MAFAP
SPAAA

Monitoring African Food and Agricultural Policies
Suivi des politiques agricoles et alimentaires en Afrique

ANALYSIS OF INCENTIVES AND DISINCENTIVES FOR SUGAR IN THE UNITED REPUBLIC OF TANZANIA

OCTOBER 2012

This technical note is a product of the Monitoring African Food and Agricultural Policies project (MAFAP). It is a technical document intended primarily for internal use as background for the eventual MAFAP Country Report. This technical note may be updated as new data becomes available.

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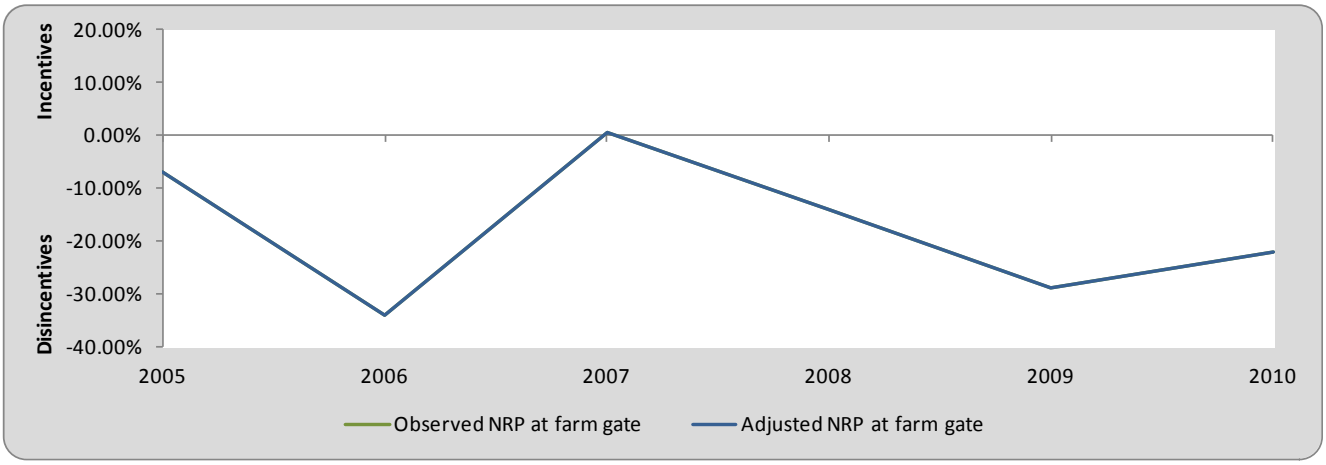
SUMMARY OF THE NOTE

Product: Sugar cane
Period analyzed: 2005 – 2010
Trade status: Import in all years

- Sugarcane is an important commercial crop in The United Republic of Tanzania URT) which is transformed into sugar in several plants throughout the country.
- During the last five years, cane production in URT has seen an extension in acreage and production. As compared to 2005, cane production has increased by 17 percent from 2.3 million tonnes to 2.7 million tonnes. During the same period, the area under cane production has increased by 15 percent from 20 000 ha to 23 000.
- URT is a net importer of sugar in global term, importing on average 64 percent of domestic apparent consumption.



The analysis undertaken shows no difference between observed and adjusted nominal rates of protection.

- Our results show that sugar farmers are heavily taxed in URT, this taxation is mainly due to inefficiencies in the sugar milling industry and/or excessive power by the sugar mills.
- Moreover, consumers are also heavily taxed, even when the Government changes the tariff policy for sugar on an ad-hoc basis.

Actions to be taken to reduce disincentives could include 1) improvement of the milling technology and capacity utilization and 2) further liberalization of the sugar market. Moreover, liberalizing sugar trade would allow consumers to get lower prices.

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1. PURPOSE OF THE NOTE

This technical note aims to describe the market incentives and disincentives for sugar cane producers in URT. The note is a technical document and serves as input for the MAFAP Country Report.

For this purpose, yearly averages of farm-gate and wholesale prices are compared with reference prices calculated on the basis of the price of the commodity in the international market. The price gaps between the reference prices and the prices along the value chain indicate to which extent incentives (positive gaps) or disincentives (negative gaps) are present at the farm-gate and wholesale level. In relative terms, the price gaps are expressed as Nominal Rates of Protection (NRP). These key indicators are used by MAFAP to highlight the effects of policy and market development gaps on prices.

The note starts with a brief review of the commodity's production and consumption as well as trade and policies affecting the commodity. It also provides a detailed description of how the key components of the price analysis have been obtained. Using this data, the MAFAP indicators are then calculated and interpreted in light of existing policies and market characteristics. The analysis is commodity and country specific and covers the period 2005-2010. The indicators have been calculated using available data from different sources for this period and are described in Chapter 3.

The outcomes of this analysis can be used by those stakeholders involved in policy-making for the food and agricultural sector. They can also serve as input for evidence-based policy dialogue at the country or regional level.

This technical note is not to be interpreted as an analysis of the value chain or detailed description of production, consumption or trade patterns. All information related to these areas is presented merely to provide background on the commodity under review, help understand major trends and facilitate the interpretation of the indicators.

Additionally, all information presented in this note is preliminary and still subject to review and validation.

2. COMMODITY CONTEXT

Sugarcane is an important commercial crop in URT which is transformed into sugar in several plants throughout the country. Most sugarcane is grown by smallholders, in estates owned by the sugar processing factories as well as contract growers. The sugar industry in URT has an important socio-economic impact in terms of employment and economic activity. It provides direct employment to about 14 000 people and is the outlet for the produce of over 30 000 farming households. Considering an average of 2-3 economically active adults per household; this industry provides secondary employment to over 80 000 people. In addition, it provides cane farmers with total earnings of about 4 billion Tanzanian Shillings (TzSh) annually (approx. 2.7 million USD). Last, sugar industry related activities provide about 12.3 billion Tshs to Government revenue (i.e. 1.7 percent of total tax revenue).

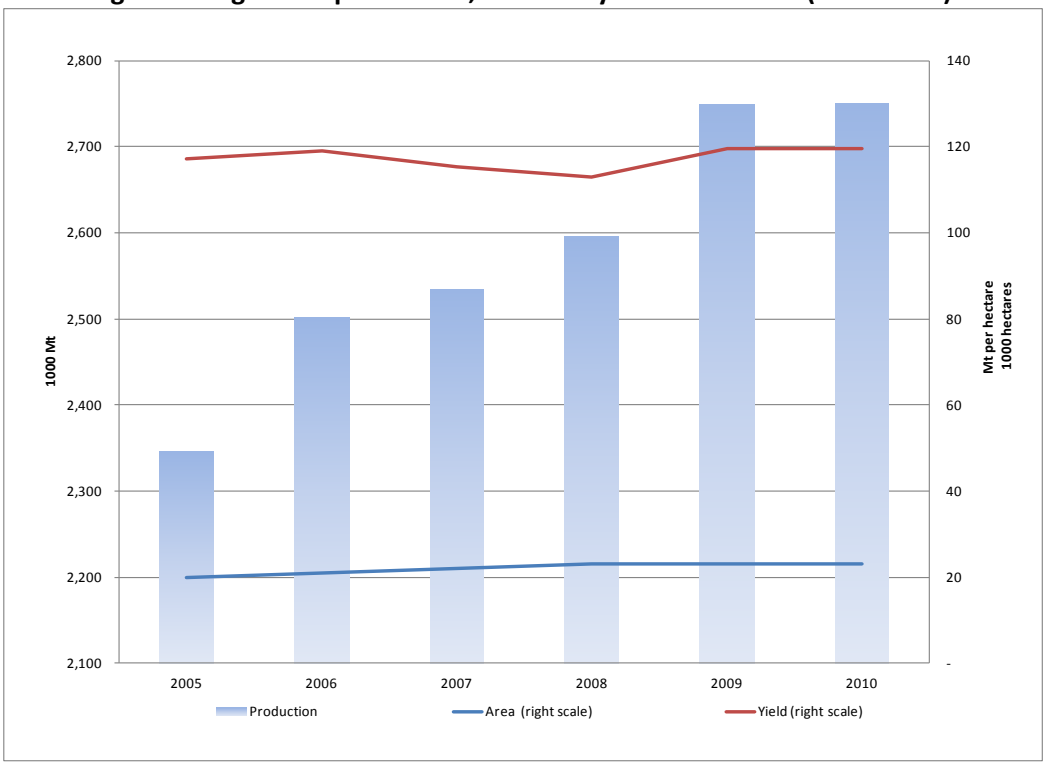
URT stands a good chance of becoming sugar self-sufficient and net exporter of the essential product if there are strategic moves to attract more investors in the local sugar sub-sector. Apart from increasing sugar supply in the market and stabilizing prices, increased investments would create employment and support implementation of the governments' ambitious Kilimo Kwanza (Agriculture First) Initiative. Experts believe that increased acreage under sugarcane and improved productivity technologies would significantly raise sugar production in the country.

PRODUCTION

Sugarcane production

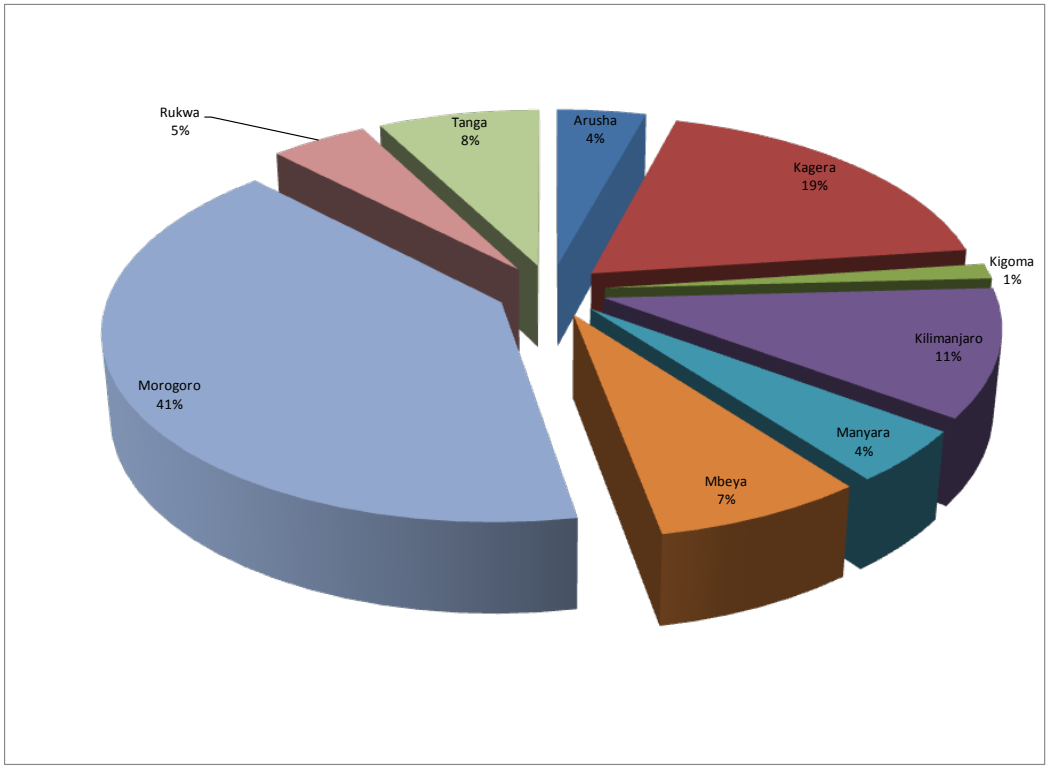
During the last five years, cane production in URT has seen an extension in acreage and production, however yields have been undulating. As compared to 2005, cane production has increased by 17 percent from 2.3 million tonnes to 2.7 million tonnes. During the same period, the area under cane production has increased by 15 percent from 20 000 ha to 23 000. This means that production increases are mostly due to area expansion, with yields moving around the 120 tonne per ha (Figure 1). As far as the geographical distribution of sugar cane production in URT is concerned, we can see that this is concentrated mainly in three regions (Morogoro, Kagera and Kilimanjaro) located in the center and north of the country covering 71 percent of total production for the period under study (Figure 2). In these regions, farmers have a reliable market and get input loans from the buyers who are mainly the sugar factories at the vicinity of their farms thus providing a key production incentive.

Figure 1: Sugarcane production, area and yield in Tanzania (2005-2010)



Source: FAOSTAT

Figure 2: Distribution of Sugarcane production in Tanzania by region, 2005/6-2009/10

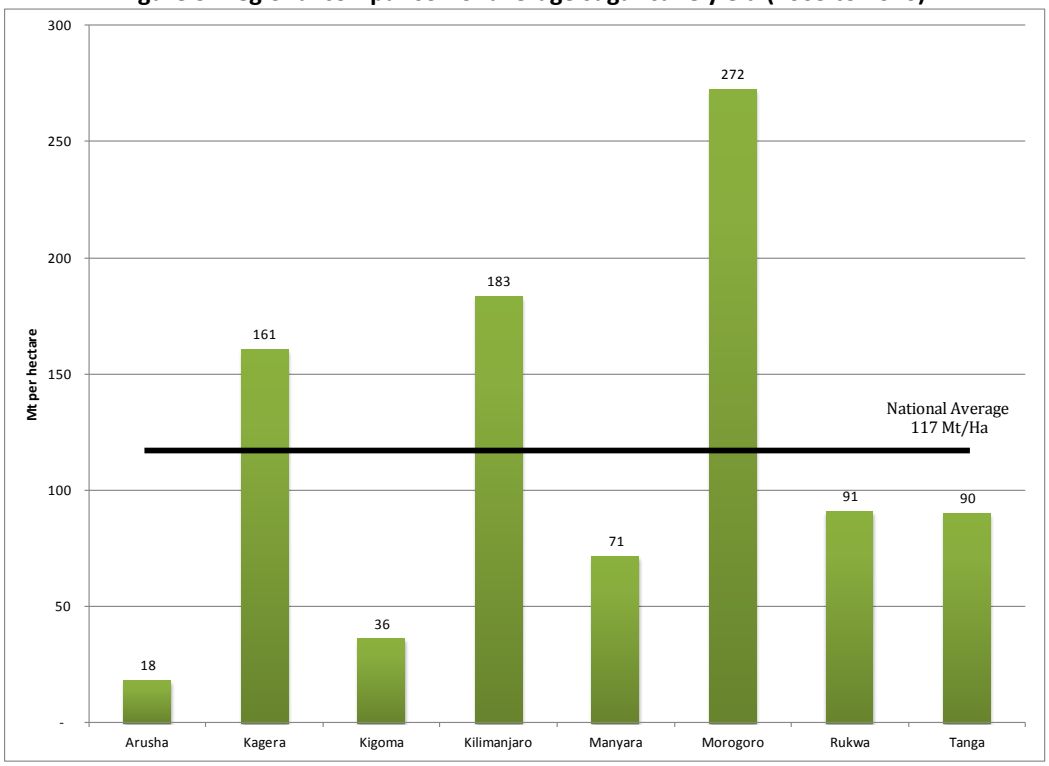


Source: MAFSC

In general, areas where sugar factories are located are characterized with relatively higher yields, which point at a positive impact of sugarcane factories on sugarcane production. Morogoro is a region with the highest sugarcane yield, mainly due to relatively higher level of mechanization

technologies (Figure 3). For example both Mtibwa and Kilombero sugar farms are fully installed with sprinkler irrigated systems. Besides, there is a reliable market for contract farmers and outgrowers. The factory owner gives contract with a clearly stated price at the end of the cropping season. Farmers also get soft loans for inputs. This shows that when marketing conditions are reliable, producers respond to incentives with reliable production.

Figure 3: Regional comparison of average sugar cane yield (2005 to 2010)



Source: MAFSC

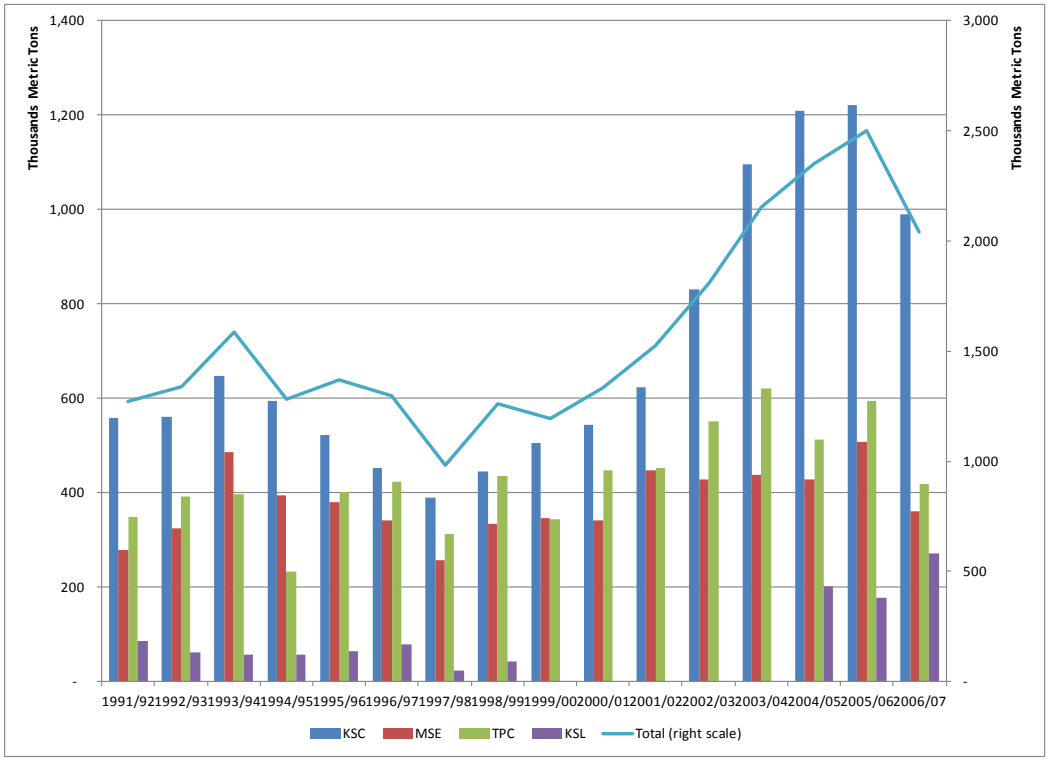
CONSUMPTION/UTILIZATION

Sugarcane processing

The sugar industry is one of the largest agro-processing industries in URT. It contributes approximately

35 percent of the gross output of the food-manufacturing sector and some 7 to 10 percent of total manufacturing value added (NDC - National Development Cooperation, 1992). There are four companies involved in raw sugar production: two located in Morogoro Region (Kilombero Sugar Company (KSC) and Mtibwa Sugar Estate (MSE)); one in Kilimanjaro region (Tanganyika Planting Company (TPC)); and one in Kagera region (Kagera Sugar Limited (KSL)) (Figure 12). All companies are under the control of domestic capital except for KSC which is owned by the South African corporation Illovo. The use of sugarcane production of each company and its share on total Tanzania's production is reflected in Figure 4.

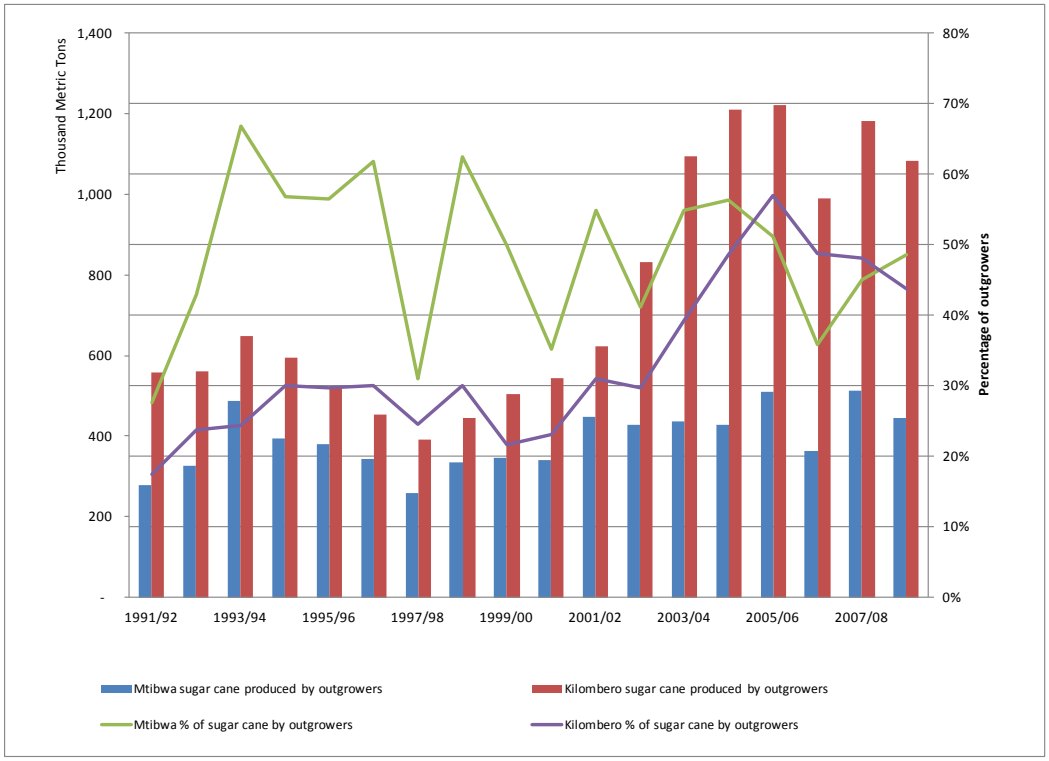
Figure 4: Sugar cane processing by factory



Source: Sugar Board of Tanzania

Close to 50 percent of total sugar cane is processed by KSC, with MSE and TPC processing approximately 20 percent each and the remaining 10 percent by KLS. In the fringe of these factories a double system of sugar cane production is developed, as sugar cane growing can be done directly by estates or by external farmers. This is most visible at Kilimanjaro Plantation company (KPC) and Mtibwa sugar estate (MSE). As of year 2008, KSC owned 13 000 ha of land within the Kilombero valley of which 7 900 ha are used to grow sugarcane in its estate. It is the largest sugar-processing company in URT and it processes two types of sugar at two factories. These two factories are Msolwa (Kilombero 1, or K1) and Ruhembe factory (Kilombero 2, or K2) which started in 1962 and 1977 respectively. K1 produces brown sugar and K2 is the only factory in the country which produces refined white sugar. As one can see from Figure 5, although production of sugar cane by outgrowers in Kilombero has always been higher, the percentage of total sugar cane processed supplied by outgrowers in Mtibwa was higher than in Kilombero factory up to 2005.

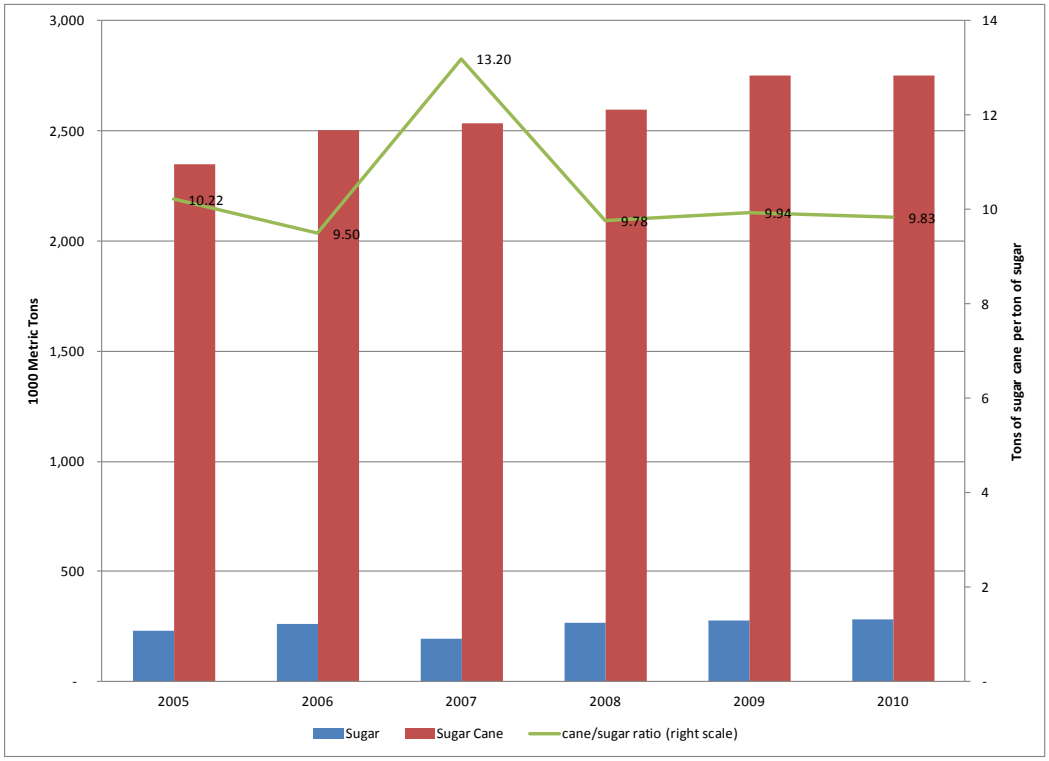
Figure 5: Role of outgrowers in sugar cane supply to factories



Source: Sugar Board of Tanzania

Comparing sugar and sugar cane production data we can obtain the quantity conversion factor. As shown in Figure 6, this factor averages at 10 throughout the study period with the exemption of 2006 when 13 kg of sugar cane were needed per kg of sugar. The Country's processed sugar production has increased from 113 thousand tonnes in 1995/96 to 263 thousand tonnes in 2005/06, representing an increase of 134.91 percent Factory-wise, Kilombero's production has increased by 227.91 percent, TPC by 80.04 percent and Mtibwa by 53.13 percent. Kagera Sugar Ltd which stopped production in 1999/2000 resumed October 2004 producing 16,703 tonnes by end of March 2006 (Sugar board website, 2012). Comparing sugar and sugar cane production data, we can obtain the quantity conversion factor. As shown in Figure 6, this factor averages at 10 throughout the study period with the exception of 2006 when 13 kg of sugar cane were needed per kg of sugar.

Figure 6: Sugar and sugar cane production in Tanzania



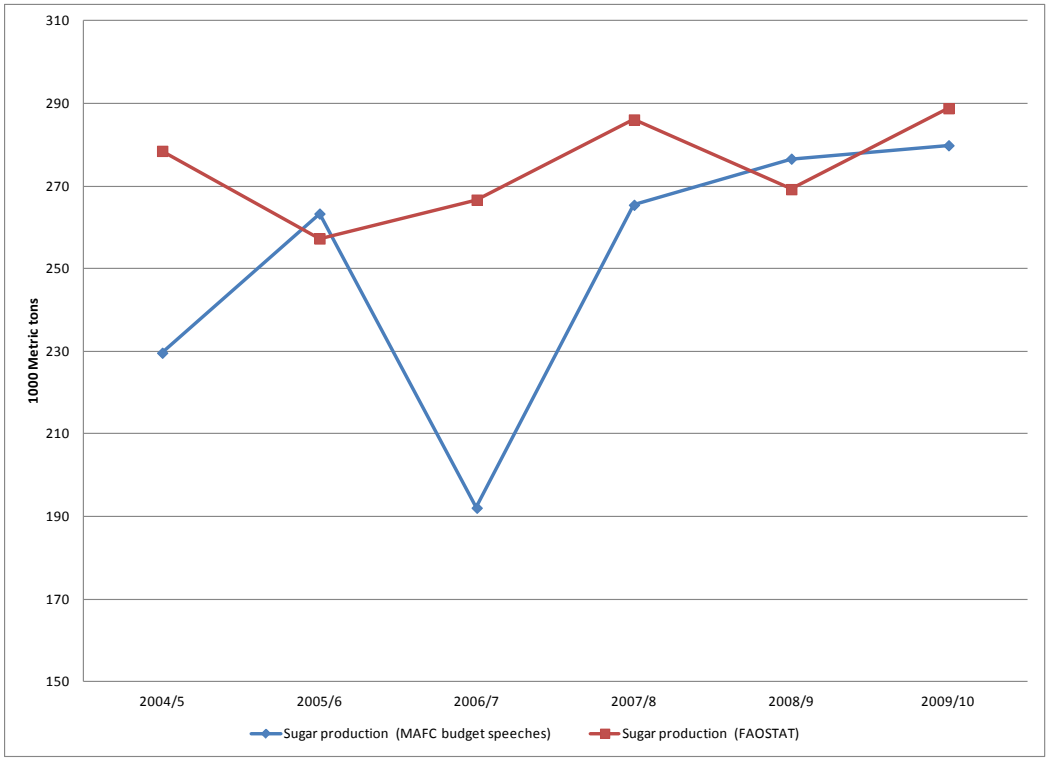
Sources: FAOSTAT, 2012 (cane production) and MAFC budget speeches (sugar production)

The country's processed sugar production has increased from 112 903 tonnes in 1995/96 to 263 317 tonnes in 2005/06, representing an increase of 134 percent. Factory-wise, Kilombero's production has increased by 229 percent, TPC by 80 percent and Mtibwa by 53 percent. Kagera Sugar Ltd, which stopped production in 1999/2000, resumed it in October 2004 producing 16 703 tonnes by end of March 2006 (Sugar board website, 2012). The closure was attributed to management challenges after privatization. However the industry was rescued thanks to a guarantee from the Bank of Tanzania which allowed it to borrow TzSh 72.178bn/- from various local financial institutions in 2003, which gave the company a two-year grace period to start servicing the principal loan and interest1.

When data from FAOSTAT and MAFSC budget speeches are compared, there are significant variations in the sugar production, most significantly in 2005 and 2007 (Figure 7). According to the MAFC budget speeches, there has been 19 percent increase in sugar production from 2005 to 2010, this increase in production is limited to 7 percent when FAOSTAT data is considered.

[1] "Kagera sugar na ufisadi wake Tanzania" (www.Jamiiforum.com article). THIS LINK IS NOT WORKING

Figure 7: Sugar production in Tanzania according to different sources



Sources: MAFC budget speeches and FAOSTAT, 2012

Other uses for sugar cane in the country include raw sugar cane consumption (both peeled and unpeeled) and processing to generate alcohol. However, their share in total production is negligible.

URT current level of sugar self-sufficiency is about 75 percent (Table 1). Up to 2009/10, the total sugar consumption was 377,313.5mt; of which 23 percent was for industrial use (in different sectors such as carbonated drinks, pharmaceuticals and bakeries) and the remaining 77 percent was consumed directly.

Table 1: Tanzania sugar production, import, consumption and export (2005-2010)

	Indicator	2005	2006	2007	2008	2009	2010
A	Local Production	229,620	263,317	192,095	265,434	276,605	279,850
B	Imports	86,773	102,689	183,412	66,724	100,133	147,189
E	Export	26,067	19,029	65,018	7,983	5,996	17,791
F	Direct Consumption (A+B-C)	290,326	346,978	310,489	324,175	370,743	409,248
G	Industrial Use		44,884	53,561	68,532	70,337	100,417
H	Total Sugar Consumption (F+G)		391,862	364,050	392,707	441,080	509,665
I	Trade balance (E-B)	(60,706)	(83,661)	(118,394)	(58,741)	(94,137)	(129,398)
J	Formal export as a % of production	11%	7%	34%	3%	2%	6%
K	Self sufficiency ratio [A ÷ (A + B-E)]	79%	76%	62%	82%	75%	68%
L	Industrial use as % of total consumption (G ÷ H)		11%	15%	17%	16%	20%

Sources: MAFC budget speeches (local production), UNCOMTRADE (import/export), International Sugar organization (Industrial use)

As a way of curbing the ever increasing import gap, the government increased sugar imports and also imposed an export ban on sugar to neighboring countries. One of the critical challenges facing the local sugar industry is the country's porous borders and ports. Smuggling is not only creating shortage in the local market but also subjecting the government to huge losses due to tax evasion. In 2011, for example, the government was compelled to engage security organs to block illegal exportation of sugar to the neighboring countries facing acute shortage that pushed prices of the commodity to extraordinarily high levels. This results in very low per capita consumption levels (under 10 kg per person and year including sugar from industrial use).

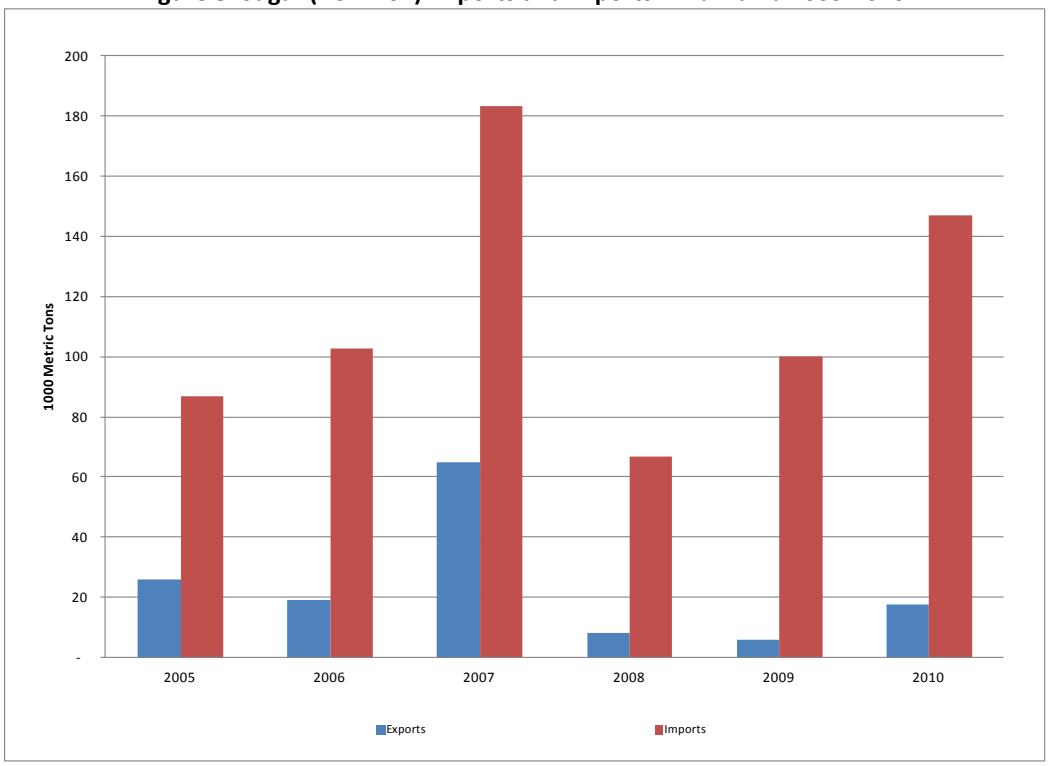
MARKETING AND TRADE

Imports and export by destination countries

The Harmonized Commodity Description and Coding System (HS) of tariff nomenclature has four 6-digit codes for sugar products: raw sugar cane (HS 17.01.11); raw sugar beet (HS 17.01.12), Cane/beet with flavor/color (HS 17.01.91) and pure sucrose (a.k.a. sugar for industrial use) (HS 17.01.99). In the following analysis, all are going to be discussed either implicitly or explicitly.

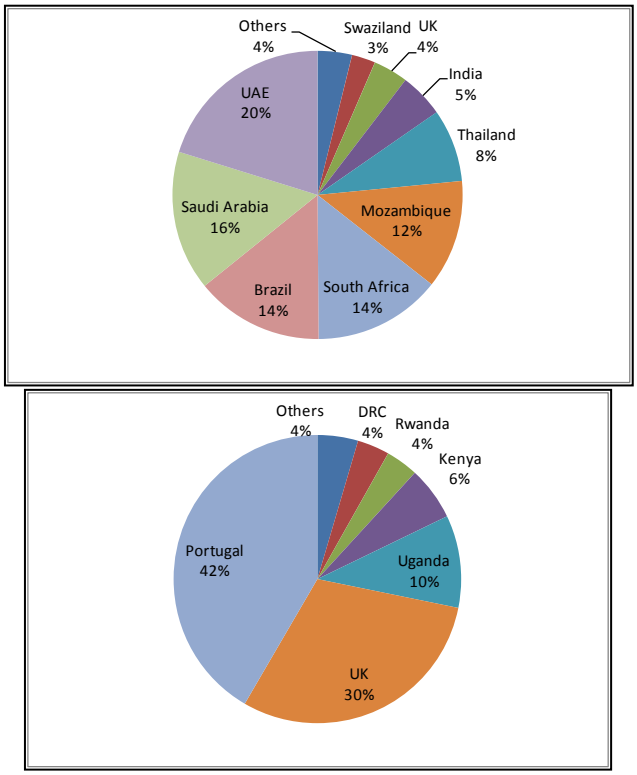
As shown in Figure 8, URT is a net importer sugar in global terms (HS 17.01 Cane or beet sugar and chemically pure sucrose, in solid form). Whereas the exports have ranged between 10,000 – 65,000 tonnes, the imports have ranged between 60 000-185 000 tonnes. Figure 9 shows the origin and destination of Tanzania's sugar trade. An Interview with officials of the Tanzania Sugar Board suggests that URT normally exports sugar to the European Union as a way of utilizing its preferential quota allocated through initiatives such as African Caribbean Pacific (ACP Sugar Protocol) and Everything But Arms (EBA).

Figure 8: Sugar (HS 17.01) Imports and Exports in Tanzania 2005-2010



Source: COMTRADE

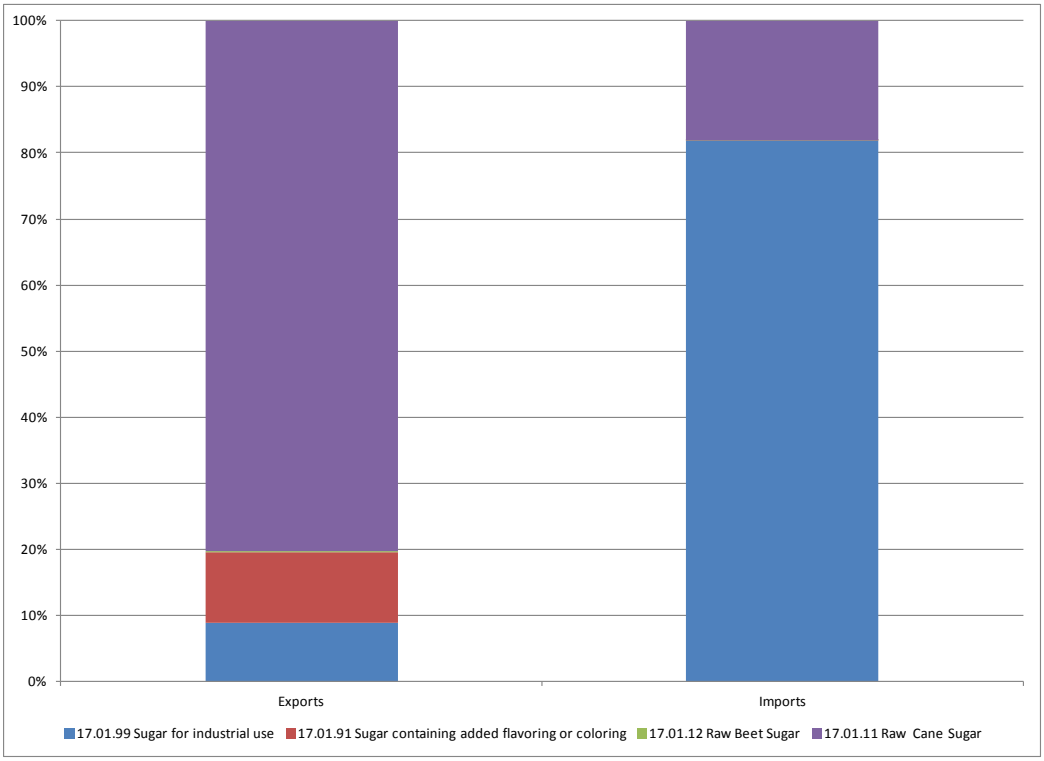
Figure 9: Share of sugar trade in volume by destination country (left chart) and source country (right chart)



Source: COMTRADE

As far as composition of sugar trade is concerned (Figure 10), the vast majority of imports is declared as sugar for industrial use (or pure sucrose), as most exemptions for import tariffs are given to industries using sugar as an input for food production (see below). On the other hand, URT mainly exports raw cane sugar. The trade pattern of net importer is constant throughout the period for sugar for industrial use and raw cane while URT is a net exporter (albeit of reduced quantities) o sugar containing added flavoring or coloring matter.

Figure 10: Composition of sugar trade in Tanzania by sugar type(2005-2010)

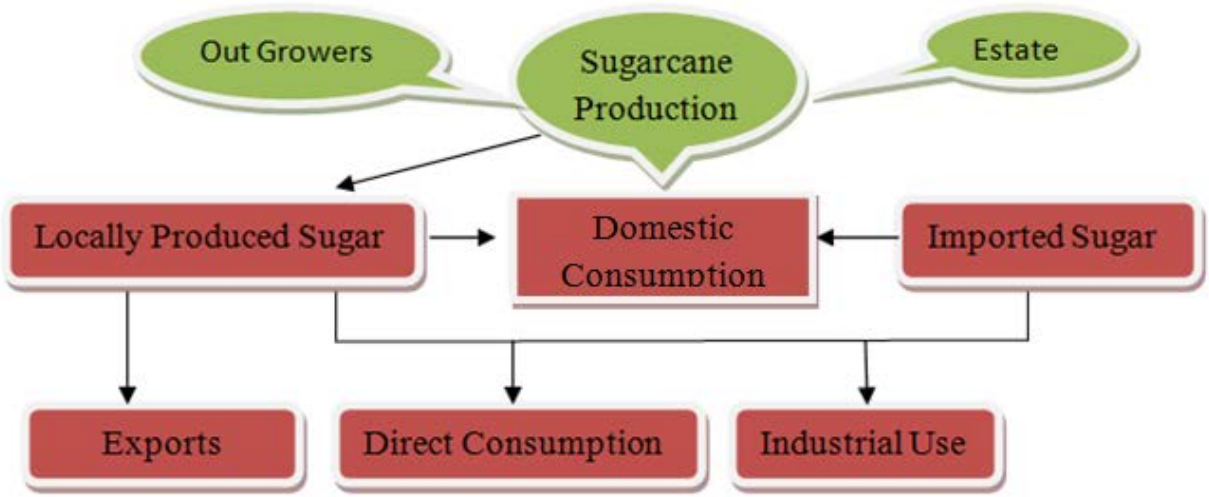


Source: COMTRADE

DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

Sugar cane is produced by both the estates and outgrowers who ultimately sell to the sugar factories located at eastern, northern and northwestern part of URT. These factories then sell the sugar to local sellers or exporters. Whereas local wholesalers market it to retailers, exporters find markets to regional and global markets. All this process of internal and international sugar marketing is regulated by the Sugar Board of Tanzania (SBT). Since the locally produced sugar is insufficient for direct or industrial local consumption, there is an import inlet in all corners of the country.

Figure 11: Sugar value chain



Sugar is mainly marketed from its main production factories located in Morogoro, Kilimanjaro and Kagera.

This sugar is either directly consumed locally or exported to Burundi, Democratic Republic of Congo, Kenya, Spain, Sudan, Uganda or Zambia.

Figure 12: Sugar value chain map

Source: Nkonya, N.M

Since the start of buying sugarcane from small holder farmers (SHFs) in 1962, the price of sugarcane was set to fluctuate with the sucrose level in the sugarcane supplied by the SHFs. Sugar processing plants offered prices according to the sucrose levels measured in the laboratory. Since then different remunerations systems have developed.

After contract renegotiations between 1999 and 2000, in 2001 KSCL, ROA and KCGA representatives agreed to fix the prices at a 9 percent level of sucrose. Given the fertility of the area, this sucrose level was thought to be achievable for every farmer, while it mitigated the variability in income for farmers. It was seen as a good incentive for SHFs to grow more cane and as a solution to the measurement problem. However, processing units have significant market power. In some seasons, some factories pay farmers lower prices than the production unit costs2. This low pay is ascribed to the monopoly situation created by the existing laws that prohibit construction of another factory within the radius of 80 km from the existing one and the obligation for farmers within that radius to sell to Mtibwa factory only at a price dictated by the factory. Moreover, farmers face delay in payments. Even when contract farming requires payments to be done within 40 days after delivery, this requirement is not observed and payment occurs three to four months after delivery.

[2] For the 2010/11 growing season in the producing area around Mtibwa, sugar factory farmer costs are approximately 43,000 TSh per tonne (30 USD) but buying price from MSE never surpassed 42,500 TzSh per tonne (29 USD).

Considering that the farmer borrows money from SACCOS[3], this delay leads to losses on the part of the farmer due to loan repayment interest. This situation for example is assumed to have discouraged farmers from growing sugar cane leading to the decline in sugar production from 246 tonnes to 179 tonnes (in 2011). This however is contrary to the reasons given by the minister's budget speech which stated that the production decline was caused by drought (URT parliament website, 2011). This situation varies across factories though, as the neighboring Kilombero sugar company buys sugarcane at Tshs 56,000/= (≈39 USD) per tonne. Based on the structural sugar deficit in URT, there are nine proposed projects which are reflected in Table 2.

Table 2: Prospective sugar production areas

	Project	Location	Raw Sugar production potential ('000'mt)
1.	Ruipa	Kilombero valley, Morogoro	224
2.	Ikongo	Mara	82
3.	Mahurunga	Mtwara	10-30
4.	Usangu	Mbeya	66-70
5.	Malagarasi (Luiche)	Kigoma	
6.	Wami	Morogoro	
7.	Kilosa	Morogoro	50-60
8.	Babati (Hangang)	Manyara	
9.	Ukutu Kisaki	Morogoro	

Source: Sugar board of Tanzania

Of the nine potential investment sites proposed, Ruipa seems to be the most adequate site. The site has following advantages over the other potential sites:

1. Availability of previous research and studies to facilitate putting together an investment plan. Additional field studies would be required mainly for data and assumptions verification.
2. The area is accessible by road and rail and is comparatively close to the port and commercial center city of Dar es Salaam.
3. The project would be in the proximity of existing establishments (Kilombero and, to a lesser extent, Mtibwa) thus allowing for economies of scale with regards to procurement of inputs such as cane seeds etc.

The area has a potential for future expansion to over 200 000 tonnes per year of raw sugar production. The local sugar price has been affected by increasing sugar production costs due to unreliable electricity from national grid and increased in tariff by 40 percent. However, almost all the sugar factories no longer depend on the national grid for electricity and produce their own using on-site generation facilities fed with sugarcane remains.

POLICY DECISIONS AND MEASURES

Following the adoption of the structural adjustment programs in the late 1990s, which emphasized the need for the government to withdraw from production and marketing, industries are presently privatized, owned and operated by the private sector.

The government's role within the industry is solely to provide a conducive environment in order to enhance growth of the sub sector, detaching from direct growing and processing in public sugar estates.

[3] SACCOS = Savings and credit co-operative society

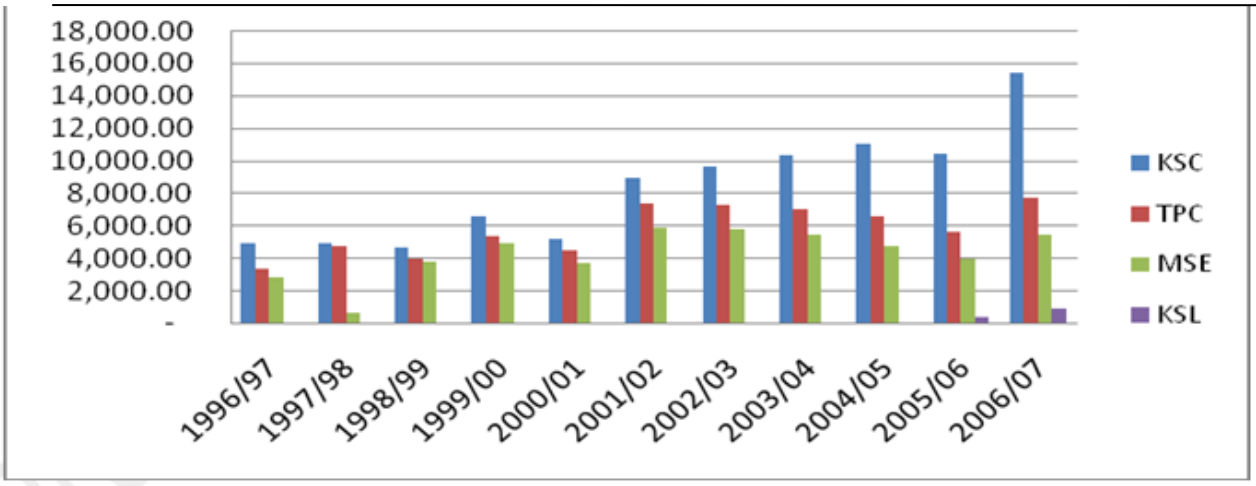
The *sugar industry* in URT is governed through the sugar industry parliamentary act N° 26 of 2001 that came in force with effect from 28th January, 2002 by presidential assent. This act provides for the establishment of the Sugar Board of Tanzania and the National Sugar Institute, improvement, development, regulation of the sugar industry and matters related to. The sugar regulations were published under this act through publication in the gazette of the United Republic of Tanzania on 24th June 2005.

The Government encouraged the private sector to participate in the ownership and management of the public sugar estates with the aim of rehabilitating the estates so that the existing facilities produce sugar at full capacity (230 000 tonnes per year). The Government had, therefore, to create an environment in which new private estates and small scale processing plants were facilitated. Emphasis was directed to Mtwara, Ruvuma (Tunduru district) and Morogoro regions, which offered possibilities for the new direction (Agricultural and livestock policy, 1997).While existing facilities increased their production to full capacity utilization, the Government had an intention of putting in place a system that allowed private traders to import the commodity to supplement domestic production.

For Sugarcane growers, these regulations require that they are registered for the purpose of controlling sugarcane quality, establishing a basis for planning and making appropriate estimates of inputs, extension services and sugar cane growers credit requirements. All growers are required by these regulations to grow sugarcane in a farm with an area of at least 0.40469 ha within a radius not exceeding 40 km from a registered miller to which they have the obligation to sell their crop. Before growing sugarcane, a registered sugarcane grower, or in his name a sugar board agent or a growers association to which he belongs, shall enter into a commercial agreement with a sugar factory to whom he will sell sugarcane. The agreement provides for the sugarcane variety to be grown, quantity, obligations on harvest schedule and delivery/transport to the mill, price or its formula, the time lapse not exceeding 30 days between delivery and payment and related interest upon payment delay, which shall be equivalent to the ruling standard short term borrowing rate from a commercial Bank.

International trade in sugar is also ruled by domestic policies. All sugar exporters need to be licensed by the board and the expected proceeds from the exports need to substantially exceed the cost of importing the same quantity of sugar. The Board prescribes the maximum quantity of sugar that may be exported every year while taking into account the domestic sugar production, the requirement of sugar for domestic and industrial use, and a buffer stock equivalent to not less than two months domestic and industrial consumption. Figure 13 shows the different export quotas allocated to the different sugar producers in URT.

Figure 13: Sugar export quota allocation by industry (1996/7-2006/7)



Source: Author using data downloaded from www.sbt.go.tz

The licensed exporter is required to enter into commercial contract with buyers, comply with all export documentations and approvals demanded by importing country or the specified market (i.e. certificate of origin, phytosanitary certificate and special delivery forms). Besides, they are required to submit such reports or returns to the board on the export in compliance with the agreement governing the specified sugar.

Export requirements include specification on quality (purity rate 96 percent o higher) and other general safety measures. Given that each particular initiative (ACP or EBA) provides a specific supply quota, the Tanzania Sugar Board has appointed a broker based in Great Britain to be in charge of market surveillance in order to ensure that consignments for both initiatives are combined and delivered together to reduce transaction costs associated with the logistic arrangement. However, there are current efforts to shift this activity to the private sector. In that account, this activity will most likely be undertaken by the Association of Sugar Producers or another private agent appointed by them. Export of sugar is not taxed, nevertheless part of the export proceeds (the so-called sugar levy; see below) are allocated to promote and develop the sugar sub sector through the Sugar Development Fund.

However, as mentioned above, URT is a net importer and the importing process has a different procedure. Import of sugar is monitored by the Tanzania Sugar Board which was mandated to carry out this activity by the Sugar Regulations Act, calling for the creation of a Technical Advisory Committee to monitor and regulate imports. First, the Sugar Board determines the amount of sugar to be imported taking into account the difference between the anticipated local sugar production and local annual consumption. A two month-buffer stock is added to this difference which makes the quantity of sugar to be imported to offset local sugar production shortfall. The import regulations require all sugar importers to be registered and licensed by the sugar board. There a three categories for importers: for importers managing quantities of sugar aggregating to more than 60mt within a period of 12 months for domestic consumption (category “A”); more than 60mt for industrial (category “B”); and amounts imported for own consumption or sale but does not exceed 5mt (category “C”).

Any person who wishes to import sugar must provide adequate information to the Board before an import license valid for each specific consignment is granted (ESRF). Some of the requirements for acquiring an import license include details of the company (address, location, VAT or TIN registration, trading license, business turnover, performance of previous year on sugar importation, sales distribution network in URT mainland) and details of the trade expected to undertake (quantity of sugar to be imported, and the number of importation lots). Granted licenses provide detailed information of category of sugar (for domestic consumption), quantity to be imported, validity period of the license, port of entry and fees payable.
The import license is granted upon the payment of a non-refundable performance bond of 10 USD per tonne to the SBT. Other conditions include the payment of a per tonne license fee, confirmation of purchase agreement i.e. evidence of sugar supply agreement, and lastly a letter of comfort from the bank indicating that a particular trader is known, has an account with the bank and is financially capable. Imported sugar normally undergoes tests to examine if it complies with the minimum food standards before it is allowed to enter the local market (ibid).

Sugar levies and development fund: The regulations require that all large scale producers and sellers shall pay to the board a sugar levy equivalent to 2.75 USD per tonne of sugar sold in URT or 3 USD per tonne for sugar imported in mainland URT. The minister responsible for agriculture may vary these levies by publishing in the government Gazette. These levies are the sources of money for the sugar industry development fund and are used for sugarcane research, training, administration, outgrowers promotion and other related activities (see below).

To address the sugar deficit in URT, some actors have considered installing an export ban as that existing for some staples. The export ban will definitely weaken the sugar supply and so the best way is for concerted efforts to increase production and tape the shortage in other countries as a business opportunity. Increased production will close the current demand-supply gap and create sugar surplus for export markets. Local producers should capitalize on frequent shortages in neighboring countries (Own observations, 2012).

As with all other export commodities, Sugarcane is part of the public research establishment (through the ZARDIs4). The research is co-financed by the industry and the government, with the private sector playing an increasing role in agricultural and livestock services, in particular with respect to extension, training and technical services which are under ASDP. The sugar research institute is located about 40 km west of
Dar es Salaam city along Morogoro road at Tumbi, Kibaha township, Pwani region5.

Despite government interventions, retail sugar price continued to rise and in some regions especially those in the border with neighboring countries, a kilo was sold for as high as 2,600 TzSh. In Dar es Salaam, for example, retail price for sugar ranges between 2,000 and 2,400 TzSh a kilo.

[4] ZARDI = Zonal Agricultural Research and Development Institutes

[5] This is a Sugarcane breeding Station that was established in 1972 under the then EAAFRO (East African Agricultural and Forestry Research Organization) of the East African Community. It replaced Kikambala Station near Mombasa, which had operated since 1967. After the Community had collapsed in February 1977, the station was taken over by the Tanzanian Ministry of Agriculture until 1st March 1982 when it came under the administration of TARO (Tanzania Agricultural Research Organization). However, it was later, in 1989 retaken when TARO ceased to exist, and is now under the department of research and development (DRD).

Sugar tariff regime

The common external tariff (CET) for sugar is of 100 percent unless it is unrefined which then has a 35 percent tariff. The 2007 version of the CET moves sugar to the sensitive items section (Schedule 2) and raises the tariff to 100 percent or 200 USD whatever is higher. However URT, during the period under study, has enacted different transitory measures reducing the tariff, abolishing it or giving special permits for sugar of industrial use. These transitory measures made the tariffs undulate between zero and 25 percent.

Table 3: Sugar import tariff and quantity imported (tonnes)

Source (EAC gazette)	Product	Quantity (tonnes)	Tariff (%)	Period
EAC/15/2008	Sugar for industrial use (1701.99)	73 000	10%	One year from 1st July 2008
EAC/13/2009	Sugar for industrial use (1701.99)		10%	Twelve months as of 1st July 2009
EAC/7/2010	Sugar (1701.11, 1701.12, 1701.91 and 1701.99)	65 000	25%	Three months from 30 March 2010 to 30th June 2010
EAC/9/2010	Sugar for industrial use (1701.99)	30 550	10%	Six months from 30 March 2010
EAC/23/2010	Sugar for industrial use (1701.99)	120 060	10%	One year from 1st July 2010
EAC/10/2011	Sugar (1701.11, 1701.12, 1701.91 and 1701.99)	40 000	0%	Six months from 1st January, 2011
EAC/20/2011	Sugar for Industrial use (1701.99)	110 571	10%	One year from 20st June 2011

These exemptions, mainly due to the specific dates for which they are granted, generate problems with the importers as in some cases the purchase date is during the tariff exemption or reduction period and the delivery date is not. There have been cases where important loads of sugar have been stuck in the port of Dar es Salaam while there is shortage of sugar in the country due to this kind of misunderstandings.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

The analysis of price dis/incentives is carried out for the period of 2005-2010 and aims at estimating price gaps and rates of protection at wholesale and farm-gate levels. According to the review in the foregoing chapters, the analysis is made considering that the point of competition takes place at the border since URT is a net importer of sugar.

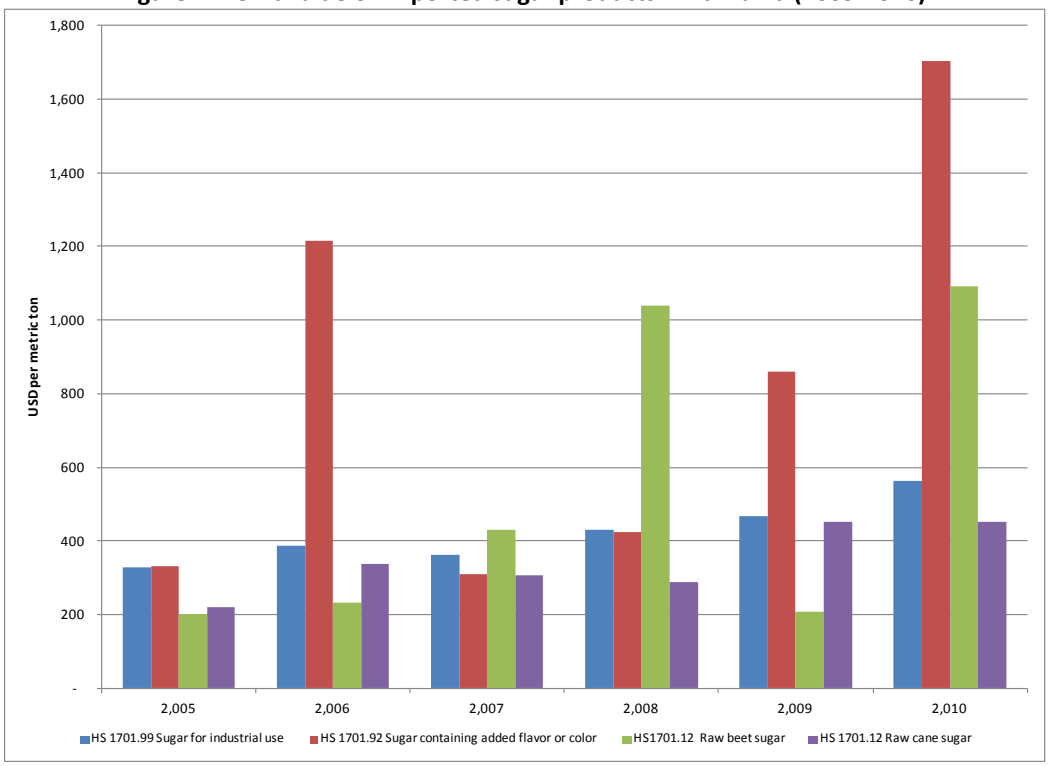
TRADE STATUS OF THE PRODUCTS

As mentioned above, URT is a net importer of sugar.

BENCHMARK PRICES

For imported products, the benchmark price must reflect the CIF cost of sugar in the port of entry to the country, in this case Dar es Salaam. Two sources of data for import and export prices are available in URT, the Tanzania revenue authority (TRA) and the UN commodity trade databases (UNCOMTRADE). In both data sets, we can compute unit prices for the four sugar commodity groups. Unit value trends for the four commodities can be seen in Figure 14.

Figure 14: Unit value of imported sugar products in Tanzania (2005-2010)



Source: COMTRADE

As the most traded product is sugar for industrial use (HS 1701.99) we have considered this as the most reliable price information and we use it as the benchmark price for our analysis. This sugar is the highest quality and purity; however as our domestic price for the point of competition is based on retail prices (see below) we consider that the quality of both reference and domestic prices can be the same. The benchmark price used for the analysis is reflected in Table 4.

Table 4: Benchmark price used for the price incentive analysis (unit value of imports under HS1701.99)

	2005	2006	2007	2008	2009	2010
Imported volume (tonnes)	79 258	72 718	112 255	66 195	99 896	132 031
Price (USD per tonne)	327	387	361	429	466	564
percent change from year before		18	-7	19	9	21
percent change from 2005		18	10	31	42	72

Sources: COMTRADE and own elaboration

With an exception of 2007 where the prices fell by 7 percent as compared to previous year, the import prices have progressively been increasing. As compared to 2005, the import prices have increased by 30 percent having the sharpest increase in 2008 (21 percent) and the minimum in 2008 (11 percent). There was a net decrease in 2007 (8 percent).

DOMESTIC PRICES

Two domestic prices are needed for the analysis. The price at point of competition reflects where imported and domestic product can be found simultaneously competing. This is assumed to be the wholesale market of Dar es Salaam where buyers can choose between imported sugar or domestically produced one. There is no price information on wholesale prices for Dar es Salaam. The Tanzania Sugar Board reports average annual retails price for the whole of URT (up to 2006) and regional 6 specific average annual prices (from 2008).
To convert these retail prices to wholesale equivalents, we have assumed a 20 percent packaging, distribution and retailer margin and constructed the domestic price at point of competition as 80 percent of the national average of retail prices. The price series used is reflected in Table 5.

Table 5: Domestic price of sugar at point of competition used for the price incentive analysis (TzSh per tonne)

	2005	2006	2007	2008	2009	2010
Average of national retail price [I]	600 000	640 000	840 000	960 000	1 045 714	1 177 143
Assumed packaging, distribution and retailer margin (20% of [I]) [II]	120 000	128 000	168 000	192 000	209 143	235 429
Observed domestic price at point of competition [I]-[II]	**480 000**	**512 000**	**672 000**	**768 000**	**836 571**	**941 714**

Sources: Tanzania Sugar Board and own elaboration

The second domestic price needed for the analysis is that at the farm gate. The Tanzania Sugar Board reports the price paid to outgrowers in three of the four main sugar processing plants in URT (Kilombero, Kagera and Mtibwa). We have taken the weighted average of the three prices as the farm gate price which is reflected in Table 6.

[6] Prices are not reported for the 23 regions in Tanzania, rather for seven ad-hoc aggregates: Eastern, Central, Southern Highlands, North, South, West and Lake.

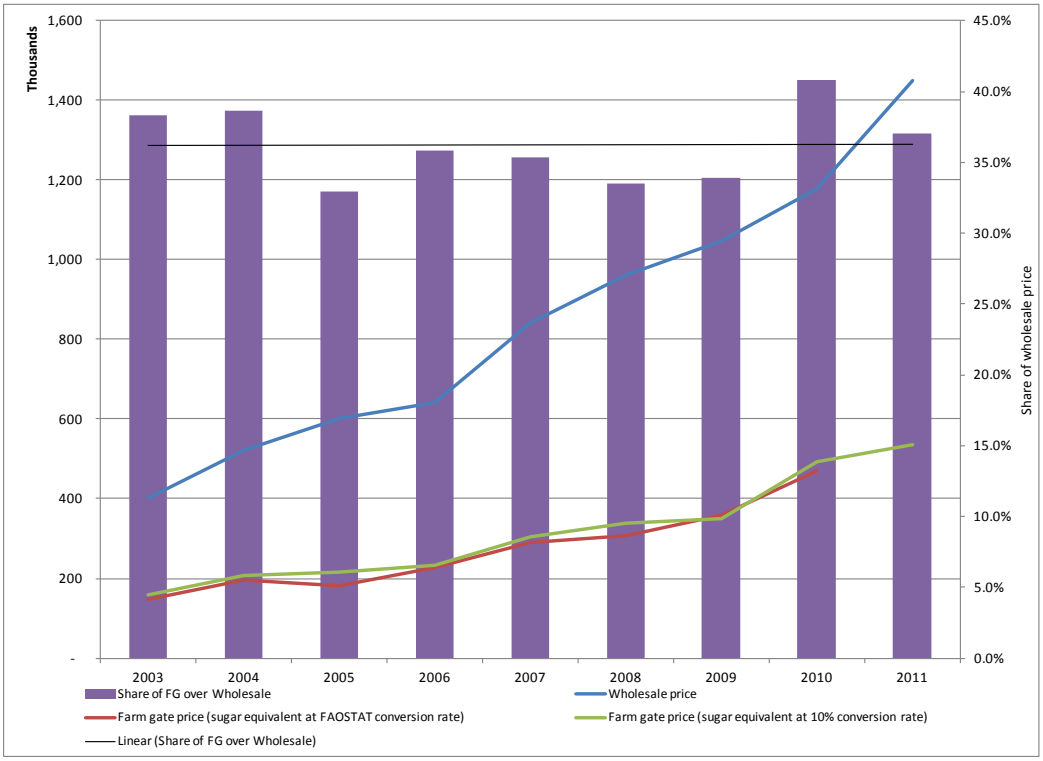
Table 6: Weighted average of outgrower prices for sugar cane in main sugar mills in Tanzania (TzSh per tonne of sugar cane)

	2005	2006	2007	2008	2009	2010
Price (TzSh per ton)						
Kilombero	22 635	24 266	31 500	35 017	36 590	54 103
Mtibwa	18 500	20 500	26 500	30 516	31 722	38 337
Kagera					30 000	33 600
Production (tons)						
Kilombero	588 051	696 253	481 147	568 169	473 457	413 640
Mtibwa	241 063	259 952	129 624	230 874	216 600	179 884
Kagera					2 712	4 082
Domestic Price at Farm gate (TzSh per ton)						
Weighted average of three plants	**21 433**	**23 242**	**30 439**	**33 717**	**35 042**	**49 217**

Source: Tanzania Sugar Board and own elaboration.

As it can be seen in Figure 15, prices at point of competition and farm gate have followed the same trend during the study period and the share of sugar cane costs over sugar price (taking into account the sugar cane to sugar ratio) has been more or less constant over time.

Figure 15: Domestic prices used in the analysis (Tzsh per tonne of sugar equivalent)



Sources: Tanzania Sugar Board and own elaboration

EXCHANGE RATES

Exchange rates for the URT have been taken from the IMF data source and summarized in Table 7. Yearly averages have been calculated using monthly data. There is no intervention on foreign currency markets in URT as the currency floats freely and therefore no adjusted exchange rate is considered in the analysis.

Table 7: Exchange Rate TzSh/USD

	2005	2006	2007	2008	2009	2010
Exchange rate (yearly average of monthly data)	1 129	1 252	1 245	1 196	1 320	1 409

Source: IMF

ACCESS COSTS

Farm gate to wholesale

Observed access costs between farm gate and wholesale need to take into account all the processing, margins and transport from the main producing areas (i.e. Morogoro) to wholesale in Dar es Salaam. All these three components are calculated referred to Sugar cane equivalents.

Milling and Refining

We have no data on processing costs for sugar in URT, however we have taken costs from sugar processing in South Africa obtained from the South Africa National Agricultural Marketing Development Council for the period 1999-2003. We take the following costs components: i) milling, ii) refining; iii) warehousing and handling, iv) packaging; and v) working capital costs. Values for 2003 have been updated to the 2005-2010 period using the CPI for South Africa obtained from the World Bank World Development Indicators and transformed into USD using the exchange rates reported by the IMF and then into TzSh using the exchange rate reported above. The costs are related to sugar units and have been transformed into sugar cane equivalents using a 10 percent quantity adjustment factor. As costs in South Africa are higher than those in low cost countries (Mitchell, 2004) we have adjusted these costs by the ratio of cost in major exporting countries (which includes South Africa) to low cost producing countries (which does not include South Africa).

Margins

We have assumed a 10 percent margin over the purchased raw sugar cane valued at the farm gate price reported above.

Transport

We have assumed an average distance from sugar mills to Dar es Salaam of 350 km and a unit cost per tonne of sugar of 0.11 USD per tonne and km to obtain the transport costs. These are converted into TzSh using the average annual exchange rate and into raw cane equivalents using a 10 percent quantity adjustment factor.

The access costs from farm gate to point of competition are summarized in Table 8.

Table 8: Access costs from Farm gate to point of competition for sugar in Tanzania (TzSh per tonne of raw sugar cane)

	2005	2006	2007	2008	2009	2010
Milling, refining and processing	15 607	16 775	16 994	15 299	17 640	22 718
Margin	2 143	2 324	3 044	3 372	3 504	4 922
Transport	4 347	4 820	4 793	4 605	5 083	5 425
Access costs from farm gate to point of competition (sum of above)	**22 098**	**23 919**	**24 831**	**23 276**	**26 227**	**33 065**

Source: As described abov.

Wholesale to border

As we consider the point of competition to be Dar, transport costs can be considered negligible and we focus on actual costs of the import or export process in the Dar es Salaam port. Access costs from port to wholesale are reported by Temu et al. (2010) which identify up to 123 USD per tonne as non-tariff requirements for importation7. These costs are summarized in Table 9 and revisited with additional information obtained from more up to date sources.

[7] Although they do not specify the year, it seems the figures are for early 2000s as they reference a tariff structure as that was in place from 2000 to 2003.

Table 9: Main import charges at the Dar es Salaam port (early and mid 2000s)

Item	Description	Charge	Update
Pre-inspection charges	Pre-inspection by TISCAN a private company mandated by TRA	Destination inspection processing fees (1.2% of FOB)	
Phytosanitary charges	Post entry plant quarantine station inspection	15 USD per consignment	
Port wharfage fees	Paid to Tanzania Harbours Authority for goods while docked or leaving port	1.5% of CIF	
Tally fee	Payable to the shipping company	1 USD per tonne	
TFCB booking fees	Tanzania central freight bureau fee for enforcing fair fright charges for exports and imports	2.5 % of CIF or FOB	Currently under SUMATRA (Surface and Marine Transports Authority) and set at 0.3 USD per tonne[8]. Included
Clearing agents fees	Documentation fees	78.43 USD per consignment (estimated)	Caps set by SUMATRA Bill of lading 45 USD Delivery order 45 USD
	Agent fees	% of value of goods	List of approved shipping agents includes over 30 companies
Loading and unloading	Re-bagging, transport, silo charges etc.	20 USD per tonne	
Health and food safety standards	Tanzania Food and Drugs Authority Permit	1,000 TzSh for testing fees	Assumed to be per tonne

Sources: Temu et al. (2010) and own elaboration

For some of these components, i.e. those reported as per consignment, we need to make some assumption about the average size of the import consignment in other to obtain a per tonne cost of access costs from the border to the point of competition. Even when sugar is normally imported as bulk we can consider a minimum consignment size of 20 tonnes (i.e. one container). Taking into account these considerations, the final components of observed access costs from border to point of competition in USD per tonne are the following.

[8] As reported for dry bulk http://www.sumatra.or.tz/index.php?option=content&task=view&id=37&Itemid=2 (LINK IS NOT WORKING)

Table 10: Components of the observed access costs from border to point of competition considered in the analysis when Tanzania is an importer of Sugar through Dar es Salaam

Item	Value (USD per tonne)	Reference year	Notes
Pre-inspection charges	0.9% of CIF	N.A.	Approximated for imports from original data (referred to FOB) using the FOB to CIF ratio of world exports to declared to Tanzania and world imports declared by Tanzania for 2005 and 2006[9].
Phytosanitary charges	0.75 USD per tonne	2003	Assuming an average shipment of 20 tonnes
Port wharfage fees	1.5% of CIF	2003	
Tally fee	1 USD per tonne	2003	
TFCB booking fees	0.3 USD per tonne	2010	
Clearing agents fees	2.25 USD per tonne	2010	Only bill of lading (imports) and assuming an average shipment of 20 tonnes
	2% of CIF	N.A.	Estimate of normal fees due to sufficient competition in Dar
Loading and unloading	20 USD per tonne	2003	
Health and food safety standards	1,000 Tzsh per tonne	2003	

Sources: Temu et al. (2010) and own elaboration

Costs not referred to percent of the import values have been actualized or deflated using the Tanzania CPI and those expressed in USD transformed to local currency using the average exchange rate for the year. In addition we consider a 10 percent profit by importers on purchase price and obtain the following access costs from border to wholesale when URT is a net exporter reflected in Table 11.

Table 11: Access costs from border to point of competition for Sugar through Dar es Salaam

	2005	2006	2007	2008	2009	2010
Access costs from wholesale to border	83 139	105 214	103 950	113 651	137 662	169 754

Source: own elaboration as described above

We have not considered any adjusted access costs in the analysis, however if additional data becomes available it will be taken into account. The adjusted data would be lower than the observed one and would increase the value of the incentives indicators if the adjustment takes place from farm gate to point of competition and decrease then if the adjustment takes place from point of competition to border.

[9] For all the other years, trade data is too inconsistent to be used (i.e. FOB price higher than CIF price or volumes differing by more than one order of magnitude).

EXTERNALITIES

We are not aware of any positive or negative externalities associated with sugar production in URT and have therefore not considered this concept in the analysis.

BUDGET AND OTHER TRANSFERS

We have not been able to identify an allocation key for sugar and therefore no BOT have been considered.

QUALITY AND QUANTITY ADJUSTMENTS

As benchmark prices and wholesale prices are referred to sugar and farm gate price are referred to sugar cane we have used a technical conversion coefficient of sugar cane to sugar of 0.10.

SUMMARY TABLE FOR DATA DESCRIPTION

Following the above discussions, here is a summary of the main sources and methodological decisions taken for the analysis of price incentives and disincentives for Sugar in URT.

		Description	
Concept		***Observed***	***Adjusted***
Benchmark price		▪ *CIF unit values from COMTRADE for HS 1701.99 Sugar for industrial use*	
Domestic price at point of competition		▪ *80% of national retail average price of sugar as reported by the Tanzania sugar Board.*	
Domestic price at farm gate		▪ *Weighted average by sugar cane processing of farm gate price paid to outgrowers in three main sugar mills in Tanzania as reported by the Tanzania Sugar Board.*	
Exchange rate		▪ *IMF data base yearly average based on monthly data*	
Access cost to point of competition		▪ *Prot handling costs*	
Access costs to farm gate		▪ *Milling costs (South Africa) plus 10% margin over farm gate price plus transport costs to Dar es Salaam assessed in Raw cane equivalent.*	
QT adjustment	Bor-Wh		
	Wh-FG		
QL adjustment	Bor-Wh		
	Wh-FG	▪ *10% raw cane to sugar ratio*	

The data used for the analysis is summarized in the following table.

		Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
		trade status	*m*	*m*	*m*	*m*	*m*	*m*
DATA	*Unit*	*Symbol*						
Benchmark Price			327	387	361	429	466	564
Observed	USD/TONNE	$P_{b(int\$)}$						
Adjusted	USD/TONNE	P_{ba}						
Exchange Rate			1 129	1 252	1 245	1 196	1 320	1 409
Observed	TzSh/USD	ER_o						
Adjusted	TzSh/USD	ER_a						
Access costs border - point of competition			83 139	105 214	103 950	113 651	137 662	169 754
Observed	TzSh/TONNE	ACo_{wh}						
Adjusted	TzSh/TONNE	ACa_{wh}	562 500	600 000	787 500	900 000	980 357	1 103 571
Domestic price at point of competition	TzSh/TONNE	P_{dwh}						
Access costs point of competition - farm gate			22 098	23 919	24 831	23 276	26 227	33 065
Observed	TzSh/TONNE	ACo_{fg}						
Adjusted	TzSh/TONNE	ACa_{fg}	21 433	23 242	30 439	33 717	35 042	49 217
Farm gate price	TzSh/TONNE	P_{dfg}						
Externalities associated with production	TzSh/TONNE	E						
Budget and other product related transfers	TzSh/TONNE	BOT						
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}						
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}						
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}						
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}	0.10	0.10	0.10	0.10	0.10	0.10
		NOTES						

CALCULATION OF INDICATORS

The indicators and the calculation methodology used is described in Box 1. A detailed description of the calculations and data requirements is available on the MAFAP website or by clicking here.

Box 1: MAFAP POLICY INDICATORS

MAFAP analysis uses four measures of market price incentives or disincentives. *First*, are the two observed nominal rates of protection one each at the wholesale and farm level. These compare observed prices to reference prices free from domestic policy interventions.

Reference prices are calculated from a benchmark price such as an import or export price expressed in local currency and brought to the wholesale and farm levels with adjustments for quality, shrinkage and loss, and market access costs.

The ***Nominal Rates of Protection - observed (NRPo)*** is the price gap between the domestic market price and the reference price divided by the reference price at both the farm and wholesale levels:

$$NRPo_{fg} = (P_{fg} - RPo_{fg})/RPo_{fg}; \quad NRPo_{wh} = (P_{wh} - RPo_{wh})/RPo_{wh};$$

The $NRPo_{fg}$ captures all trade and domestic policies, as well as other factors which impact on the incentive or disincentive for the farmer. The $NRPo_{wh}$ helps identify where incentives and disincentives may be distributed in the commodity market chain.

Second are the ***Nominal Rates of Protection - adjusted (NRPa)*** in which the reference prices are adjusted to eliminate distortions found in developing country market supply chains. The equations to estimate the adjusted rates of protection, however, follow the same general pattern:

$$NRPa_{fg} = (P_{fg} - RPa_{fg})/RPa_{fg}; \quad NRPa_{wh} = (P_{wh} - RPa_{wh})/RPa_{wh};$$

MAFAP analyzes market development gaps caused by market power, exchange rate misalignments, and excessive domestic market costs which added to the NRP*o* generate the NRP*a* indicators. Comparison of the different rates of protection identifies where market development gaps can be found and reduced.

Table 9: MAFAP price gaps for sugar in Tanzania 2005-2010
(TzSh per tonne of sugar at point of competition and of raw cane at farm gate)

	2005	2006	2007	2008	2009	2010
Trade status for the year	**m**	**m**	**m**	**m**	**m**	**m**
Observed Price gap at point of competition	109 841.43	9 969	233 596	273 387	227 084	139 810
Adjusted Price gap at point of competition	109 841.43	9 969	233 596	273 387	227 084	139 810
Observed price gap at farm gate	(1 735.36)	(11 842)	(121)	(5 669)	(14 058)	(14 094)
Adjusted price gap at farm gate	(1 735.36)	(11 842)	(121)	(5 669)	(14 058)	(14 094)

Source: Own calculations using data as described above

Figure 16: MAFAP price gaps for sugar in Tanzania 2005-2010 (USD per tonne)

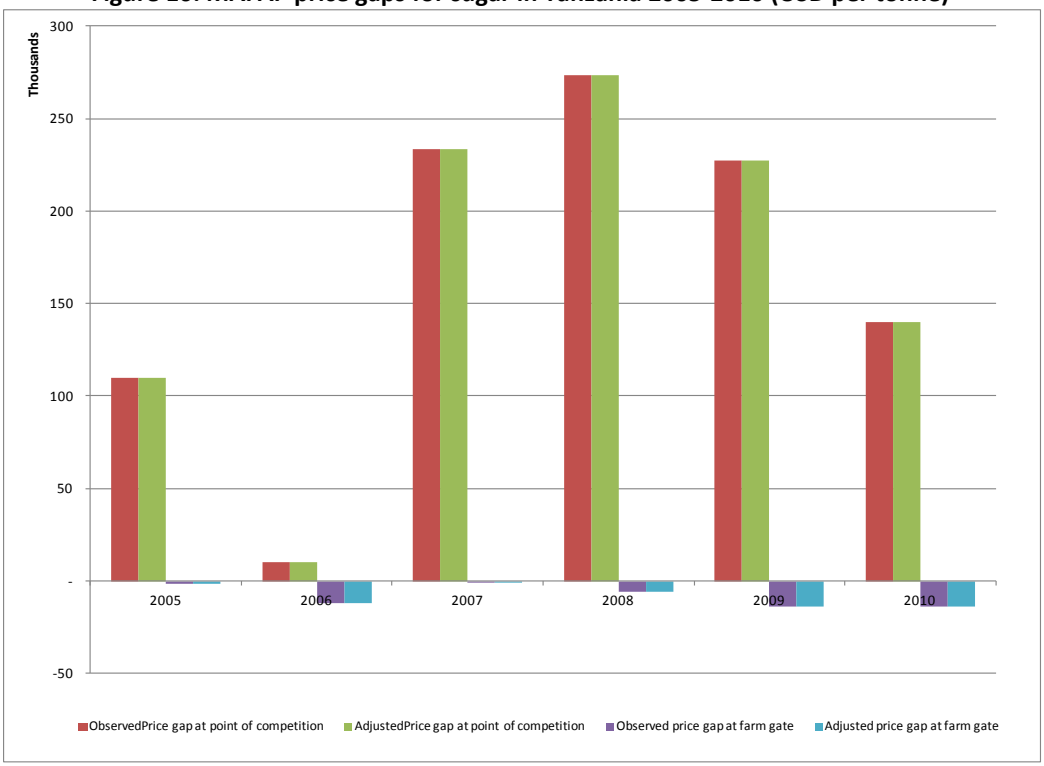
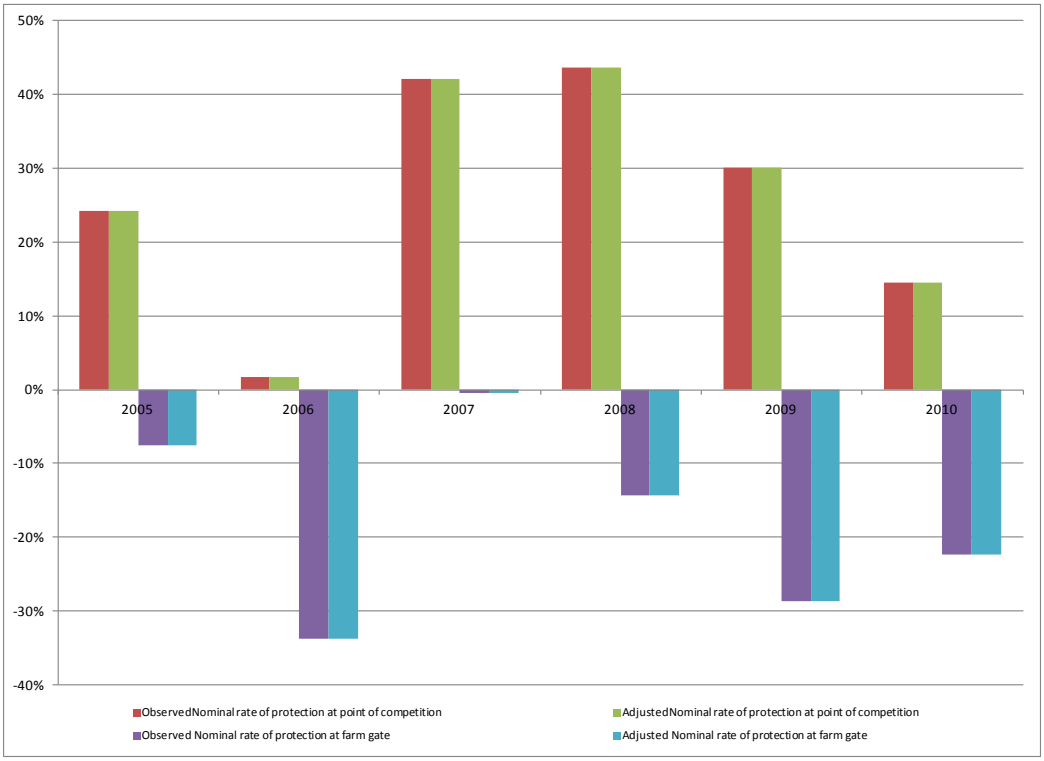


Table 12: MAFAP nominal rates of protection (NRP) for sugar (at point of competition) and raw sugar cane (at farm gate) in Tanzania 2005-2010 (%)

	2005	2006	2007	2008	2009	2010
Trade status for the year	**x**	**x**	**x**	**x**	**x**	**x**
Observed Nominal rate of protection at point of competition	24.3%	1.7%	42.2%	43.6%	30.1%	14.5%
Adjusted Nominal rate of protection at point of competition	24.3%	1.7%	42.2%	43.6%	30.1%	14.5%
Observed Nominal rate of protection at farm gate	-7.5%	-33.8%	-0.4%	-14.4%	-28.6%	-22.3%
Adjusted Nominal rate of protection at farm gate	-7.5%	-33.8%	-0.4%	-14.4%	-28.6%	-22.3%

Source: Own calculations using data as described above

Figure 17: MAFAP nominal rates of protection for sugar in Tanzania 2005-2010 (%)



4. INTERPRETATION OF THE INDICATORS

As it can be seen, there is a diverging impact of policy and value chain inefficiencies in the sugar market for URT. While at the point of competition the border policy (i.e. 100% or 200 USD per tonne common external tariff) results in domestic prices being higher than reference prices, this situation changes drastically for sugar cane farmers who receive a price for their output significantly below than the reference price The level of protection at the wholesale level has been decreasing as of 2008 due to the exemptions for sugar imports, in particular in 2010 when the exception was granted for all types of sugar.

Compared to the actual taxes on sugar cane marketing at domestic level (around 120 TzSh per tonne of sugar cane), the disincentives are far greater than the taxation by local governments. Farmers face significant disincentives due to the either very high profits by the local sugar industry or higher processing costs. However we cannot identify which of these factors is pushing the disincentives to farmers. If it where the latter, investments in sugar mills would be necessary to lower processing costs and assure either lower domestic prices for consumers or higher farm gate prices for producers.

In 2007, the disincentives to farmers were lower due to the low domestic production of sugar which led to competition by mills for raw sugar production and important quantities of raw cane being exported and imported.

5. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

MAIN MESSAGE

Sugar consumers in URT are paying higher prices than those at the international level due to the tariff and other factors. Farmers however are not benefitting from this border protection; moreover they receive disincentives by the functioning of the value chain. Data was obtained from one of the sugar mills (Mtwiba) showing processing costs that are well above those considered in the study (50%) higher which would explain the high level of disincentives and relate them to a bad functioning of the sugar processing sector.

Changes in trade policy are reflected into the additional price that consumers need to pay for sugar in URT however disincentives to farmers seem to be disconnected from changes in trade policy.

PRELIMINARY RECOMMENDATIONS

In view of the high costs of sugar in URT and the low prices perceived by farmers for sugar cane the government should consider making the ad-hoc exemptions of the sugar import tariff stable. This would require that sugar is taken away of the Sensitive Items list of the EAC Common External Tariff.

If high sugar processing costs are confirmed for the rest of the factories, the sector should consider investing in upgrading the milling facilities.

LIMITATIONS

The major limitation for this study was lack of local sugar processing costs from factories. The Ministry of Agriculture through the Sugar Board of Tanzania collects data on sugarcane farm gate prices and wholesale prices only.

FURTHER INVESTIGATION AND RESEARCH

Obtain domestic data on sugar processing to disentangle the causes for disincentives to producers and provide better recommendations for policy modifications and value chain interventions.

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ANNEX I: Methodology Used

A guide to the methodology used by MAFAP can be downloaded from the MAFAP website or by clicking here.

ANNEX II: Data and calculations used in the analysis

DATA		Unit	Symbol	Year trade status	2005 m	2006 m	2007 m	2008 m	2009 m	2010 m	Notes
Benchmark Price											
	Observed	US$/TON	$P_{b(int\$)}$		327	387	361	429	466	564	CIF Price
	Adjusted	US$/TON	P_{ba}								
Exchange Rate											
	Observed	Tshs/US$	ER_o		1,129	1,252	1,245	1,196	1,320	1,409	
	Adjusted	Tshs/US$	ER_a								
Access costs border - point of competition											
	Observed	Tshs/TON	ACo_{wh}		83,139	105,214	103,950	113,651	137,662	169,754	
	Adjusted	Tshs/TON	ACa_{wh}								
Domestic price at point of competition		Tshs/TON	P_{dwh}		562,500	600,000	787,500	900,000	980,357	1,103,571	75% of retail price
Access costs point of competition - farm gate											
	Observed	Tshs/TON	ACo_{fg}		22,098	23,919	24,831	23,276	26,227	33,065	
	Adjusted	Tshs/TON	ACa_{fg}								
Farm gate price		Tshs/TON	P_{dfg}		21,433	23,242	30,439	33,717	35,042	49,217	SBT OG price
Externalities associated with production		Tshs/TON	E								
Budget and other product related transfers		Tshs/TON	BOT								From PE Analysis
Quantity conversion factor (border - point of competition)		Fraction	QT_{wh}								
Quality conversion factor (border - point of competition)		Fraction	QL_{wh}								
Quantity conversion factor (point of competition - farm gate)		Fraction	QT_{fg}		0.10	0.10	0.10	0.10	0.10	0.10	
Quality conversion factor (point of competition - farm gate)		Fraction	QL_{fg}								

CALCULATED PRICES		Unit	Symbol		2005	2006	2007	2008	2009	2010	Formula
Benchmark price in local currency											
	Observed	Tshs/TON	$P_{b(loc\$)}$		369,519.47	484,817.70	449,954.02	512,961.93	615,610.35	794,006.85	[1]*[2]
	Adjusted	Tshs/TON	$P_{b(loc\$)a}$		369,519.47	484,817.70	449,954.02	512,961.93	615,610.35	794,006.85	[1]*[2]
Reference Price at point of competition											
	Observed	Tshs/TON	RPo_{wh}		452,658.57	590,031.38	553,904.42	626,613.30	753,272.77	963,761.03	[9]+[3]
	Adjusted	Tshs/TON	RPa_{wh}		452,658.57	590,031.38	553,904.42	626,613.30	753,272.77	963,761.03	[10]+[3]
Reference Price at Farm Gate											
	Observed	Tshs/TON	RPo_{fg}		23,168.15	35,084.01	30,559.40	39,385.80	49,099.93	63,311.59	([11]*[QTfg])-[5]
	Adjusted	Tshs/TON	RPa_{fg}		23,168.15	35,084.01	30,559.40	39,385.80	49,099.93	63,311.59	([12]*[QTfg])-[5]
				effective tarif	0.30	0.02	0.52	0.53	0.37	0.18	

INDICATORS		Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
Price gap at point of competition										
	Observed	Tshs/TON	PGo_{wh}	109,841.43	9,968.62	233,595.58	273,386.70	227,084.37	139,810.39	[4]-[11]
	Adjusted	Tshs/TON	PGa_{wh}	109,841.43	9,968.62	233,595.58	273,386.70	227,084.37	139,810.39	[4]-[12]
Price gap at farm gate										
	Observed	Tshs/TON	PGo_{fg}	(1,735.36)	(11,842.00)	(120.55)	(5,669.25)	(14,057.89)	(14,094.38)	[6]-[13]
	Adjusted	Tshs/TON	PGa_{fg}	(1,735.36)	(11,842.00)	(120.55)	(5,669.25)	(14,057.89)	(14,094.38)	[6]-[14]
Nominal rate of protection at point of competition										
	Observed	%	$NRPo_{wh}$	24.27%	1.69%	42.17%	43.63%	30.15%	14.51%	[15]/[11]
	Adjusted	%	$NRPa_{wh}$	24.27%	1.69%	42.17%	43.63%	30.15%	14.51%	[16]/[12]
Nominal rate of protection at farm gate										
	Observed	%	$NRPo_{fg}$	-7.49%	-33.75%	-0.39%	-14.39%	-28.63%	-22.26%	[17]/[13]
	Adjusted	%	$NRPa_{fg}$	-7.49%	-33.75%	-0.39%	-14.39%	-28.63%	-22.26%	[18]/[14]
Nominal rate of assistance										
	Observed	%	NRAo	-7.49%	-33.75%	-0.39%	-14.39%	-28.63%	-22.26%	([17]+[8])/[13]
	Adjusted	%	NRAa	-7.49%	-33.75%	-0.39%	-14.39%	-28.63%	-22.26%	([18]+[8])/[14]

Decomposition of PWAfg	Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
International markets gap	Tshs/TON	IRG	-	-	-	-	-	-	-
Exchange policy gap	Tshs/TON	ERPG	-	-	-	-	-	-	-
Access costs gap to point of competition	Tshs/TON	ACG_{wh}	-	-	-	-	-	-	-
Access costs gap to farm gate	Tshs/TON	ACG_{fg}	-	-	-	-	-	-	-
Externality gap	Tshs/TON	EG	-	-	-	-	-	-	-

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