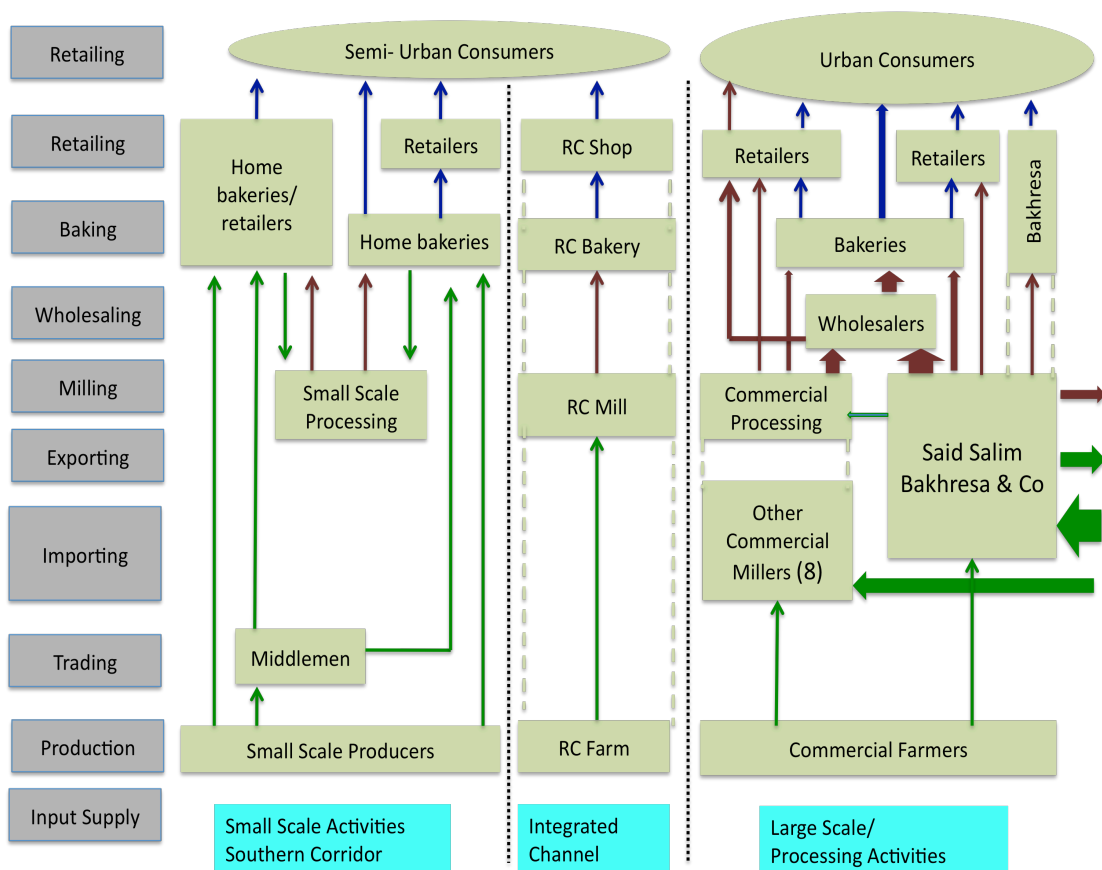
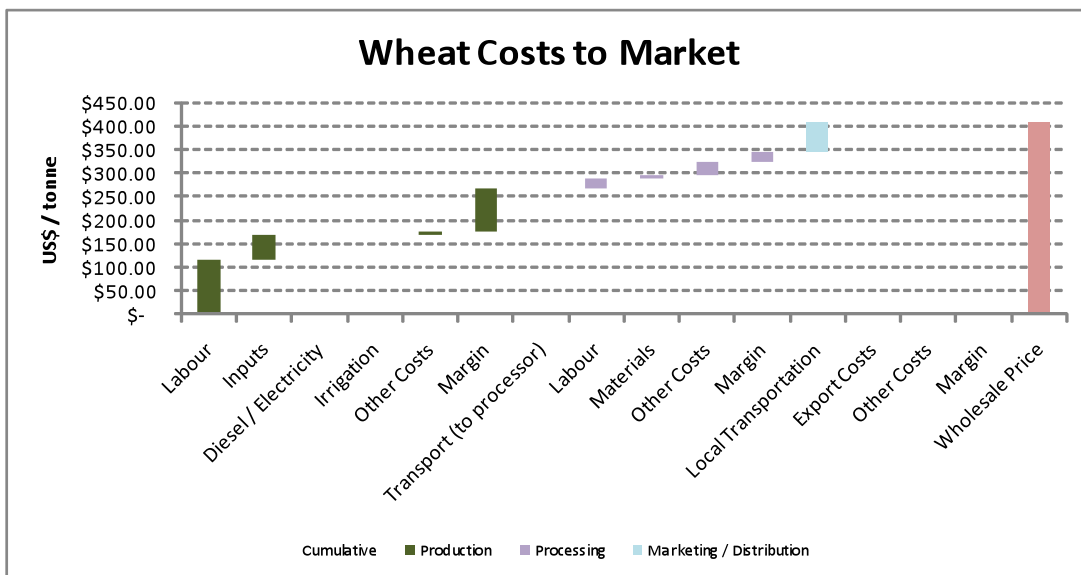


Figure 5: Cost and revenue drivers and margins along the chain



These costs represent all costs (including margins) which make up the wholesale price of wheat delivered to market in Dar es Salaam. Though it was not possible to establish the cost and revenue drivers of the millers, it can be assumed that even though their margins per unit might not be that high, their profits are substantial

based on the enormous volumes that they process. Moreover, the millers benefit from a relatively high price for maize bran (an input for the animal feed industry). Obviously, the market is driven by the wholesalers, retailers and bakers in a thrust to increase their volumes of trade and value addition.

Market Development

The future potential scenario and the critical triggers to achieve future yields/production is depicted in the following figure:

Figure 6: Wheat subsector development triggers and potential



Assuming the wheat sector in Tanzania is triggered as above, the production of wheat in Tanzania could grow substantially both in the short and long term.

Table 1: Wheat Production Projections, Tanzania

Short term (3 -5 years)	Market	Long term (by 2030)	Market
90,000 mt	Tanzania	660,000 mt	East and Southern Africa

The best and probably only way to catalyse the wheat value chain in the south of Tanzania is through commercial farms. Currently only a few commercial farmers in the southern corridor produce wheat. However, the landscape could change dramatically if Bakhresa goes ahead with replicating and expanding its Malawi model (medium scale farms of 200 hectares) in southern Tanzania. Depending on the type of finance², Bakhresa may invest in one to two farms in the short term. Considering the wheat scarcity on the world market in the long term, Bakhresa is likely to pursue the strategy of backward integration and start additional and larger farms (500 hectares and above). Moreover, it will attract other farmers to invest as the economies of scale will reduce transaction costs and make wheat from the southern corridor more competitive. In the short term a total of 20,000 hectares under wheat with an average yield of 4 mt per hectare and an additional 10,000 mt by SHF is achievable, which will also be the minimum threshold for Bakhresa to set up a mill with a capacity of 250 mt daily in Iringa. This will reduce transaction costs from the farm to the mill substantially and improve commercial attractiveness of growing wheat. In the long term it will result in 100,000 hectares of commercial wheat farms. With the availability of high yielding seed and investments in irrigation, an average yield of 5 mt per hectare becomes feasible and a total output of 0.5 million mt of wheat can be achieved. SHF could add another 160,000 mt and hence a total expected output over the long term is estimated at some 660,000 mt from the southern corridor.

Table 2 : Projected Benefits

	No. SHF	Total hectares	Yield (MT)/ Hectare	Total Yield (MT)	GP per hectare (\$)	Total Added Value (GP)
Short term	1000	4000	2.5	10000	400	4,000,000
Long term	5000	40000	4	160000	700	112,000,000

Currently, the per capita consumption of wheat is 10 kg annually (Minot, 2010) but due to ongoing urbanization and increase of high-income earners, it can be safely assumed that by 2015 the per capita consumption will have increased to 15 kg annually and by 2030 it may reach 25 kg annually. This implies that total consumption of wheat in Tanzania from the current 450,000 mt will reach 780,000 mt by 2015 and total wheat consumption in Tanzania could be as high as 1,500,000 mt by 2030.

² The Malawi farm was financed through International Finance Corporation

Table 3: Wheat Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	780	1,500
Imports ('000 tonnes)	Tanzania Imports	1,000	1,000
	EAC Imports	8,000	11,000
Consumption ('000 tonnes)	Global Consumption	675,000	850,000
Export Demand ('000 tonnes)	Middle East Demand	60,000	81,000
	EU Demand	125,000	180,000
	Other Export Demand	490,000	589,000

Sources: World Bank, OECD, FAO

Import substitution offers the best growth opportunity for the Tanzanian wheat producers. Their lack of competitiveness due to comparative disadvantages such as relatively short daylight hours and long distances to the millers, particularly for farmers in the south, compounded by poor access to high yielding seeds and expensive inputs, has initially to be overcome by higher import duties. However, in the long term competitiveness can improve by offering guarantees to seed breeders in the form of certification and more efficient ways of transport (specialized grain trucks instead of bags in trailers).

Value chain analysis – Sunflower³

Potential clusters

Sunflower may be included as a core crop in the Ihemi, Ludewa and Sumbawanga / Northern Zambia clusters. It is unlikely to be grown as a sole crop, but will be used on mixed farms, inter-cropping with other crops.

General background to commodity

Sunflower is one of the most important oilseed crops in Tanzania. The crop is adaptable over a wide range of environments and therefore it is widely cultivated in Tanzania. The crop is popular in the Eastern, Central, Northern and Southern Highlands of Tanzania. Sunflower is gaining popularity and current data shows that local production of both factory and home extracted oils contributes to about 40% of the national edible oil requirement, with imported oils occupying a significant portion of the remaining 60% (ARI Ilonga, 2008). Global oilseed production for 2009 was in excess of 400 million mt, with sunflower total production of 32 million mt ranking it among the top ten oilseeds (FAOSTAT 2009).

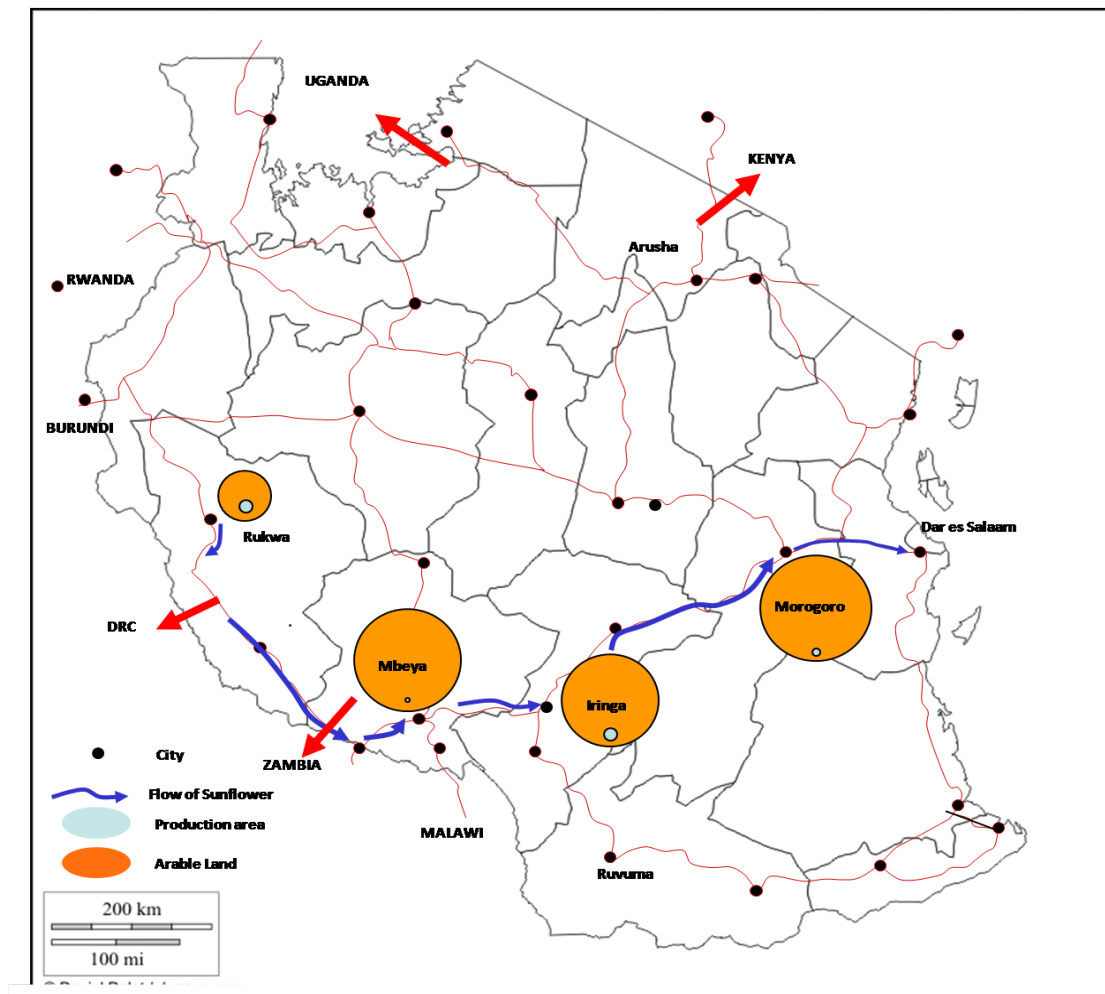
Sunflower has many economic applications: edible oil production, biofuel, animal feed and potentially in latex/rubber production. The edible oil has both favourable economic and nutritional implications. It contains a higher level of healthy monounsaturated fats than most other natural oils, making it nutritionally superior to synthetic edible oils and even olive oil. The sunflower oil industry provides employment at the SME level and offers opportunities for export and import substitution at the macro level. Sunflower cake is high in protein and can be used as feedstock for poultry, small animals, pigs, dairy and draught animals.

The sunflower plant grows best in fertile, moist, well-drained soils and is propagated by open pollination. The plant also grows a deep tap root system that affords the plant some level of drought-resisting capabilities. Sunflower can therefore be planted in less fertile and semi arid areas, and is commonly intercropped with or used as a rotational crop or break crop for cereals.

The diagram below depicts the arable land in the SAGCOT regions cultivated by sunflower. In each of the regions, the total cultivated area is also very low and not exceeding 40% of the total. There is therefore tremendous scope for the expansion of sunflower production in each of the regions of Morogoro, Iringa, Mbeya and Rukwa.

³ This report is a summary of more detailed analysis undertaken by Match Maker Associates

Figure 7: Figure showing the comparison between total arable land and area under sunflower cultivation for the SAGCOT regions



In general, reasonable yields can be achieved using basic inputs and simple farming techniques and the processing of the seeds to produce oil is economically viable. The cost of producing sunflower oil in Tanzania is lower than other oil seed crops (sesame, ground nuts), and the crop has the added advantage of superior performance in poorer soils and increased adaptability across various ecological zones.

There is an active local market demand for sunflower oil for domestic use and demand for the by-product seed cake for livestock feeding. In relation to the cooking oil industry, development of the local sunflower oil industry has potential for significant import substitution given that the majority of cooking oil consumed in the country is imported.

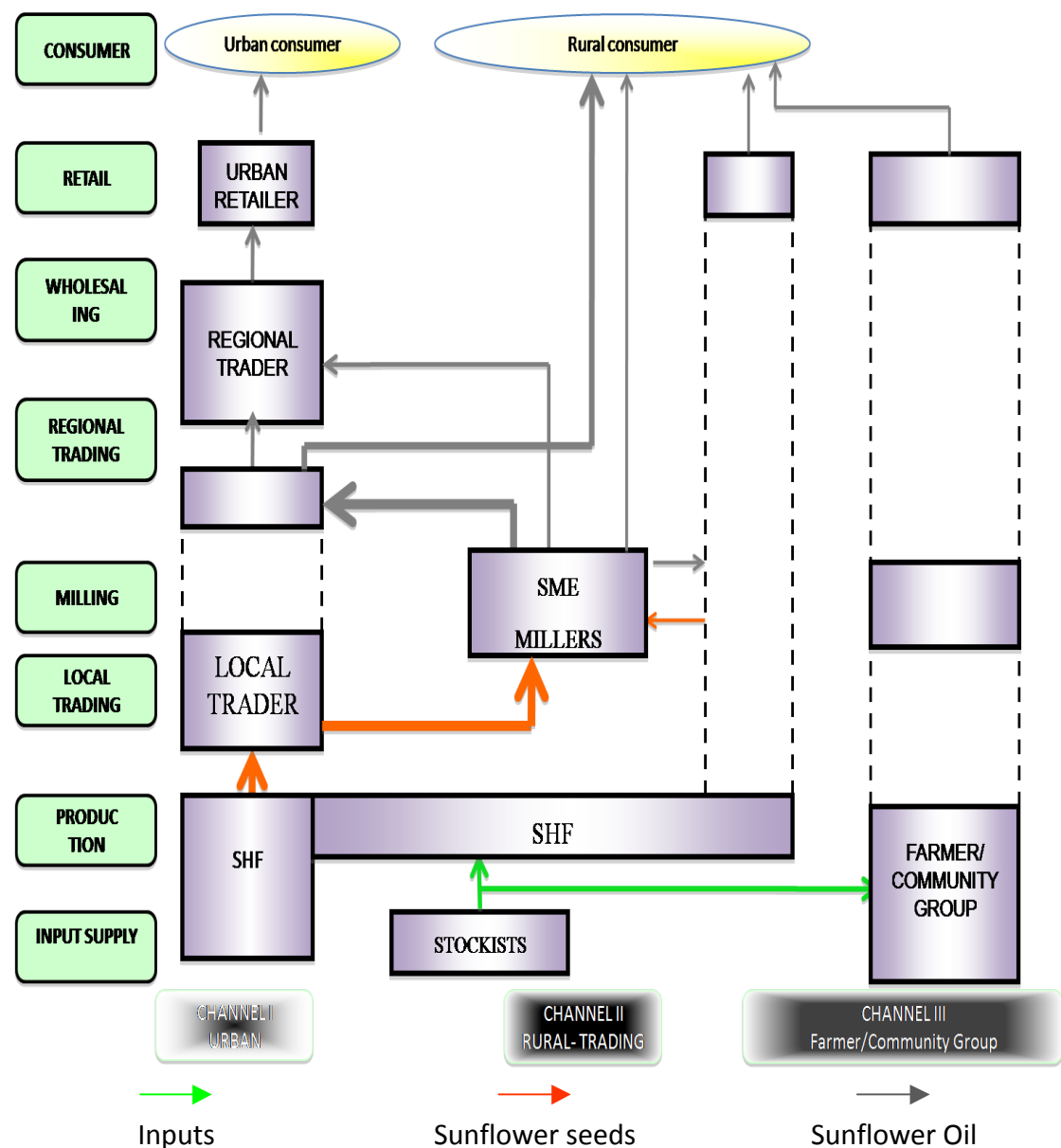
Sunflower seed cultivation is a profitable cash crop for smallholder farmers as the margins generally exceed those of other commonly grown cash crops. National production of sunflower has been increasing over the years, and has moved from 80 MT in 2000/2001 to 35,000 MT in 2009 (FAOSTAT). The southern region of Rukwa is

the second highest sunflower producing region, but there is also significant production in the Iringa region.

Value chain dynamics

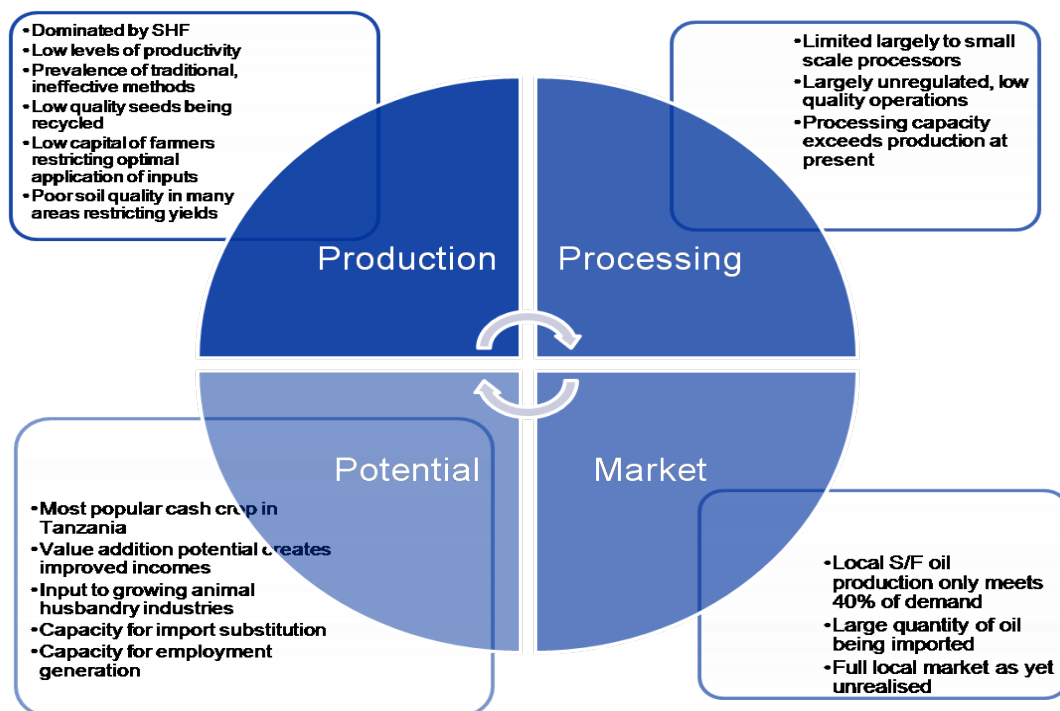
At the production level, the sunflower subsector in the Southern Highlands is characterised by smallholder farmers on less than 5 acres. On these small plots there is usually mixed cultivation, with the most popular combination being maize, beans, sunflower and groundnuts. Sunflower is usually intercropped with maize, and pure stand cultivation is seen only in a few cases.

Figure 8: Value Chain Map for the Sunflower Oil Subsector in the SAGCOT regions



When harvested, the sunflower crop is usually sold to local traders either at the farmgate or at the local markets. These traders are either on commission from local processors or are acting independently. The independent traders may then locate buyers for the seeds, or negotiate with the processors, while the commissioned collectors usually work based on an order from the processor. In a small number of cases some of the farmers also take their seed to the processors themselves. The processors are the pivotal point for the sunflower oil subsector, as all the seed must pass through these actors. They therefore come into contact with a wide variety of actors and have different types of transactions. The processors who lack capital are simply paid for their milling services, and oil and cake are returned to the trader or farmer who transports it. In other cases the processor may purchase seeds or oil after processing. Once the oil is produced, the owner (farmer, trader or processor) may then either sell directly to the rural market, sell to rural retailers, or to further traders for movement toward the urban market.

Figure 9: Dynamics for the Sunflower Value Chain



The market for sunflower oil within the southern corridor is well established and absorbs more than 75% of the sunflower oil produced in the regions. Therefore only a relatively small percentage is traded outside the region. Local consumers are able to purchase sunflower oil in the following ways:

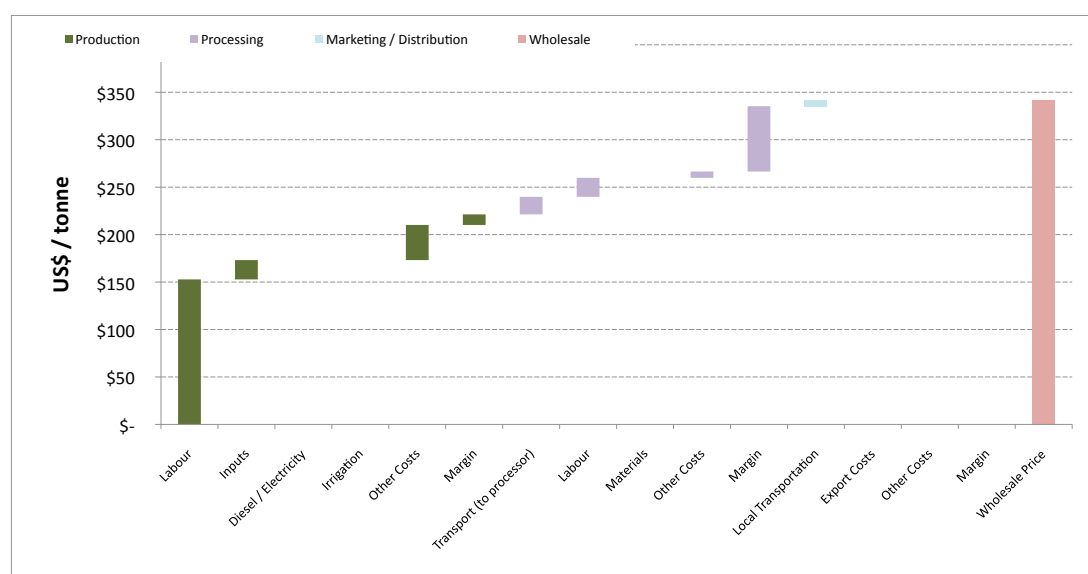
- from farmers who have paid for the processing of their crop,

- from local traders who have purchased from farmers and paid for the processing,
- from processors who have bought either the seed or oil from the farmers,
- from retailers who have bought the oil from processors or traders, or
- from farmer/community groups who own processing equipment.

Urban consumers either obtain the oil from urban retailers, urban wholesalers/retailers or purchase the oil when making trips to the region.

The price of sunflower seeds varies between the two extremes of excess supply, and scarcity. Excess supply occurs usually during the time of harvest since all the farmers in the region harvest simultaneously, lowering the price. Later in the year, as the supply is consumed, and especially during the time of replanting, the price of sunflower seeds increases.

Figure 10: Cost and revenue drivers and margins along the chain



These costs represent all costs (including margins) which make up the wholesale price of sunflower grown by a smallholder farmer, sold and delivered to a processor, who then delivers to a wholesale market in Dar es Salaam after processing into oil.

Market development

The present edible oil demand in Tanzania is estimated to be 250,000 mt a year. This may be translated into 273,000,000 litres of edible oil (0.917kg = 1 litre edible oil). At present local production of sunflower oil accounts for 40% of this demand. The annual import of edible oil into Tanzania is estimated at 200,000 tons, the majority of which is consumed in urban centres. This has yet to be significantly penetrated by locally produced sunflower oil.

The population of Tanzania is expected to increase by 15% in the next five years to 52 million, from the 2010 estimate of 45 million, and to 75.5 million by the year

2030, which will give a commensurate increase in the demand for and consumption of edible oils.

Between 2004/05 and 2008/09 the national production of sunflower in Tanzania has registered a phenomenal growth rate of over 72% per annum (albeit from a low base). During this period the most significant growth concentrations occurred in the regions of Singida and Dodoma. There is potential for further improvement in the Southern Corridor given the comparative advantages in terms of soil quality, irrigation potential and infrastructure.

As can be seen in Figure 7 above, present sunflower cultivation is insignificant, occupying less than 1% of the total arable land in each case. The local market for sunflower oil is expanding and there is significant potential for import substitution. Some exporting of sunflower oil has already begun to large markets such as the Netherlands, and there is considerable scope from the world market.

It is therefore deemed reasonable that with the right support, an average of a 100% annual increase in the production of sunflower in the SAGCOT region may be achieved. This would give a production figure of 175,000 tonnes in the next five years and 700,000 tonnes of sunflower seeds by the year 2030.

Table 4: Sunflower Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	300	450
Imports ('000 tonnes)	Tanzania Imports	240	360
	EAC Imports	700	960
Consumption ('000 tonnes)	Global Consumption	37,000	115,000
Export Demand ('000 tonnes)	Middle East Demand	4,700	6,500
	EU Demand	6,000	8,700
	Other Export Demand	26,000	99,350

Sources: World Bank, OECD, USDA, FAO

The world's demand for oils and fats has doubled for the last 15 years and is projected to reach 217 million metric tons by year 2030 (Fry 2005). FAO projects the oil seed industry to maintain growth pace among the major agricultural sectors for the foreseeable future.

Globally exports are projected to grow by about 15 million metric tones by 1020. Brazil and Argentina (soy oil) and Malaysia and Indonesia (palm oil) will increase their share. Western Europe and Africa are expected to increase their dependency on imported oils and fats.

Sunflower oil world trade has been stable in the last five production years, with Argentina still holding the leading position in terms of volume traded. The total volume traded in 2003 reached 3.4 million tonnes, with a value of US\$1,583 million.

Argentina (30%), Ukraine (27%) and The Netherlands (10%) were the main exporters, while the Netherlands (11%), Argelia (8%) and Germany (6%) are the main importers. The world production of sunflower pellets is also important, as it is the principal grinding sub product. Argentina is the largest exporter, and the European Union the greatest importing block. (USDA; FAS; Circular Series FOP 4-09 April 2009).

Value chain analysis – Soybean⁴

Potential clusters

Soybean may be included as a core crop in the Ihemi, Ludewa and Sumbawanga / Northern Zambia clusters. In general soybeans can be grown in areas where either beans or maize can be cultivated. Currently, soybeans are cultivated in Ruvuma region (Songea), Morogoro (Kilosa, Mvomero and Morogoro Rural districts), Kagera region, some parts of Iringa and Mbeya, Rukwa, Arusha, and Lindi regions (Nachingwea districts).

General Background to commodity

The estimated annual production of soybeans in Tanzania in 2005 was 5,000 mt, with 1,150 mt of this being produced in Mbeya, Rukwa, Iringa and Ruvuma regions. Demand far outstrips supply, with the feed industry alone using 150,000 mt per annum. The deficit is met by imports from other countries.

Given that soybean can be grown in areas where either maize or beans are grown, there is great potential to expand the area under production (it is estimated that at current yield levels of 1.5 mt/ha the country could potentially produce over 2 million mt per annum). The low levels of current production are attributed to a limited knowledge of the crop's potential for human consumption and animal feed. There are also current difficulties in processing due to a lack of knowledge of the technology used, thereby causing difficulties in marketing the crop.

⁴ This report is a summary of more detailed analysis undertaken by Match Maker Associates

Figure 11: Regional background for soya

REGIONAL BACKGROUND

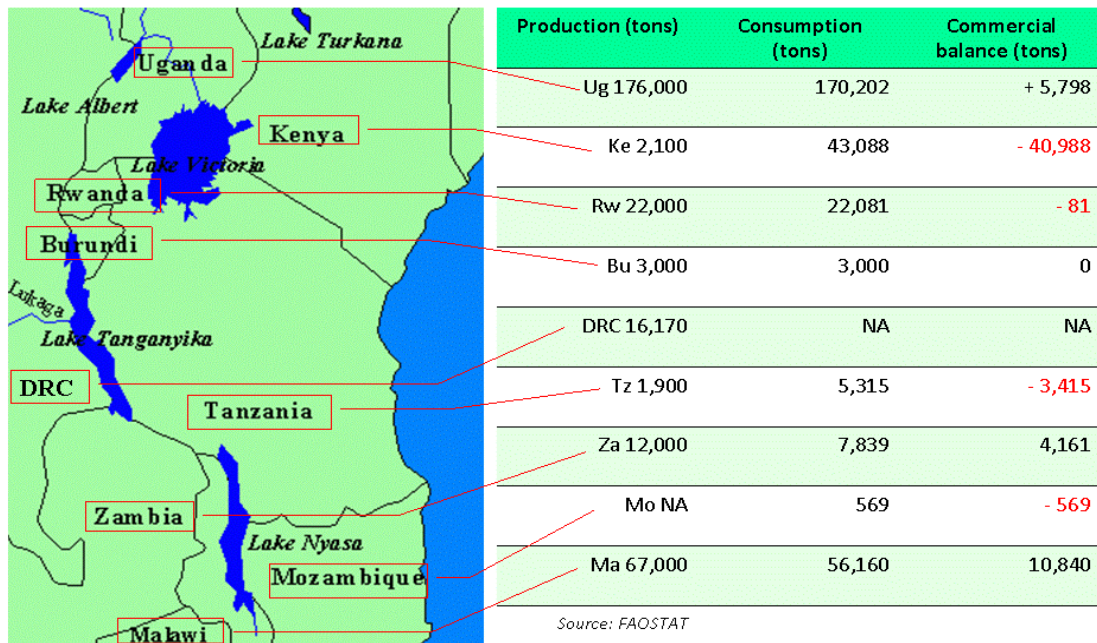


Figure 12: Soya: production (2005 and potential) and main flows

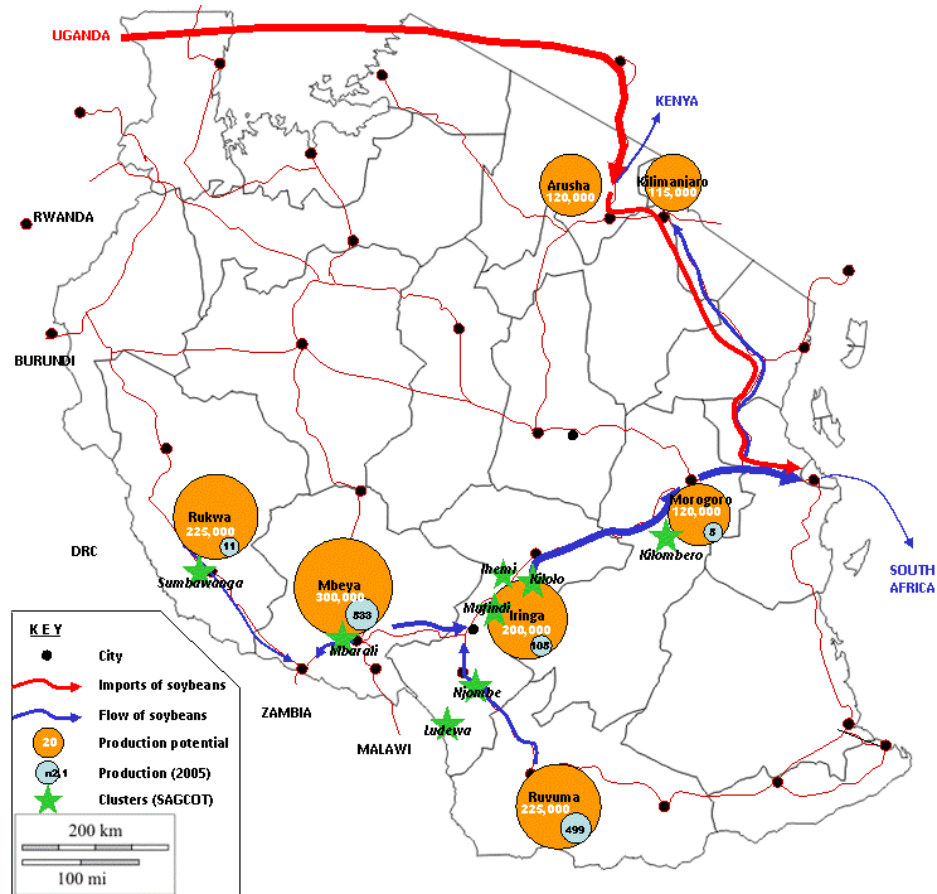


Table 5: Regional background for soya

Production areas	Current production (mt)	Area (ha)	Potential (mt)
Mbeya	2005: 533 mt	200,000	300,000
Rukwa	2005: 11 mt	150,000	225,000
Ruvuma	2005: 499 mt / 2010: 800 mt (expected)	150,000	225,000
Iringa	2005: 105 mt / 2010: 120 mt	130,000	200,000
Morogoro	Mentioned by farmers and researchers		120,000

Value chain dynamics

Figure 13: Value Chain Map for the Soybean Subsector in the SAGCOT regions

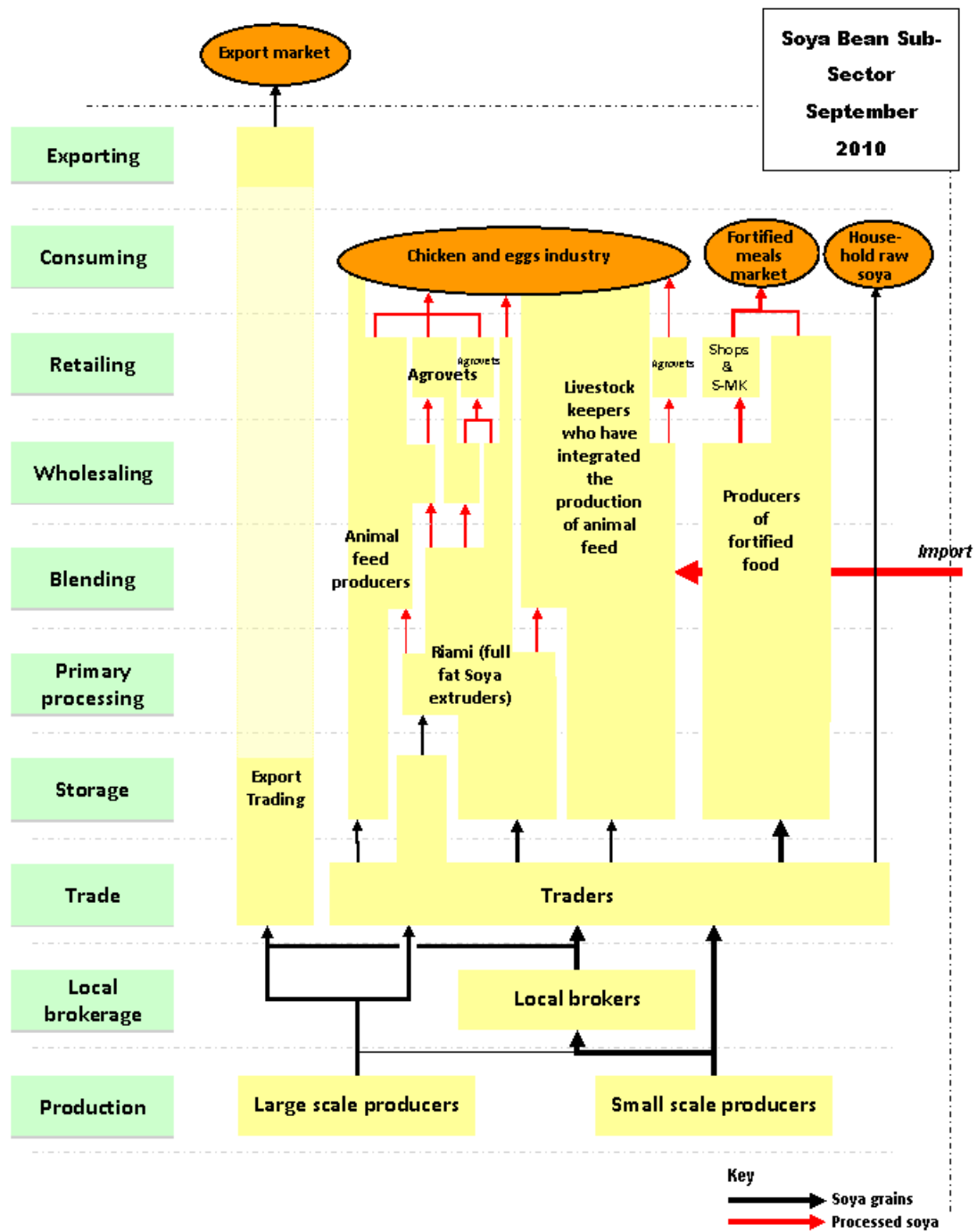
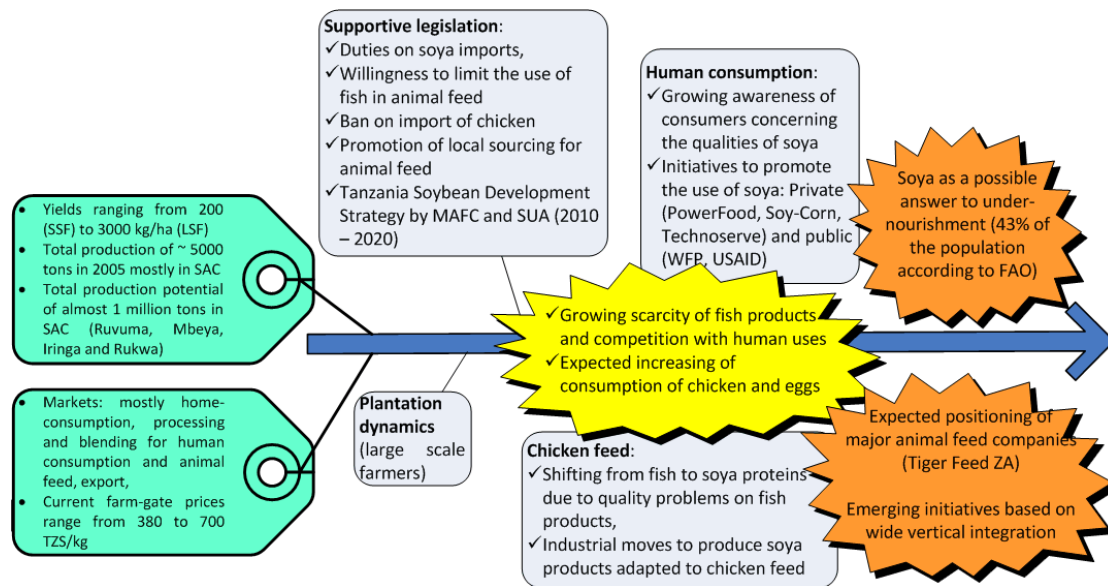


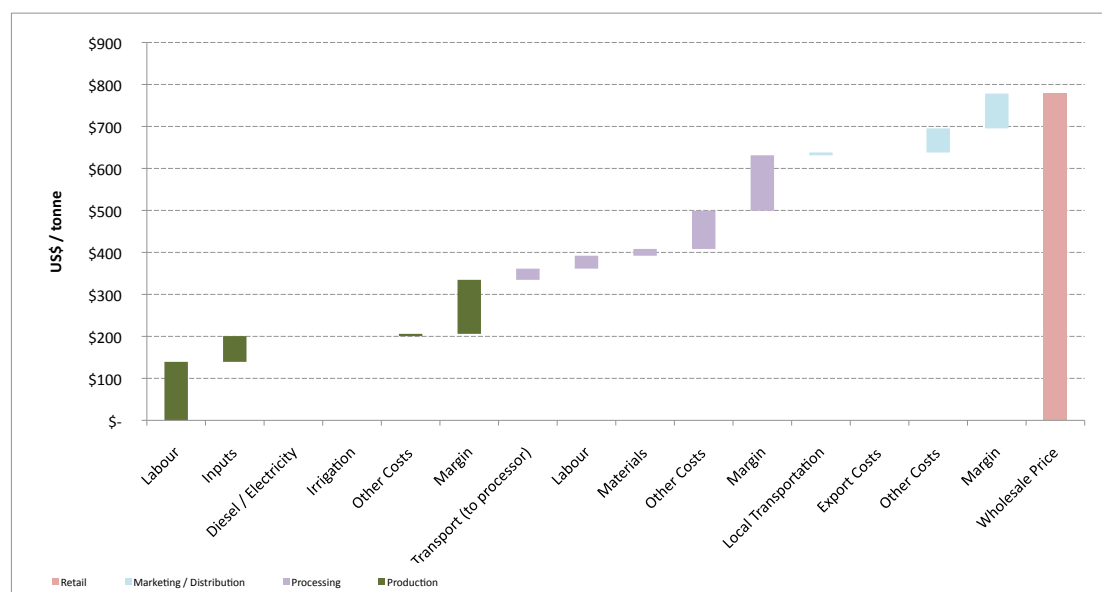
Figure 14: Dynamics of the soybean value chain in the SAGCOT regions



The share of costs and profits varies considerably from one producing and processing situation to another. The sales to the exporter provide the lowest margins for the producers whereas the sales to local animal feed processors are the most attractive. Due to the commercial nature of the business, it is difficult to identify the gross margins for all the actors involved in all chains.

Error! Reference source not found. represents the price structure and the cost drivers for the main strands of the value chain. Aside from the cost of the farmer’s own time, the major cost driver remains the raw material, representing 38% on average and ranging from 29% to 44% of the total. The yields considered for the calculation of the profitability at farm level correspond to the highest values observed during the survey. The margins are on average some 28% with a variation from 12% to 40%.

Figure 15: Cost and revenue drivers and margins along the chain



Market development

There is significant potential for increased production of soybeans in Tanzania, through three main channels:

- Change in human consumption patterns towards soybeans and associated processed soy products, both in Tanzania and internationally, for health and other reasons
- Increased use of soybeans and associated products in animal feeds. This is particularly possible for chicken feed in the short-term, and over the longer term, in dairy cow and pork feed. There is a possibility of prohibition of the use of fish in animal feed, which will increase the demand for soybeans. Over time, this will decrease the cost of feed for animals, thereby increasing the margin in the short term, and market share in the longer term.
- An increase in productive capacity, through, among other things, increased extrusion capacity (in volume and technology) and the use of higher quality seeds. Figure 16 provides an example of an improved business model for soya.

Total potential demand is therefore estimated at some 745,000 mt by 2030. Table 5 provides current production levels for the SAGCOT regions and the total area currently under maize. Estimated total production at current yield levels of 1.5 mt/ha would give some 1.1 million mt.

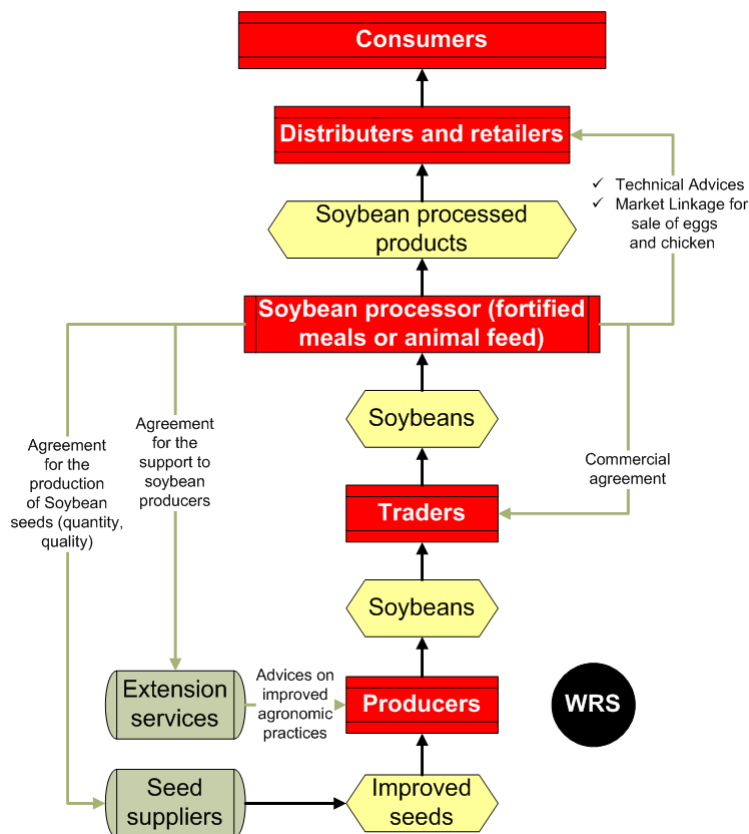
Table 6: Soybean Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	13	25

Imports ('000 tonnes)	Tanzania Imports	10	15
Consumption ('000 tonnes)	Global Consumption	290,000	485,000
Export Demand ('000 tonnes)	EU Demand	50,000	75,000
	Other Export Demand	240,000	410,000

Sources: World Bank, OECD, FAO

Figure 16: Proposed soybean subsector business model



Value chain analysis – Rice

Potential clusters

The Mbarali and Kilombero clusters are already the two major areas for commercial rice growing in the Corridor, and will be the bases for the Corridor's rice expansion. Rice may also be grown in the Ludewa and Sumbawanga clusters.

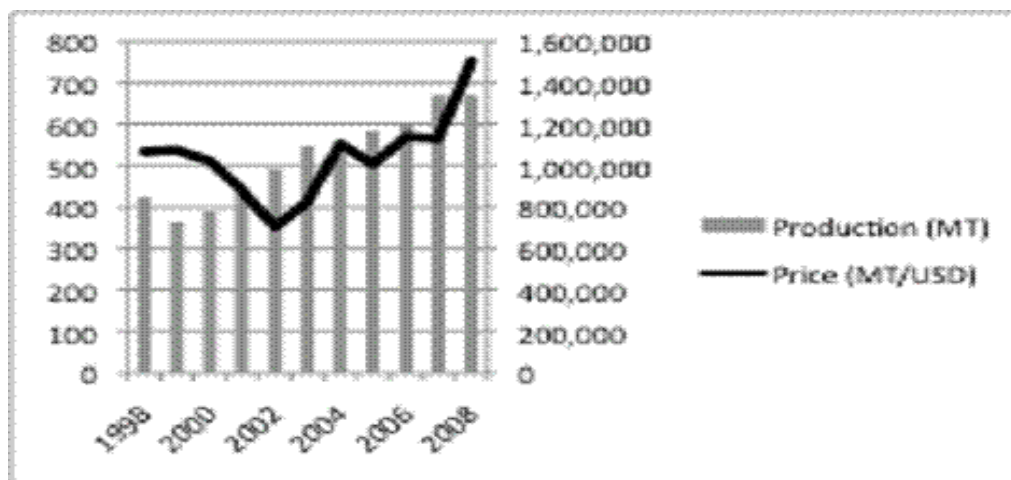
General background

Rice is the second most important crop in Tanzania, and used mostly as a cash crop. Tanzanian productivity is lower than most neighbouring countries, and one of the lowest in the world. Furthermore, Tanzania hardly meets its own demand and therefore imports large quantities, mostly from South-East Asia. However, Tanzania is the second largest producer in Southern-Eastern Africa.

Tanzania's total production is about 900,000 mt, from which a small part is exported to neighbouring countries. Rice production internationally is highly concentrated in India, Thailand, the USA and Vietnam. As a commodity, rice is used for political purposes in some of these countries, and due to this, and the concentration of production, the international rice price is tied closely to the activity of these countries.

Around 90% of Tanzania's production is sourced from small-scale farmers, on an average farm size of 1.3 ha. The rice subsector is highly fragmented with millers and brokers playing a central role in the trading process. The supply channels are generally long and the produce changes many hands before reaching the final consumer. A few more structured supply chains are emerging and there is an increasing interest of large (foreign) investors.

Figure 17: Tanzania Production and Prices of Rice from 1998 to 2008

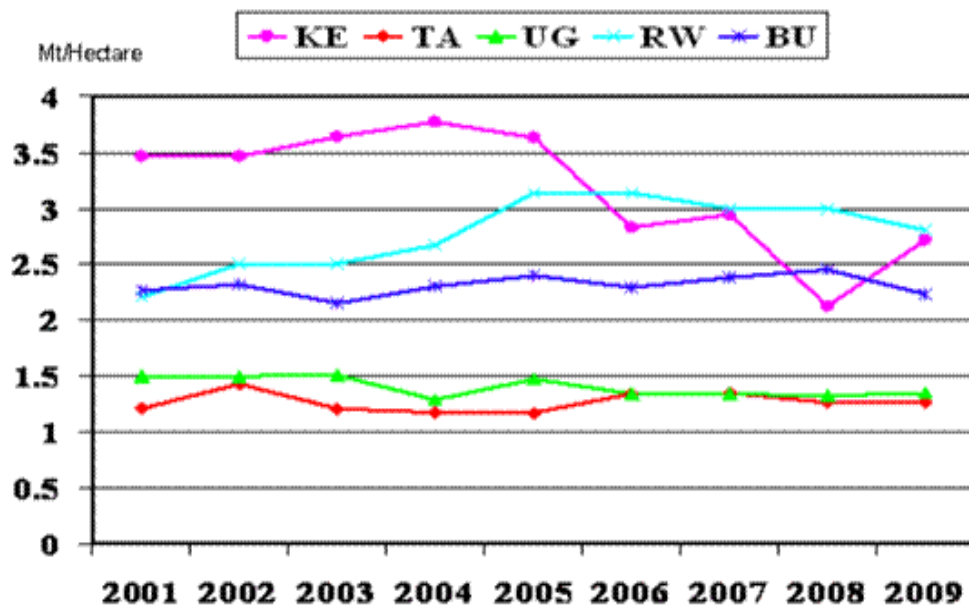


Four primary channels or supply chain paths operate within the country:

- Traditional – small-scale production, own seeds used as input, minimal fertilizer, limited use of WRS, spot price takers at local markets. Most farm production moves through millers, brokers, wholesalers and various other actors to the retail sales sector, before it finally reaches the final consumers.
- Small-scale with coordinated and bulk trading through warehouse receipts systems – this allows better management of price risk through controlling access to market, and minimising post-harvest losses due to poor storage.
- Large-scale farmer chain integration – large scale commercial farms (sourcing in part through outgrowers) control the processing of rice, and the distribution to large urban wholesalers, who then on-sell to different consumer groups, in particular the medium-to-high income retail market segment.
- Partial chain integration – similar to large-scale chain integration, except more of the chain (including processing and distribution and retailing) is controlled by a single company

Significantly, because most rice farming in Tanzania is rain fed, it is also less productive. Among EAC countries, Tanzanian producers rank well below their neighbours with respect to yields generated per hectare. See Figure 18 below.

Figure 18: Productivity of producers in different EAC states



Rice markets internationally, and locally, are becoming increasingly segmented by quality. In the traditional rice consuming regions of Tanzania, strong demand exists

for aromatic/high quality rice. High quality rice, in Tanzania, can be characterized as rice with a low percentage of broken rice, young rice, with relatively long kernels which are transparent in colour, with low moisture content, an absence of stones and which possess a strong aromatic smell. Traders at all levels mix high quality/aromatic species, which are in relatively short supply, with non-aromatic low quality rice, be it local or imported. Blending enables traders to sell the rice as aromatic, which is preferred in the market and at the same time reduce their procurement costs by increasing the blended share of cheaper, non-aromatic rice. However, consumers are aware of this blending, and price it accordingly, which ultimately ends up affecting the price paid to farmers for genuine aromatic rice.

There is growing demand for rice from Tanzania's major markets. The demand by urban medium-high consumers is increasing for quality and branded aromatic rice, which is primarily produced in Tanzania. Likewise most neighbouring countries have rice deficiencies, which makes the regional block a highly attractive market if efficient supply chains can be developed. The export ban has been lifted in 2010 and this could motivate more structured supply chains to penetrate this market segment. The study has also identified institutional niche clients (army barracks, hospitals, schools and mining companies etc) as another attractive market segment.

Rice is grown in different areas in Tanzania mainly within three main ecosystems:

1. Rain-fed lowlands (68 %): average productivity 3-5 mt/ha;
2. Rain-fed uplands (20%): average productivity 1-2 mt/ha;
3. Irrigated rice cultivation (12 %): average productivity 3-8 mt/ha.

Figure 19 below illustrates the main producing areas (coloured dark green), the main flow of paddy/rice (black arrows) and the main trading/processing centres (white circles).

Figure 19: Rice production and primary rice flows to the principal regional markets

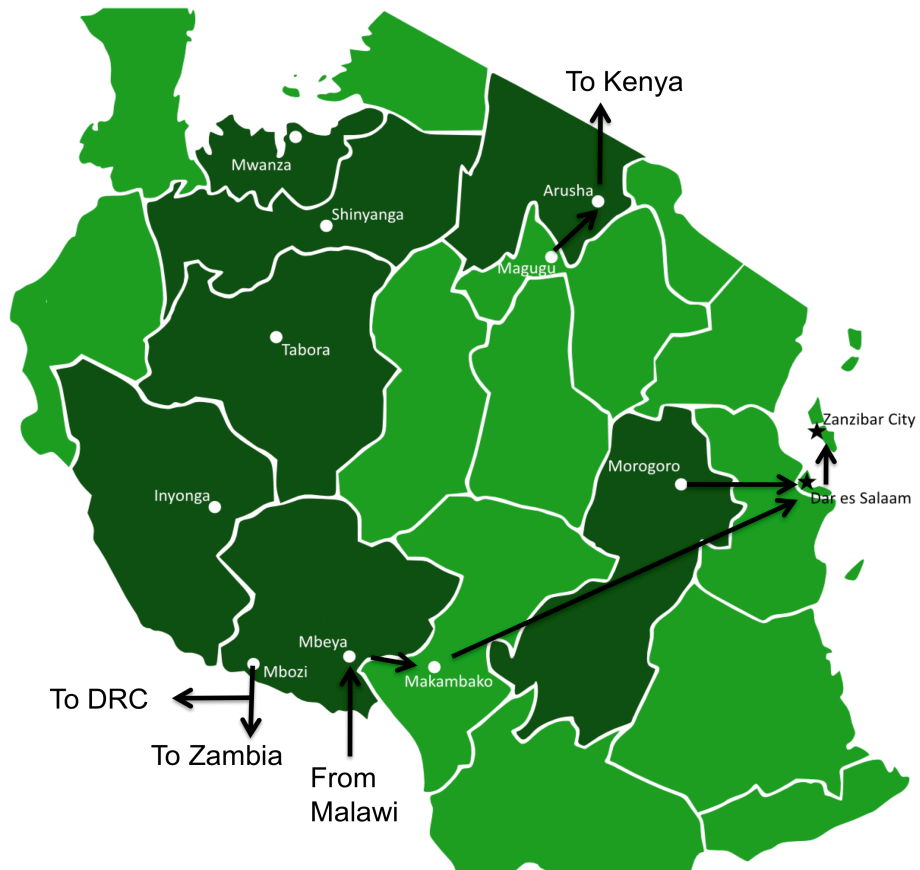
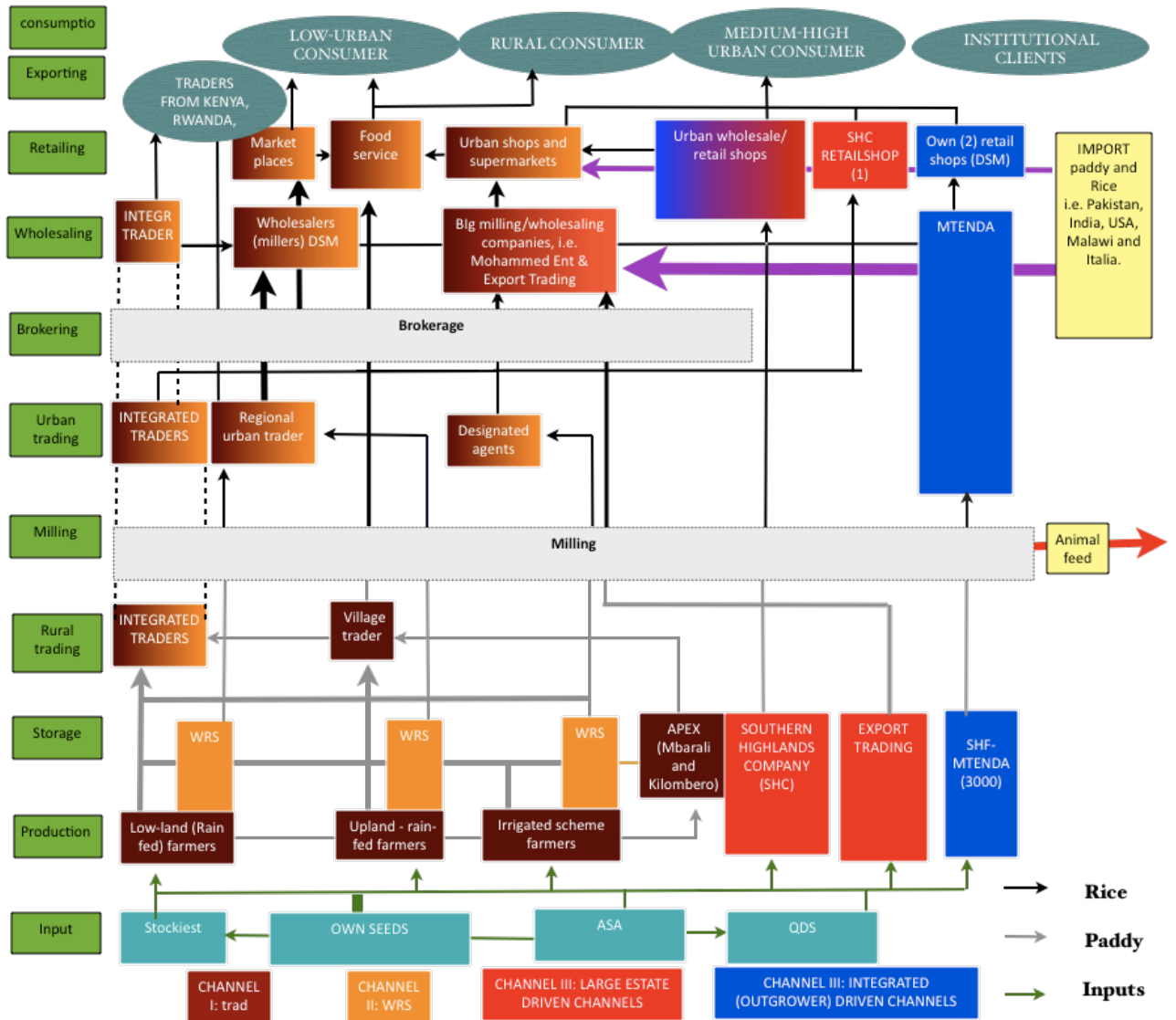
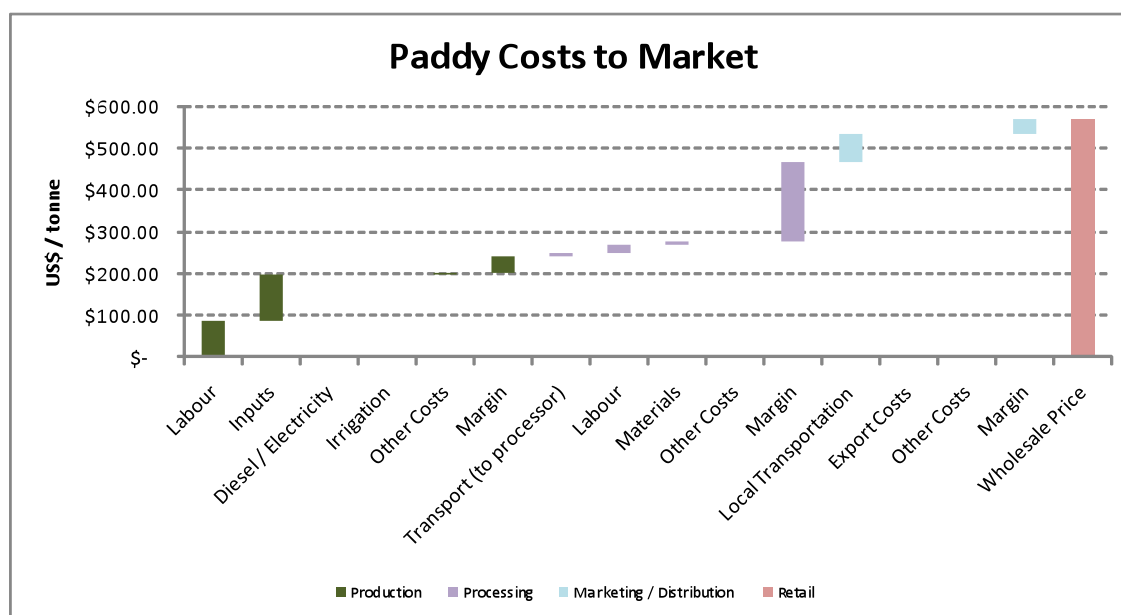


Figure 20: Value Chain Map for the Paddy/Rice Subsector



Industrial organization of small-scale farmers, designed to capture economies of scale in rice chains, is progressing in Tanzania, but only at a slow pace. Farmers have not yet demonstrated a great deal of enthusiasm for farm level organisation, although an increasing number of farmer groups, with the support of NGOs and governmental institutions, are being established and/or strengthened. One example includes the increasing application of the warehouse receipts system model.

Figure 21: Cost and revenue drivers and margins along the chain⁵



Based on secondary literature and survey finding, transport costs are on average \$0.40/T/km from the farm gate to the primary market (rural), \$0.27/T/km from the primary (rural) market to the secondary (regional) urban market, and \$0.12/T/km from the secondary market to the wholesale markets. However, during peak times and in the more remote rural areas the costs can even be higher.

The profitability of the rain-fed smallholder farmers varies from negative returns of to modest returns of 27% and hence it shows that their activities are hardly profitable and that many are working at a subsistence level. The irrigated farms are much more productive and profitable, with simplified gross margins from 2% to 61%. The producer's main cost drivers are (own) labour (60-80%), inputs (10-30%), local transport costs (5-10%). The other main actors (traders, millers and retailers) realize positive gross margins varying from 9-25%. Main cost drivers for traders/millers are raw material (paddy; 60-80%), transport costs (6-12%), milling (5-10%), loading-unloading (2-3%), taxes (2-3%) and for the bigger traders, rent of storage (20-30%).

In most cases moving rice from farmers to final consumer still involves multiple transactions. The margins required by each party within multi-party chains substantially increase the final retail price. Long, traditional chains diminish Tanzania's competitiveness and encourage imports⁶. Competitiveness is further undermined by high losses since broken rice is sold for half to a quarter of the going price for full kernel rice. A good deal of this problem results from the fact that most

⁵ Note that calculations are done per 100 kg bags and consist of two main actors. Moreover the costs are based on several costs finding during the surveys and translated to potential sales to Kenya (Nairobi)

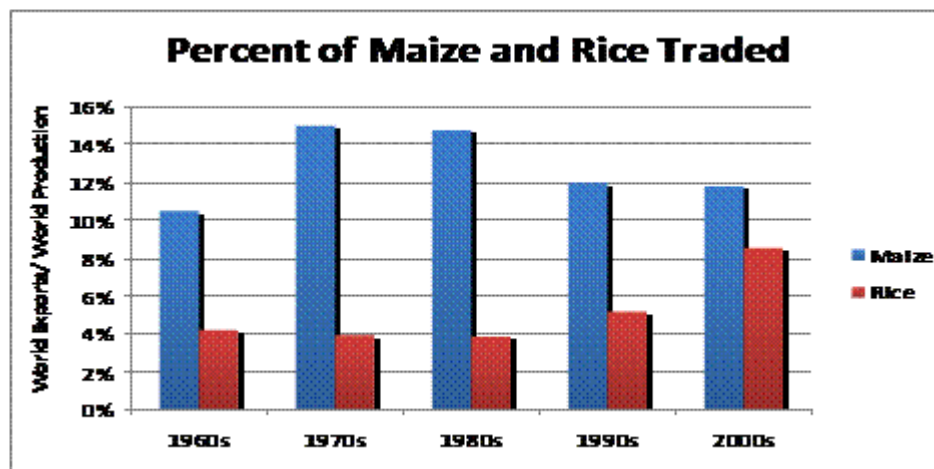
⁶ Imported rice is often cheaper than Tanzanian rice, even after 75% import duty and 18% VAT.

rice is milled using cheaper, pounding machines. Big millers are now emerging and increasing the capacity of their larger/higher yield milling machines.

Market development

The world rice market has four distinct features, which magnify the sensitivity of rice prices to economic shocks. The first is of these is the fact that the global rice market is thin. Rice traded across borders represents about 8 percent of global production. See figure 1 below.

Figure 22: Percent of maize and rice traded



Source: World Bank 2010 (USDA Data)

The rice trade is a residual activity in most countries, with almost all rice being consumed domestically in the producing country, and with only a small share either imported or made available for export. Although 8 percent is a significant improvement over the 4-5 percent traded in the 1960s and 1970s, it still leaves the rice market vulnerable to large price responses to small changes in quantities.

The second feature of the rice market is that it is quality segmented. This is due to a moderate elasticity of substitution between Indica and Japonica rice, which can be explained by different consumer preferences. Within the Indica rice segment numerous additional quality differences exist which are based on fragrance, length of grain, broken percentage, freshness, processing method (e.g. parboiled), and other criteria. As a result of its segmented nature, economic shocks can have a disproportionately large price impact on any particular type of rice.

The third feature of the rice market is that exports are concentrated. The biggest rice exporters are Thailand, Vietnam, the US, and India. These four countries make up more than 70 percent of global rice exports during 2006-2008. This

concentration makes rice prices very sensitive to changes in the export plans of these four countries, as the rice export ban from India in 2007 made quite clear.

The most significant critical feature of rice, however, is that it is a political commodity. Governments in Asia are extremely sensitive to rice price swings. Instability on world markets causes politicians to seek to insulate their domestic market, which makes the thin world market become even more unstable, as was illustrated by the rice price hikes in 2008.

Africa has steadily increased its production of rice over the past half century (by 3.5 % per year since 1961). The share of rice vis-à-vis overall cereal production has increased apace. In 1961, rice accounted for 9.3 % of total cereal production in Africa. This share has risen steadily to become 15.2% in 2007. As a result rice has become a significant cereal crop in Africa.

Table 7: Rice Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	1,150	1,750
Imports ('000 tonnes)	Tanzania Imports	85	45
Consumption ('000 tonnes)	Global Consumption	730,000	1,150,000
Export Demand ('000 tonnes)	Middle East	8,000	
	EU Demand	3,500	5,000
	Other Export	718,500	1,145,000
	Demand		

Sources: World Bank, OECD, USDA, FAO

Although the share of rice in Africa's overall agriculture production base remains small (just 1.48 % in 1961), that share is rising quickly, accounting for 2.34 % in 2007. Although still accounting for a small portion of Africa's overall agricultural production, rice is clearly a commodity with a promising future. Part of that promise relates to the decline of rice production in Asia where the largest share of rice is still produced and consumed. Production of rice has been declining in both the Philippines and Indonesia until the recent rice price crisis and production in these countries as well as in China and India is expected to continue to decline marginally over the longer term. This therefore provides significant opportunities for Africa and in particular Tanzania.

Value chain analysis – Maize

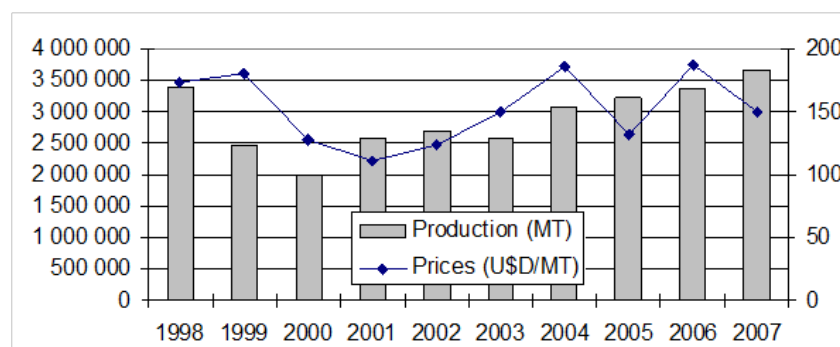
Potential clusters

Maize may be included as a core crop in the Ihemi, Ludewa and Sumbawanga clusters, but can be grown in all other clusters, although they are not as focused on maize. The supply of maize can be used as a food source (either whole or processed as flour), or as a feed source for livestock farming within mixed farm models.

General background

Maize production is undertaken almost exclusively by small-scale farmers (over 95% during the long raining season farming an estimated 2 million Ha in 2002 / 2003⁷, with an average land holding of 0.67 Ha), with some large-scale farmers operating 750 farms country-wide, planting maize on an estimate of 30,000 Ha⁸. Yields range from 1.2–7.7 mt/Ha for small-scale farmers, and from 5.5–9.5 mt/Ha for large-scale farmers. Traditional seeds can produce up to 5.5 mt/Ha, while the potential of improved seeds currently available in Tanzania is 12.0 mt/Ha⁹. On average, Tanzania has been a net importer of maize (141,120 Tons pa), but annually this has varied between a positive export balance of 60,934 tonnes in 2005 and 80,251 tonnes in 2007, and net import balances of 229,488 tonnes in 2006, 43,577 tonnes in 2008 and 9,259 tonnes in 2009.

Figure 23: Tanzania maize production and prices 1998 - 2007



Source: RATIN

The value chain can be segmented by end user: Home Consumption (with no trade), Urban Low Income Consumers (ULIC), High-Medium Income Urban Consumer (HMIC), Institutional Market (IM) and Export Market (EM).

⁷ Tanzania Agriculture Sample Census / Small Holder Agriculture – 2003

⁸ Tanzania Agriculture Sample Census / Large Scale Farm Report – 2003

⁹ Evaluation of Mr. Ulyate in Iringa. Varieties available in South Africa have a potential yield of 20 Tons/Ha and more...

Table 8: Tanzania national maize consumption

Institution	MT/year	Source
National production	3,339,530	
Home Consumption	1,924,185	57.9% of rural population ¹⁰ x 222 g daily per person (effective average availability in 2009)
Urban Low Income Consumers	911,285	Assumption: Urban population = 17,301,960 65% of which has low or very low income = 11,246,274 x 222 g/day = 981,384 MT
High & Medium Income Cons	113,160	Balance
<u>Institutional Market</u>		
NFRA	180,000	Communication NFRA
WFP	15,000	Communication WFP
Army	8,100	Assumption: 100,000 x 222 g x 365 days
Schools and hospitals	159,800	Assumption: 4 millions x 180 days x 222g/day
Export market	28,000	Informal Cross Border exports in Northern Regions
Total consumption	3,339,530	

Maize is a priority in Tanzania's food security policy and has been subject to regular export bans. This is one reason for disincentives for increased production and investment (Kenyan maize prices average 20% above local Tanzanian prices, but cross-border trade has regularly been restricted). The export market that exists can be divided into the markets for maize grains and for maize flour. Grains are mostly exported by traders and store keepers while flour is exported by millers and flour wholesalers. Imports of seed are generally arranged and controlled by food security agencies.

The main markets for Tanzanian maize are Dar es Salaam (and by extension Zanzibar and Comoro), the Mtwara–Lindi region, northern cities such as Moshi and Arusha, Kenya, Rwanda and Burundi, Congo and to a lesser extent Malawi and Zambia. There are two main bulk markets located in Makambako and Kibaigwa that collect and spread maize from and to further regions. The relevant source of imports of maize is Uganda where the prices can be lower than in Tanzania according to the availability of maize.

The maize wholesale market based in the main (Dar es Salaam) and secondary towns (Songea, Njombe, Makambako, Iringa, Mafinga, Morogoro, etc.) frequented by the traders, the storekeepers, some farmers and maize brokers. It is on these markets that maize can be sold from trader to trader and that much long-term grain storage is operated and that the traders locate their buffer reserves. Maize brokerage is a specificity of the Dar es Salaam maize wholesale market where they connect the

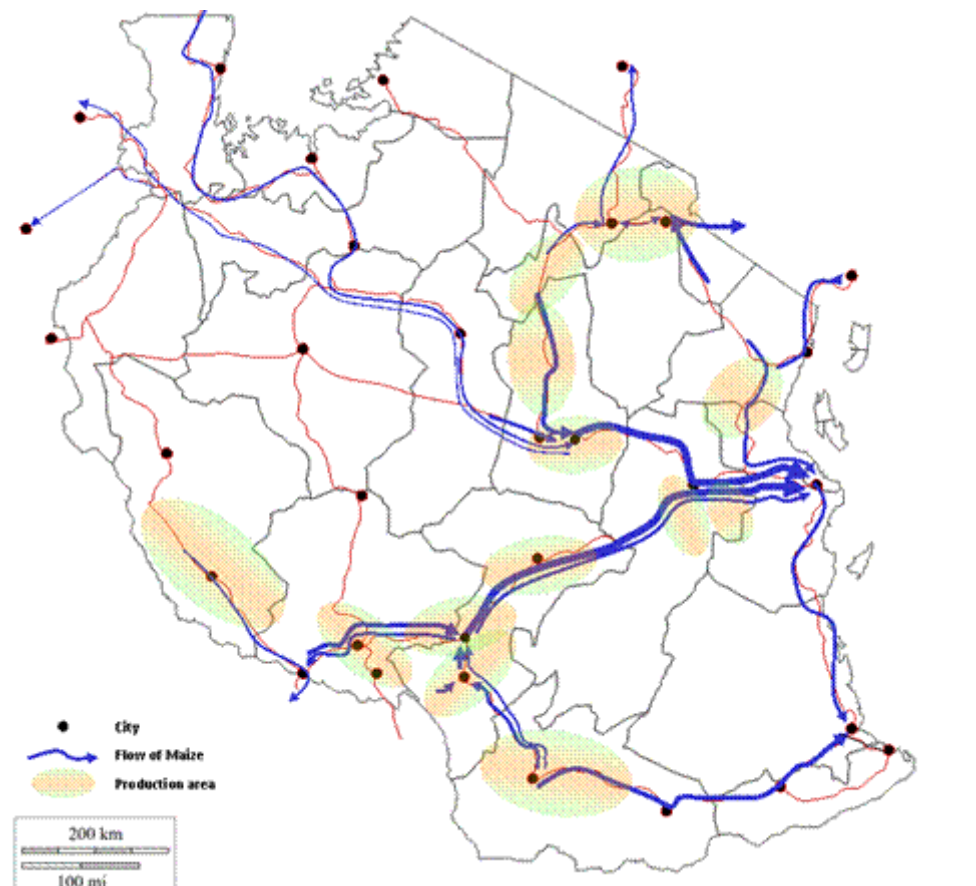
¹⁰ http://globalis.gvu.unu.edu/indicator_detail.cfm?IndicatorID=30&Country=TZ page visited on 26/08/2010. We considered an average of the urban / rural population based on 2005 data and 2015 previsions.

traders and the millers. The millers define prices but the brokers have the capacity to influence them through their central position.

The flour wholesale market is concentrated around the main mills and in the main consumption centres. The flour wholesale markets connect the millers, the wholesalers and the retailers. The prices are defined by the millers according to their processing costs and to the demand on the market (quantities / prices).

The flour retail market is where consumers get flour from retailers on local markets, from shops or kiosks and now more importantly, from supermarkets.

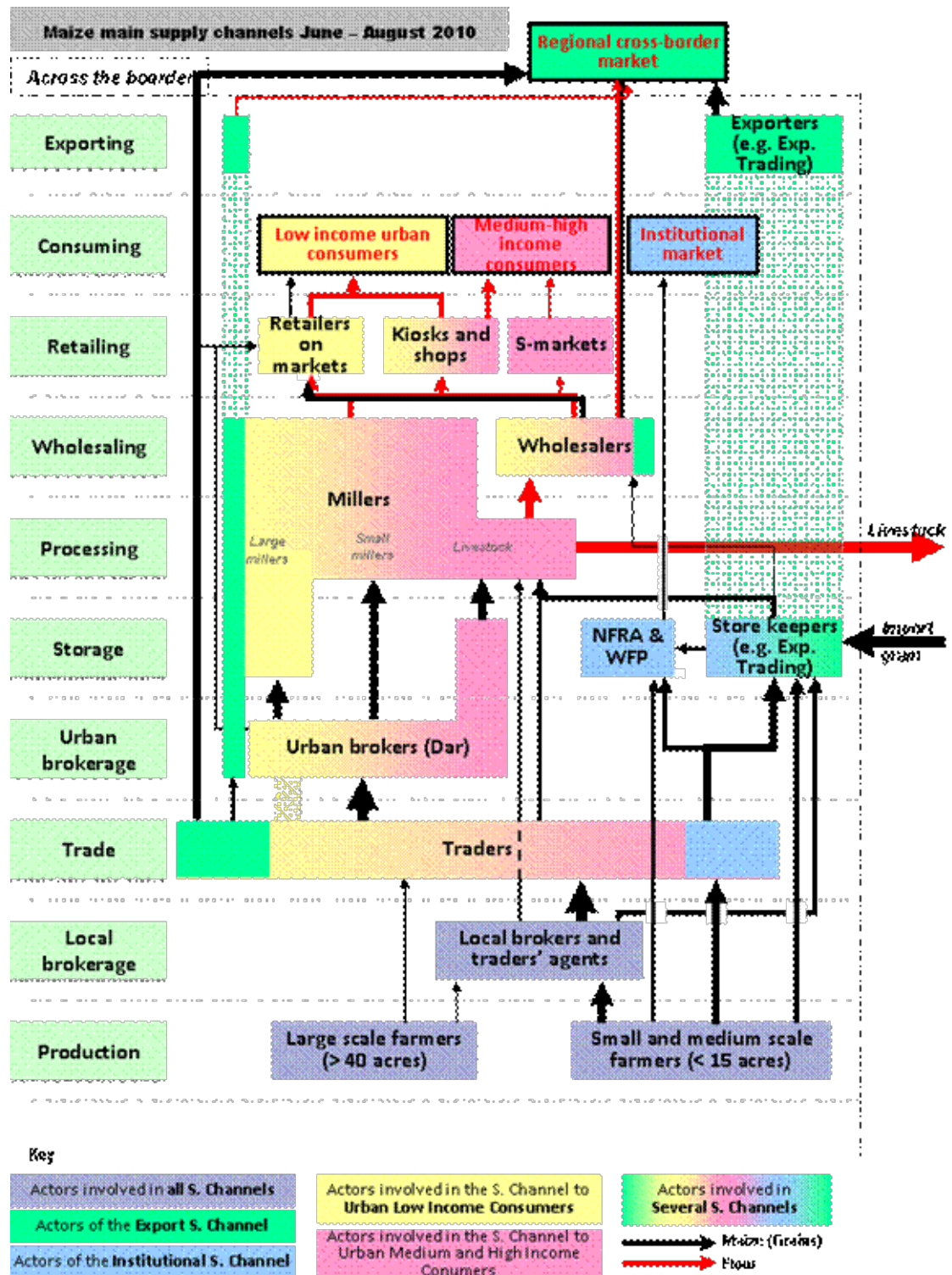
Figure 24: Geographical flows of maize



Milling capacity is growing rapidly. Hammer mills have reached most of the villages (an average of one mill per village is a conservative estimate). Urban medium scale millers are now emerging to take a share of the market for maize flour. In all the larger (regional) towns, the number of mills has at least doubled in the last 10 years. In Dar es Salaam, the number of medium and large-scale millers has increased by 10 times over the last years 10 years (from 20 to over 200).

Value chain dynamics

Figure 25: Value chain map for the maize subsector

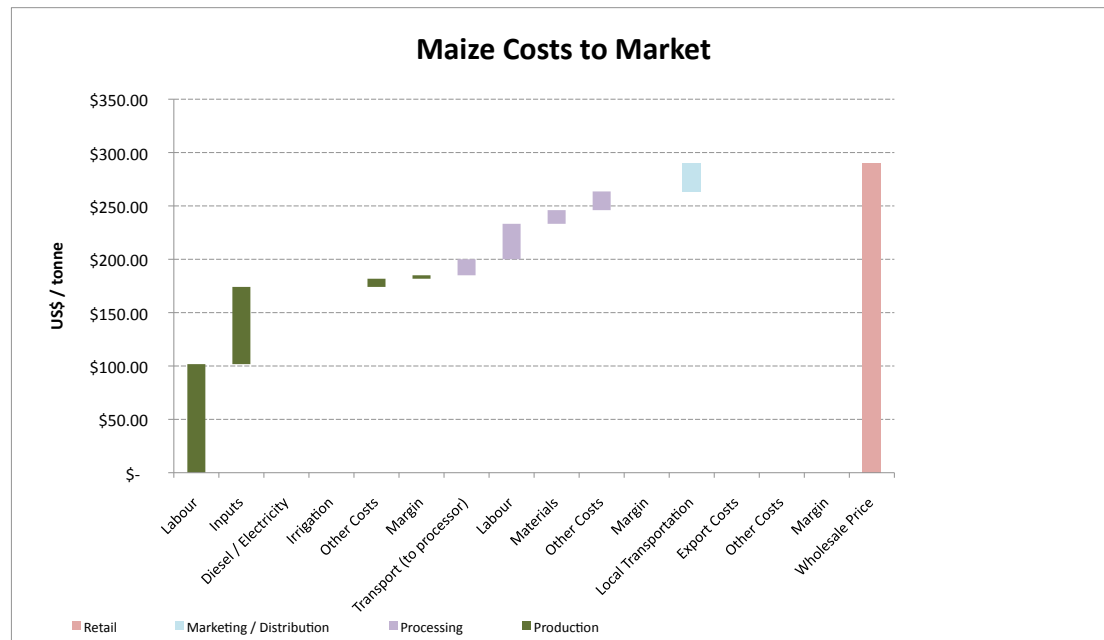


In the chart above, two kinds of products have been represented: (i) the maize grains and (ii) the maize flour and by-products (germs and pericarp used for animal feed). The maize subsector channels are long, with brokerage services dominating at village, district and national urban markets. The market margins are generally quite

high, signifying inefficiencies in supply chains, and prices vary greatly between seasonal (harvests and scarcity) periods. In addition, post harvest losses are quite significant and productivity levels are low. Actors with storage facilities and access to financial services are the only ones who are taking advantage of such seasonal price changes. There are few business models such as warehouse receipts systems, but their results and impact are still at a nascent stage. Farmer organisational models are also emerging but have still not yet reached a level of facilitating farming as a business, nor commanded a credible position in the supply chains. Business acumen is generally low and maize farming is more a tradition than a business practice.

Few farmers have a clear marketing strategy (e.g. to become informed about the price before the sales decision or to chose between different sales places according to the price). Most of them look for a buyer – if possible locally – when they need to cover some expenses. They mostly sell to the traders’ agents, to local brokers or to the traders themselves. Some of them transport their crops to the closest town or to weekly markets. For the small producers, it is difficult to sell maize to National Food Reserve Agency (NFRA) because they usually don’t manage to satisfy the NFRA requirements (volume, quality).

Figure 26: Cost and revenue drivers and margins along the chain



These costs represent all costs (including margins) which make up the wholesale price of maize delivered to market in Dar es Salaam.

Profitability levels across the various sub sector activities can be relatively attractive if economies of scale can be achieved. Yields are feasible to improve from current 1.3 mt/ha to 9.5 mt/ha, which can result in profitability increase from negative 70%

to a positive 63% respectively. Labour productivity per man-day could also increase up to 14,800 Tshs per man-day. Average margins of 24% and 42% are achievable by traders and processors respectively. The main cost driver in the sub sector apart from own labour is transport and agricultural inputs.

Farm gate prices observed during the study (Sept 2010) vary from 138 TZS/Kg up to 333 TZS/Kg depending on the localization of the seller and the period of the year. Final retail prices vary from 600 to 1050 TZS/Kg on average (the second price corresponds to an average of the prices observed in the supermarkets). Converted in equivalent maize, this gives approximately 426 to 745 TZS/kg. Consequently, the market margins potentially vary from 27.9% to 439.8%. On average the market margin reaches some 230%.

But this general picture deserves to be analysed more deeply, considering the possible variations due to the different chains and to the positioning of storage.

Table 9: Market Margins for different end markets and storage strategies

	Sale after harvest	Storage by farmers	Storage by traders
ULIC (flour)	137%	105%	200%
HIMIC (flour)	284%	195%	330%
EM (maize)	70%	47%	104%
IM (maize)	Direct sale by farmer to IM		

The table above shows how the integration of additional functions by farmers allows the reduction of market margins, thus making the channel more profitable for farmers. Indeed, when farmers store the maize the market margin is always inferior to any other situation even though they also integrate additional costs and risks.

Market development

The Tanzanian rural population is estimated to be 58% of the total population and consequently, and their home consumption is estimated at some 1.9 million mt per annum.

Farmers are generally managing to produce enough maize to sell 70 to 80% of their production (after having built their food reserves), and there are cases in which farmers keep up to 90% of their production of maize for their home-consumption. However, with the use of improved seeds, relevant fertilizers and improved farming techniques and the creation of economies of scale to improve production efficiency, maize production can rapidly increase. For example, a 20% increase of the yields, combined with an increasing of the planted areas of 20% would produce an additional 1.3 million mt that could be aimed at both the export market (Kenya is

importing 100,000 mt annually) and to the local market for the substitution of starch imports.

The increasing of the production of 20% could be considered as a head-start benchmark (for the next three years) although the potential of the varieties currently used in Tanzania allows a production of ten times the actual average yields (12 mt). Existing varieties in South Africa can provide an increase of 15 times these yields (mt).

Table 10: Maize Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	3,800	5,500
Imports ('000 tonnes)	Tanzania Imports	0	0
	EAC Imports	500	850
Consumption ('000 tonnes)	Global Consumption	910,000	1,400,000
Export Demand ('000 tonnes)	EU Demand	50,000	70,000
	Other Export Demand	860,000	1,330,000

Sources: World Bank, OECD, FAO

Value chain analysis – Livestock (Red Meat)

Potential clusters

Livestock (red meat) may be included in all clusters on either mixed crop and livestock farms, and on large-scale ranches in Ludewa and Sumbawanga.

General Background to commodity

The livestock sector contributes about 4.1% of Tanzanian GDP and 8.9% of the agricultural GDP (Economic Survey, 2004). The meat industry contributes 40%, the dairy industry 30% and the balance represents the contribution of pigs, poultry and other products and services from the sector (Livestock Policy, 2007). Out of about 4 million households in Tanzania, 1.8 million raise at least one type of livestock (NBS, 2002). Furthermore, about 0.3 million pastoralist households depend on livestock husbandry as the main source of livelihood.

There are about 18.8 million cattle, 12.1 million goats, 3.6 million sheep, a million pigs and 60 million chickens in Tanzania (Njombe et al, 2008). Most of the livestock are of indigenous types, well adapted to the prevailing low level of feeding, endemic animal diseases and general husbandry practices.

Livestock production in Tanzania is divided into the traditional and modern/commercial production systems. The former is further divided into agro-pastoral, pastoral and mixed farming sub systems. The commercial sector is further sub divided into large-scale enterprises and smallholder units. The traditional sector is the most dominant, accounting for over 95% of cattle, over 98% of goats and sheep kept, and slightly less for other species (pigs and poultry). Livestock owners in the traditional system keep livestock for multiple objectives, including (in descending order of importance as reported by the BACAS/MLDF (2003¹¹):

- To generate income
- Meet subsistence needs
- Store of wealth, cash income
- Manure and drought
- Meeting socio-religious needs of communities

The following are the key features and dynamics of the meat industry in Tanzania:

¹¹ Baseline Study for the Formation of Livestock Producers' and Traders' Associations.

- Almost (98%) of livestock are owned by traditional pastoralists and agro-pastoralists
- Small but growing private sector in production, processing and marketing
- Large numbers of 'live' cattle are exported to neighbouring countries such as Kenya and Comores
- A small but increasing volume of red-meat is exported, mainly to the Middle East
- Minimum value addition is taking place currently
- Some preliminary processing 'cuts', sausages and packaging is emerging
- Supermarket outlets, modern urban butchers and food service (tourism, institutions) are gaining momentum
- Food safety and hygiene standards are generally low in the industry
- Dodoma is setting the pace in terms of having a modern abattoir and changing the hygiene standards of urban retailing
- Food service industry is importing processed meat products from Kenya, South Africa, New Zealand
- The Tanzania urban market for red meat is growing. Urban working class is ready to pay premium prices for quality meat
- The industry lacks market-driven skills and manpower development systems in meat production and processing
- The extension system to support livestock production is inadequate

Commercial livestock production is sub divided into large-scale enterprises and smallholder units. The former was introduced on a limited scale during the colonial period but expanded by the state in the 1970s and 80s. By mid 1990s public large-scale enterprises were performing poorly, both in physical production and financial terms. Most enterprises have been privatized, except for state farms retained to produce improved breeding stock and part of NARCO's ranches.

The National Ranching Company (NARCO) is a parastatal company mandated to produce beef cattle for the domestic and export market. The eight existing ranches have an area of 230,400 ha, with capacity to hold over 100,000 livestock units. In the last few years, each ranch has been divided into a core unit of 20,000 ha and a number of smaller ranches of 500-5,000 hectares have been sold to private national investors. The core ranches have a total of about 43,000 head of cattle and 3,025 sheep. The ranches have good quality Boran herds, suitable for upgrading local breeds for meat production. Off-take of the ranches at 22% is double the national herd while slaughter weight of ranch bred steers is over 150% of national herd.

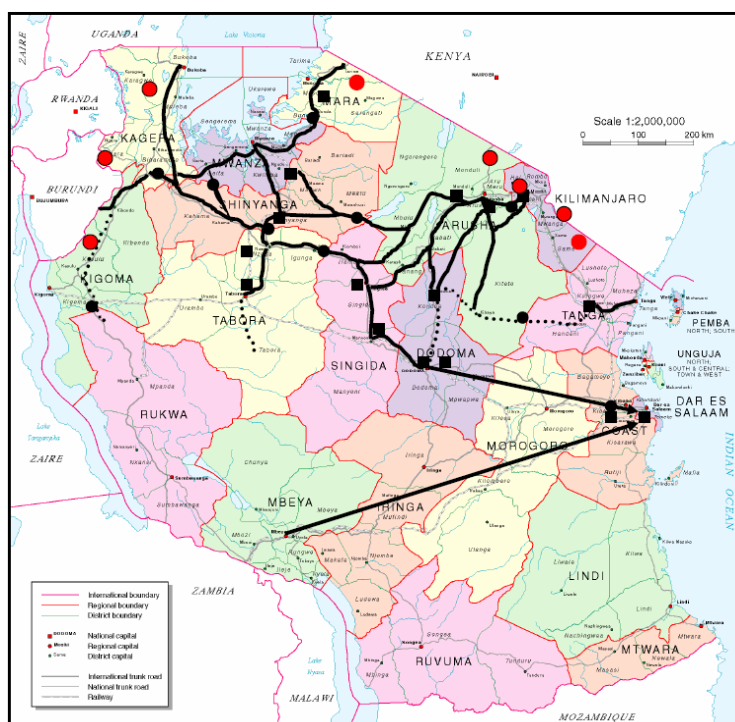
Apart from the government-owned farms, there are a number of private investors engaging in medium ranching and fattening. Some of these enterprises are targeting the upper beef markets in the country (supermarkets and tourist hotels) and export of beef.

There is substantial potential for improvement of the traditional red meat sub sector through the adoption of improved technologies in production, processing and marketing. Meat production can be increased through improved husbandry, particularly adequate feeding and provision of water throughout the year, prevention/treatment of common animal diseases followed by introduction of more productive livestock. The most difficult improvement will be the provision of adequate feeding and water during the dry season. But some relocation of the national herd, removal of unproductive animals and judicious use of crop/industrial by-products will go a long way towards the desired improvement in feeding.

The basic infrastructure for livestock marketing includes livestock markets, stock routes and holding grounds, while those for processing meat include abattoirs and slaughterhouses. There are approximately 400 livestock markets, 22 of which are secondary markets under the Ministry of Livestock Development. The remaining are primary markets under district councils. There are ten border markets intended to facilitate and formalize sale of animals to neighbouring countries. The markets are connected through a network of stock routes along which check points and holding grounds provide watering points and veterinary checks on trade stock. Many of these installations need repair. Most holding grounds and stock routes land has been encroached upon.

There are two public abattoirs, in Arusha and Dodoma, with the capacity to slaughter about 200 cattle and 200 small ruminants each per day. There are a number of privately owned slaughterhouses of varying standards and capacity countrywide. In general they employ basic technology and hygiene conditions are not satisfactory. Dar es Salaam alone has 6 such slaughterhouses with a capacity to slaughter 720 animals a day.

Figure 27: Marketing Infrastructure Network in Tanzania



A Meat Technology Training Centre has been established in Dodoma and is being used to train local entrepreneurs for meat technology. The centre started training in 2007 and about 25 trainees are expected to graduate each year.

A number of private meat processing plants are emerging. This is creating a demand for quality livestock products, thus motivating livestock producers to increase off take rate and consequently increase efficiency in the production chain. Table 1 indicates some of the main processing plants in Tanzania:

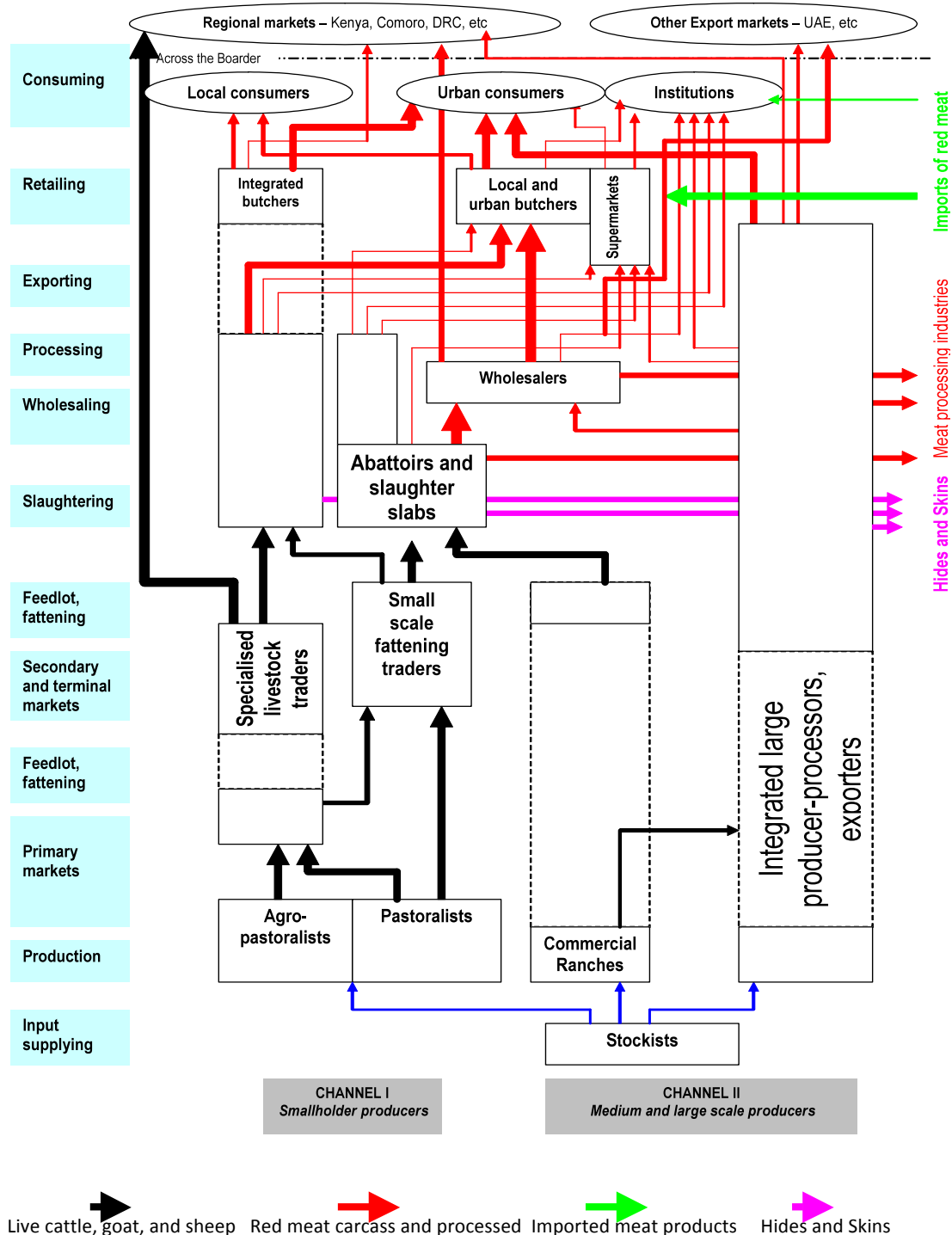
Table 11: Meat Processing Plants

Region	Processing Plant(s)
Dar es Salaam	Makela Foods; Tanzania Meat Company (Tanmeat)
Arusha	Arusha meat; Happy Sausage; Meat king
Iringa	CEFA/Boma la ng’ombe Village Company
Ruvuma	Peramiho Mission
Rukwa	Sumbawanga Agricultural and Animal Feeds Industries (SAAFI) – Meat Processing Plant.
Morogoro	Tanzania Pride Meat – Morogoro (in receivership)
Coast	Best Beef - Mlandizi
Dodoma	Meat Technology Training Centre

The Corridor has a livestock population of about 2 million cattle, 1.6 million goats and 150,000 sheep. In the last three decades the corridor was been host to frequent seasonal migration of thousands of cattle, goats and sheep from the Lake Zone that has created extensive overgrazing and land use conflicts with crop farmers.

The corridor has been self-sufficient for meat supply and surpluses are transported by lorries or rail (TAZARA) to the Pugu market. An export abattoir with a capacity to slaughter 150 head of cattle per day (SAAFI) has been commissioned. The plant has enabled the area to produce high quality meat for local and export markets. The facility could resume export beef to Zambia, an opportunity that was lost in the 1970s. The plant has created an important opportunity for producers in the area.

Figure 28: Value Chain Map for the Red meat Subsector in the SAGCOT regions

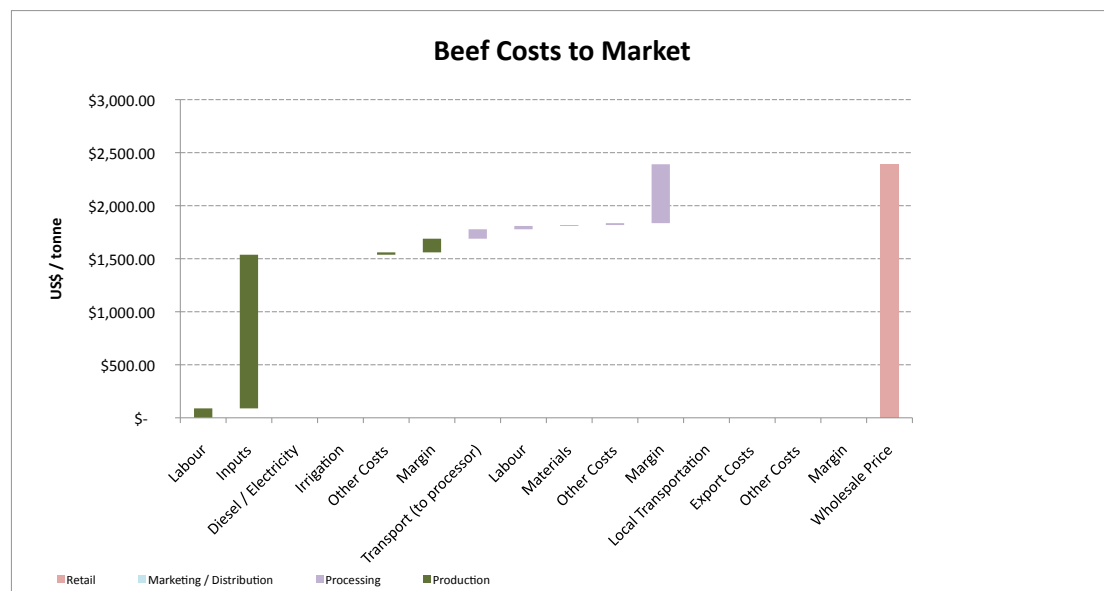


The smallholder channel is championed by traditional pastoralists and agro-pastoralists who command over 98% of meat production in Tanzania. It is estimated that 335,000 tonnes of meat are produced annually in Tanzania. The meat produced by this channel is almost entirely for local consumption. Typically producers are hardly involved in upstream subsector functions. Traders of different sizes and

specialisation dominate the interface between producers and slaughterhouses / butchers. In Tanzania live animals are traded in primary and secondary markets and from there they have to go through “approved” slaughter slabs / abattoirs before the red meat is sold in urban and rural wholesale and to retail butchers. In the smallholder channel there is an emergence of innovative traders particularly in the Lake Zone who have started small scale fattening operations before the animals are sold to the secondary markets. This channel is also championing cross border trade of live animals through specialised traders. Cross border trade with Kenya is the most developed market outlet.

The larger scale channel was dominated in the 1980s, by state-run commercial ranches. However, divestiture of state run ranches is ongoing and their importance is declining. With 11 state-run ranches there was a potential to carry up to 90,000 cattle and produce 1500 tonnes of beef per annum. The government has also invested in a number of abattoirs, two of which are large scale modern enterprises that are able to process meat to export market standard. The private sector is also slowly entering with integrated large scale ranching and fattening operations combined with modern abattoirs where they process red meat for urban and export markets. Currently there are large-scale integrated ranches in Morogoro, Sumbawanga and Arusha.

Figure 29: Cost and revenue drivers and margins along the chain



These costs represent all costs (including margins) which make up the wholesale price of beef delivered to market in Dar es Salaam. The most significant costs are for the calf, which may either be bought or bred.

Market development

Though illegally/unofficial, many Tanzanian cattle are sold live in Kenyan markets. The Kenyan market attracts Tanzanian traders because of its high prices and robust export-driven meat industry. Kenya's main export markets for meat products include the United Arab Emirates, Tanzania and Uganda. The value of meat products exported increased from KShs 190 million in 1999 to KShs 285 million in 2002. Indeed some of exported cattle from Tanzania to Kenya are re-imported back in Tanzania as processed meat.

Apart from live exports to Kenya, Tanzania's other official export destination of live animals include Comoro, Burundi, Uganda and to Zanzibar from the mainland. Tanzania also exports red meat / carcass to various countries including Oman, Kuwait, United Arab Emirates (UAE), Muscat, DRC and Zanzibar

Table 12: Export trend of Live and Meat Products Tanzania 2002-2007

Live Animals				Red Meat / Carcass					
Year	Cattle	Goats	Sheep	Destination	Year	Beef	Goat	Mutton	Destination
2002	382	140		Kenya,	2002				Oman,
2003	1,714	411	2	Comoro,	2003				Kuwait.
2004	5,263	1,199	2	Burundi,	2004	1,080			Dubai
2005	4,075	2,177		Zanzibar,	2005	600			(UAE),
2006	6,231	2,753	11	Uganda	2006	163	16,774	20,335	Muscat,
2007	3,849	736			2007	10,737	25,345	76,592	DRC, Zanzibar

Source: Ministry of Livestock & Fishery

The production of red meat in Tanzania has been growing steadily over the years. The annual increase has not been that much and due to RVF that struck in 2007, the production had to stifle. Production increased by 14% between year 2002 and 2006. Most of this was production for the local market. If this is the proxy of how the local market has been growing then there is every indication that market for red meat will continue to grow in Tanzania. The numbers of urban middle class are also continuing to grow and with meat a common food for these households the demand is expected to grow. Another interesting trend is that good quality meat is generally in short supply and the price has been increasing. Urban middle to high-income families are willing to pay more for good quality meat. The other fast growing market in Tanzania is in the food service industry. Tourism has been growing steadily and hotels and specialised restaurants are increasing annually. This is also evidence by supermarkets coming in to take the market share of the growing

demand for quality meat. Institutional markets such as schools/universities, prisons, hospitals etc are growing in the country as well.

Table 13: Livestock Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	290	480
Consumption ('000 tonnes)	Global Consumption	77,000	125,000
	EU Demand	10,000	15,000

Sources: World Bank, OECD, USDA, FAO

Value chain analysis – Irish Potato

Potential clusters

Irish potato may be designated as a core crop in the Sumbawanga, Ihemi and Ludewa clusters. It is not envisaged to be a major component of the larger commercial farms, but to have programmes developed around it for the benefit of smallholder farmers.

General background to commodity

At a global level, for most of the 20th century, Europe was the world's largest producer of Irish potatoes (hereafter 'potato'). While that honour has now passed to Asia, seven European countries are still among the top 10 global producers. Europe also has the highest level of potato consumption in the world (almost 90 kg per capita per year). Many western European countries are shifting from potato growing to processing and production of seed tubers for export.

Between 1997 and 2007, harvested acreage worldwide grew more than 17%, with growth of almost 12% between 2004 and 2005. Production has also increased at an average annual rate of 4.5% over the same period, and has exceeded the growth in production of many other major food commodities in developing countries, particularly Asia.

Potato consumption has increased in the developing world, from less than 10 kg per capita in 1961-63 to about 22 kg in 2003 (FAO, 2007). While still less than the consumption of developed countries, evidence suggests it will increase strongly in the future. Over the next decade, it is expected that most of the world's potatoes will be grown in Asia, Africa and Latin America.

Table 14: World potato production, 1991-2007

(million tonnes)	1991	1993	1995	1997	1999	2001	2003	2005	2007
Developed	183	199	177	174	165	166	160	159	159
Developing	84	101	108	128	135	145	152	160	165
WORLD	267	301	285	303	301	312	313	319	325

Source: FAOSTAT (2007)

African potato production has expanded from two million mts in 1960 to 16.7m mts in 2007.

Table 15: Top potato producers in Africa (2007)

	Harvested area (Ha)	Quantity (tonnes)	Yield t/ha
Egypt	105,000	2,600,000	24.8
Malawi	185,000	2,200,000	11.9
South Africa	58,000	1,972,391	34.9
Algeria	90,000	1,900,000	21.1
Morocco	60,000	1,450,000	24.2
Rwanda	133,000	1,200,000	9.0
Nigeria	270,000	843,000	3.1
Kenya	120,000	800,000	6.7
Uganda	93,000	650,000	7.0
Angola	120,000	615,000	5.1

Potatoes are grown under a wide range of conditions, from irrigated commercial farms in Egypt and South Africa to intensively cultivated tropical highland zones of Eastern and Central Africa, where it is mainly a smallholder farmer's crop. Among the top ten producing countries in Africa, four are bordering Tanzania. Therefore, at this stage, Tanzania does not have a comparative or competitive advantage to export to its neighbours. In addition to their good production bases, Malawi, Rwanda, Uganda, Kenya and Mozambique have robust potato development programmes. All these countries perceive Tanzania as potential export market for both seed and ware potato.

Potatoes in Tanzania are essentially a food security crop with growing domestic urban demand. 90% of the national crop is grown in the Southern Highlands, and predominantly around Iringa and Mbeya. The production system is mixed farming, rain-fed based and exclusively smallholder. There is limited supplemental irrigation and there are no irrigated commercial potato farms in Southern Highlands.

Table 16: Potato production Tanzania - Tonnes (1970 – 2008)

Year	1970	1980	1990	2000	2008
Tanzania	55,385	200,000	210,000	350,000	650,000

Source: FAOSTAT (2008)

Due to increased demand, particularly urban demand, potato production is expanding within the Southern Highlands region, and is spreading into central (Morogoro) and north eastern (Kilimanjaro, Arusha and Manyara) Tanzania. Despite the fact that potatoes are a heavy user of fertilizers, due to land pressure, most

smallholder farmers do not adopt a rotational farming system to improve soil fertility and control diseases and pests.

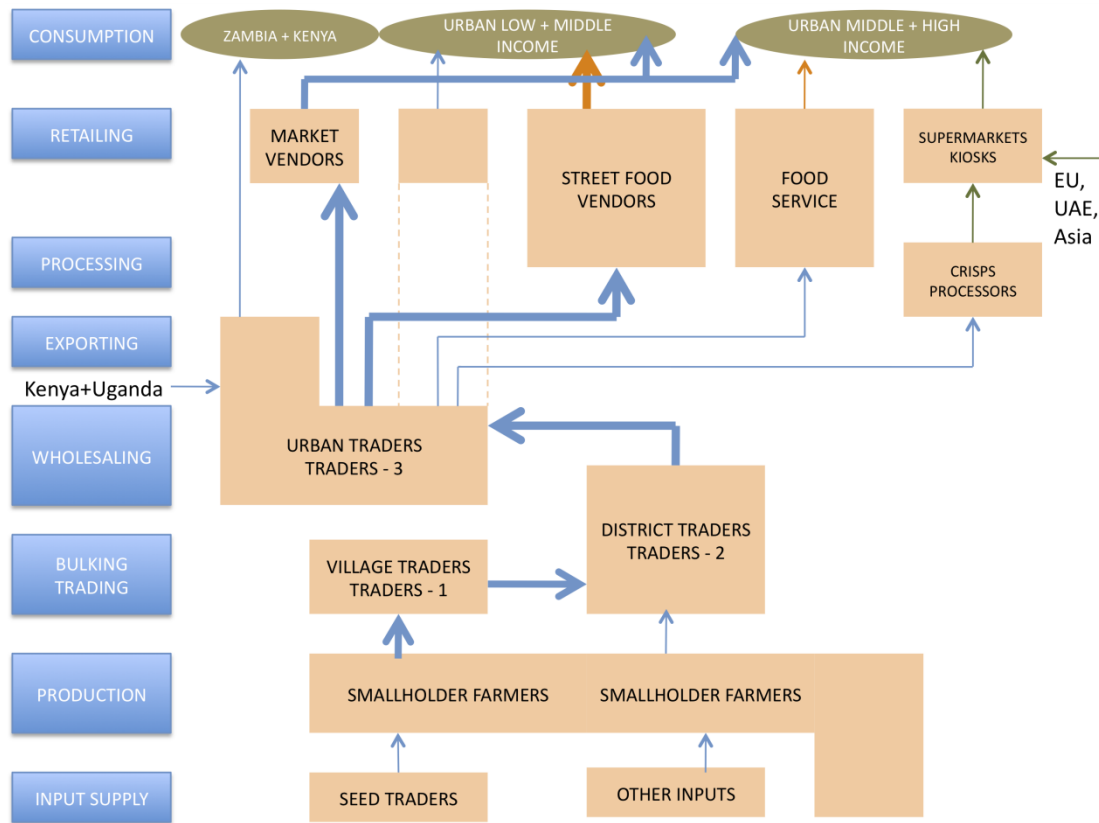
The bulk of potatoes are sold into the ware market as an ungraded product. The marketing system is not well organised with most farmers being price takers, and retailers and subsequent consumers paying high prices due to the high transaction costs of farmers and traders. Most potatoes in Tanzania are consumed as food at household level and through food service outlets i.e. restaurants, street food vendors, etc. It has been established that significant volumes of ware potato in major urban centres are consumed as French fries (chips) through food service outlet and mainly street food vendors. Urban and semi-urban market retailers sell direct to household consumers.

The production and sales of seed potato in Tanzania is extremely limited, with Agriculture Research Institute's (ARI) Uyole seed farm in Igeri Njombe the sole supplier. Currently the public sector has no facilities to produce clean pre-basic seed, and supplies of tissue cultured materials are obtained from the International Potato Centre (CIP) in Nairobi, Kenya. Investment in improved facilities to produce tissue cultured materials and basic seed would be of great benefit to the sector and is an essential first step in supporting increased production and improved quality. ARI Uyole is in the process of setting up such a facility.




At present there are a few trading links with Kenya and Zambia but these are fairly occasional and unregulated. Tanzania does not export to other neighbouring countries, because they have sufficient production, which is backed up by robust seed and ware potato production development programmes. Lake Victoria urban centres of Tanzania are receiving most of its ware potato from Kenya and Uganda. Western urban centres rarely receive fresh potato due to poor road infrastructure.

Value chain dynamics

Figure 31: Value Chain Map for the Irish potato Subsector



Key:

-  Ware potato
-  Processed potato (crisps)
-  Ready to eat potatoes (French fries, boiled, mashed, etc)

Most farmers do not use improved quality seeds and other inputs (fertilizers and chemicals). Those who do, use limited amounts of fertilizers and some chemicals to prevent late-blight disease. Most inputs are sourced from local dealers who supply inputs for varied crops and livestock. Some producers obtained subsidized fertilizer (to be used for maize), but divert some to potatoes because the crop is their main cash crop. Most farmers also source seed potato from traders. In the Southern Highlands these traders come from mainly Njombe, Ludewa and Makete districts. While there are several traditional seed production pockets in the Southern Highlands, this does not necessarily assure that seed-quality standards are met.

Figure 32: Irish potato dynamics

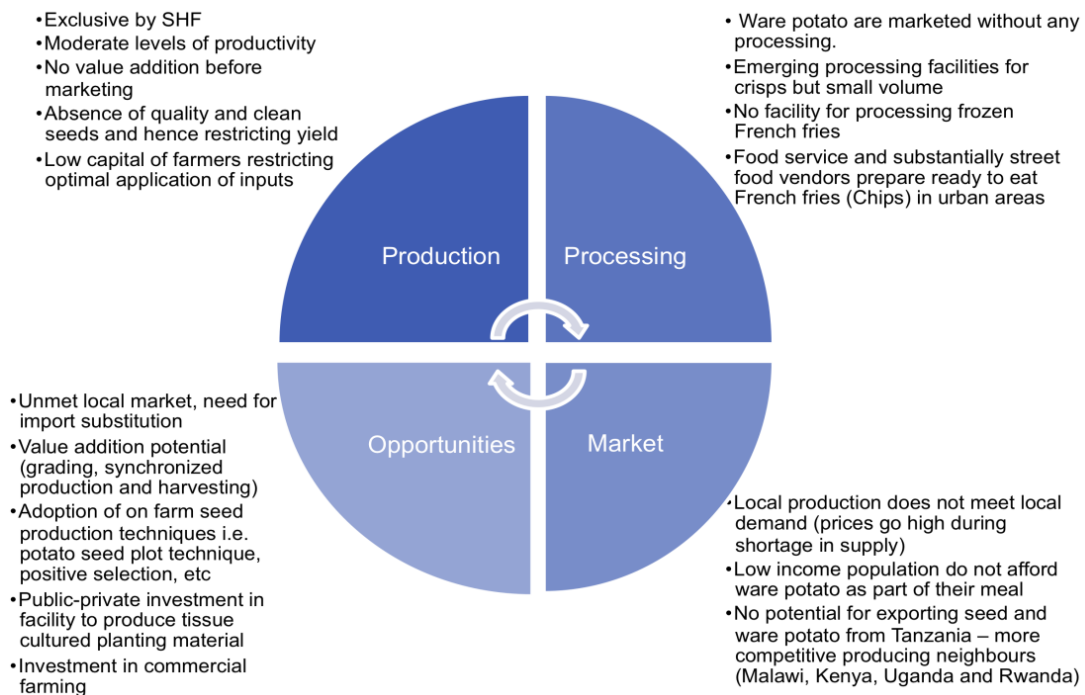


Figure 33: Cost and revenue drivers and margins along the chain

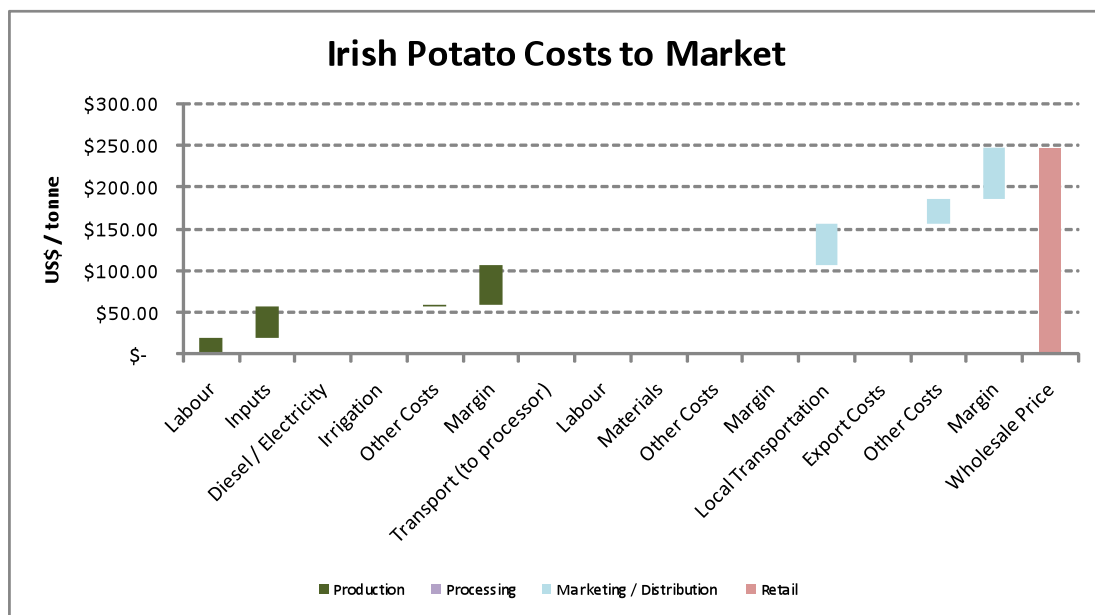


Figure 33 represents all costs (including margins) which make up the wholesale price of potatoes delivered to wholesale markets in Dar es Salaam. There are no processing costs as only a small amount of potato production is processed in Tanzania.

Most producers do not apply all necessary inputs as recommended by agriculture extension officers. Despite this, the majority of producer break even when the yield reach about 80 bags per acre (1 bag = 100kg). Yield capacity of recommended

varieties (such as Kikondo) is about 40 tonnes/ha (160 bags per acre). At a yield of about 25 tonnes/ha (100 bags per acre), the gross profit of a farmer can be about TShs 700,000. However, the farmer will require inputs (fertilisers, chemicals and seeds) together with labour that will account for over 60% of the production cost.

Marketing of ware potato in the Southern Highlands, like elsewhere in East Africa is unregulated and producers and traders have developed long term relationships that are built on trust. The relationships and the systems in general appear to work and there are equitable gains among chain actors. Village traders/brokers get about 2% of the end market price but this is because they have no substantial investment apart from their time/labour. Although retailers of ware potato get high percentages (44%) of end market price, they handle smaller volumes compared to other actors along the chain. Street food vendors have even higher percentages (72%) of the end selling price because they add value prior to sale (they prepare ready to eat French fries).

Market development

Current ware potato production does not meet the demand due to the following facts:

- All potato produced is consumed and there are occasional imports mainly from Kenya to fill the gap during off-season
- Northwestern regions of Tanzania do not have good supply of potato due to poor infrastructure linkage with Southern Highlands and thus Kenya and Uganda is taking advantage of good road networks to export to the regions
- Low-income families can not afford potatoes because the retail price is high, and during scarcity prices go even higher
- Population growth and growing urbanization will trigger higher demand of ware potato, especially retailed by street food vendors and other food service

Given the lack of reliable production and consumption data, future demand is derived using projected population statistics of UN population department and FAO production data. In these estimates population growth is the trigger for demand. It is also assumed that there is no significant scope for external potato trade between Tanzania and other countries in the region. This would mean that any impact achieved through the adoption of improved production and marketing (cost price competitiveness) as well as accelerated urbanisation would increase domestic demand levels only.

Table 17: Irish Potato Production Projections, Tanzania

Crop	Short-term (3-5 years)	Market	Long-term (by 2030)	Market
Irish potatoes	860,000	Tanzania	1,300,000	Tanzania

Tanzania, like its neighbours, has a very limited range of processed potato products. The bulk of the potato crop is sold as ware potato and eaten as a boiled vegetable. The development of locally-owned urban takeaway outlets (fast food kiosks) in the major cities has increased the demand for potato for processing into chips. There are three major medium scale crisps processing companies in Tanzania: Crispo Snacks Foods (T) Ltd based in Iringa, and Jingles and Bingos based in Dar es Salaam. Despite large volumes of crisps produced by these large companies, they use relatively low volumes of fresh potatoes. Crisp market development is also hampered by high volumes of imported crisps from processing giants such as Lays and other brands from South Asia.

The spread of fast food restaurants and the growth of the tourism industry are important sources for introducing crisps to local populations. Frozen French fries are also attractive to urban middle and high-income population because of their convenience. In many developed countries, home consumption of frozen French fries is nearly equal to consumption in restaurants. In developing countries, and specifically in Tanzania, the demand of both crisps and French fries will mainly be from tourism food services, and limited affluent urban population through supermarkets.

Value chain analysis – Citrus

Potential clusters

Citrus may be included as a core crop in the Kilombero, Ludewa, Sumbawanga and Lower Rufiji clusters.

General background to commodity

Citrus ranks among the top three fruit groups of the world with respect to area and production. In the 1990s, fresh annual citrus consumption per capita was 40kg in Western Europe, while it was 4.2kg in South East Asia, 6.0kg in China and 11.2kg in Thailand. Citrus is grown commercially in more than 140 countries around the world, and is contributing around US\$6-8 billion to the world economy annually. 79% of all processed citrus is oranges, with the majority of the rest consisting of

tangerines, lime and lemons. It is anticipated that the global citrus industry is growing due to a trend in consumption towards a more health-conscious lifestyle.

In Tanzania, oranges are the largest crop in terms of production. Lemon, lime, mandarin and grapefruit are also grown in small volumes, but are predominantly for home consumption. Tanzania's varieties of oranges include Msasa, Nairobi, Valencia, Pamba, Jaffa, Washington and Zanzibar. Production of citrus is largely concentrated in the North East Coast, with the Tanga and Coast regions having the largest planted area.

The agricultural census of 2003 established the total production of oranges by smallholders in Tanzania around 195,000mt per annum, harvested from 23,000 ha, resulting in an average yield of 8.5 mt/ha. The average productivity in East and Southern Africa is between 10 and 40 mts/ha, indicating that Tanzania has the potential to improve its productivity.

Around 95% of citrus production is consumed as fresh fruit, and processing of citrus is only done at low scale. Tanzania exports fresh citrus, particularly from the Tanga region, to Kenya. Apart from this regional export market, the domestic citrus market has three main segments:

- Fresh citrus for rural household and traveler consumption purchased through formal (rural markets, kiosks) and informal (road side, street vendors) market outlets.
- Fresh citrus for urban household consumption purchased through formal (rural and urban market centres, kiosks, supermarkets) and informal (road side, street vendors) market outlets.
- Fresh citrus for local juice/concentrate processors (Bakhresa, Dabaga, Ivory etc).

The main export of citrus fruit from Tanzania is to Kenya. The volume is significant, and is increasing, as approximately 60-80% of the oranges from the Tanga region go to the Kenyan market. The Kenyan market is only active during the high production season when Kenya has a shortage of oranges and Tanzania a surplus.

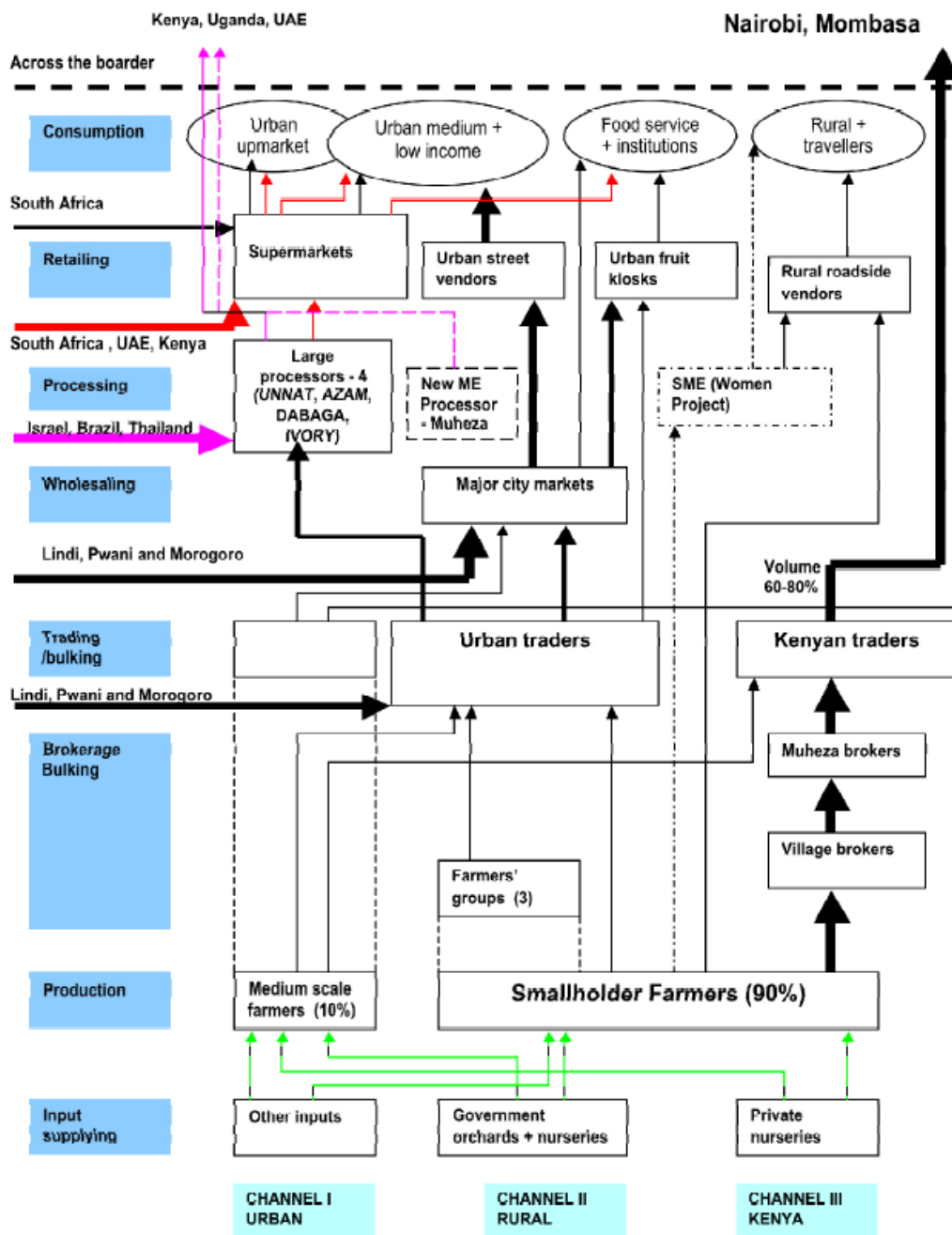
Tanzania is a *net exporter of fresh citrus* and a *net importer of processed citrus products*, especially juices. There has been a sharp increase in tonnage of exported fresh citrus from 9.5 mt in 2004 to 22 mt in 2008. Imported fresh citrus was sourced mainly from the UAE, Kenya, South Africa, China, India and Italy; whereas the main destinations of exported fresh citrus were Kenya, Uganda, UAE, DRC, Yemen, Malawi and Hong Kong.

The value of imported processed citrus products – specifically juices and concentrates – has increased steadily from about 1,000 mt in 2004 to just over 5,000 mt in 2008 (with a value of TSH 3.4 billion). The exported volume of processed citrus

products is comparatively small, although it increased from 27 mt in 2004 to just over 800 mt in 2008, which implies that the current import bill can be substituted through more development of the sub-sector, and particularly through increased upgrading into processing.

Value chain dynamics

Figure 34: Value chain map for the citrus subsector in main exporter regions



Planting material (seedlings and grafted or budded young trees) tend to be produced by farmers themselves, purchased from other farmers that have small home nurseries, or bought from individuals or institutions which raise planting materials for sale. Farmers who buy seedlings from small home nurseries are not sure that the cultivar (variety) they ordered will be supplied to them. There is no commercially viable system in place that ensures that farmers get the right varieties at the right time. The consequence is that production of oranges is not specialized by variety although it is known that varieties have different desirable qualities and preference. Research has established that varieties such as Msasa and Nairobi are good for the fresh market, while Valencia is a strong variety for juice processing.

Although some small-scale farmers (and family labour) will fulfill the role of harvester, most orange producers utilize local contract labour to harvest and pack oranges in baskets. Local transport mostly takes place by baskets carried on the head or transported by bicycle. Often the harvesters will also transport the oranges to the roadside. Where the orchard is accessible by small trucks, the oranges are packed into the truck. The small trucks deliver oranges to nearby trading centres where they are packed into bigger trucks for transportation to towns in the country (Dar es Salaam, Arusha, Moshi) or exported.

Within the market, brokers operate at the village level and at the town level. The Town level broker also liaises with exporters (particularly Kenyan). Usually the broker initiates the trade and takes charge of the harvesting. The trader is there only to verify the grades being harvested. Traders either deliver their stock in bulk to the wholesale market, to be sold to individual retailers, or deliver directly to retailers at retail markets who have placed orders in advance.

There are currently four fairly large fruit processors in Tanzania: Bakhresa (AZAM), Dabaga, Ivory and UNNAT (currently in receivership). There are other small / medium scale processors, but they tend only to serve local markets, e.g. Mali Muleba Fruit Juice in Kagera region, which serves only the Lake Zone market.

Bakhresa's current fruit processing facility at Vingunguti, Dar es Salaam, has a capacity of 40 mt per day. The company also has a new facility at Mbagala, Dar es Salaam, with a processing capacity of 300 mt per day in two lines. Until 2008, Bakhresa was importing all juice concentrates, but now they source oranges, mangoes, guava and pineapples within Tanzania.

Dabaga Vegetable and Fruit Canning Company is a registered Public Limited Company in Tanzania, located in Iringa. The company started in 1979, with processed tomatoes. The company has grown to 3 factories producing 40 different products, one of which is fruit juices. Dabaga has also been producing canned organic pineapple for export. Dabaga mainly sources its raw material from Pwani,

Morogoro and Lindi. High transport costs make sourcing of citrus from further afield uneconomic.

Ivory – Iringa Food and Beverage Ltd, was established in 2006 and currently employs around 35 people with an investment in processing equipment worth USD 85,000. Ivory processes tomato sauce, chilli sauce, artificial flavoured juices and pulp-based juices (mango, pineapple, orange and passion fruit). Its weekly demand for oranges is around 10 mt, sourced mainly from Morogoro, Pwani and Lindi regions.

UNNAT’s commercial production started in October 2008 with pineapples. The factory was expected to process citrus (specifically oranges) and tomatoes. However in October 2009 the factory closed due to a number of reasons, including having equipment insufficient to produce orange juice concentrate, lack of other equipment necessary for the effective production and packaging of any alternative fruit concentrates, and under-capitalization.

A few supermarkets in major cities sell citrus. Some supermarkets import oranges from South Africa. Although they serve a small market segment, it is an outlet that could also purchase locally if critical success factors such as price, quality and appearance (colour) and variety are taken into account. The supermarket selling price is TSH 250 per orange, which is more than 5 times the price of oranges from street vendors.

Figure 35: Cost and revenue drivers and margins along the chain

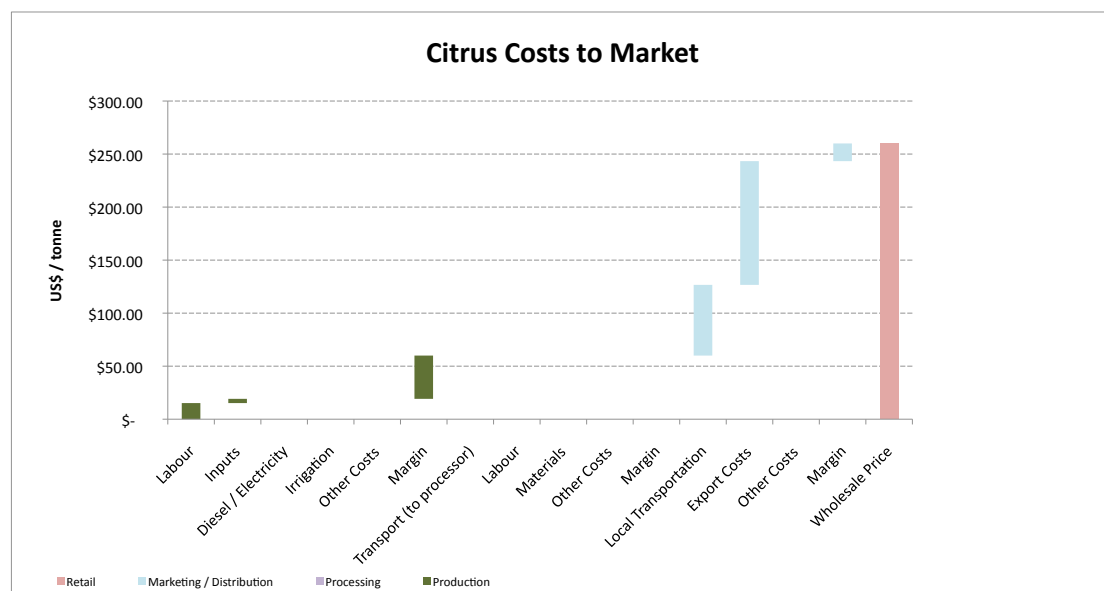


Figure 35 represents all costs (including margins) which make up the wholesale price of oranges delivered to market in Kenya (where a large proportion of Tanzania’s traded production is sold at wholesale markets). There are few input costs for smallholder farmers, other than the initial capital costs. There are also no processing

costs as very little citrus is processed in Tanzania, and this doesn't represent the majority of the citrus market.

Market development

The production of citrus in Tanzania could grow substantially in the short and long term. Overall it is anticipated that citrus industry globally is growing, due to tendencies towards improved diet, and increases in the appearance and quality of fruit. Many producing countries have started developing varieties that take market preferences into consideration. Better varieties and better handling practices are essential to maintain sustained growth. Success in the retail citrus trade will depend on having the right type, at the right place and time and right price. New mandarin types, such as fortunes, novas, clemendores and seedless murcots, are attracting more consumers. Likewise bright, reddish-orange and seedless (easy peelers) tangerines are preferred. All these market dynamics will have a bearing on how the industry positions itself in Africa, and particularly in Tanzania.

Table 18: Citrus Demand Projections

Market Demand		2015	2030
Local Demand ('000 tonnes)	Tanzania Demand	320	500
Imports ('000 tonnes)	Tanzania Imports	15	20
Consumption ('000 tonnes)	Global Consumption	140,000	220,000

Sources: World Bank, OECD, USDA, FAO

Projections of world production and consumption of citrus to 2010 identified that the two largest citrus producing countries, Brazil and the United States, are expected to retain their leadership in global production. China is expected to increase production and consumption of oranges and tangerines, and it has been suggested that it may become an important market for processed citrus and fresh grapefruit.

For Tanzania in particular it will require a clear focus on developing comparative and competitive advantage through creation of economies of scale and more effective supply chains in order to exploit this market. Value addition especially in concentrates is also a great opportunity for Tanzania.