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Technical note: Analysis of price incentives and disincentives for rice in Kenya over the period 2005–2013

July 2014

Monitoring and Analysing Food and Agricultural Policies (MAFAP)

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CONTENTS

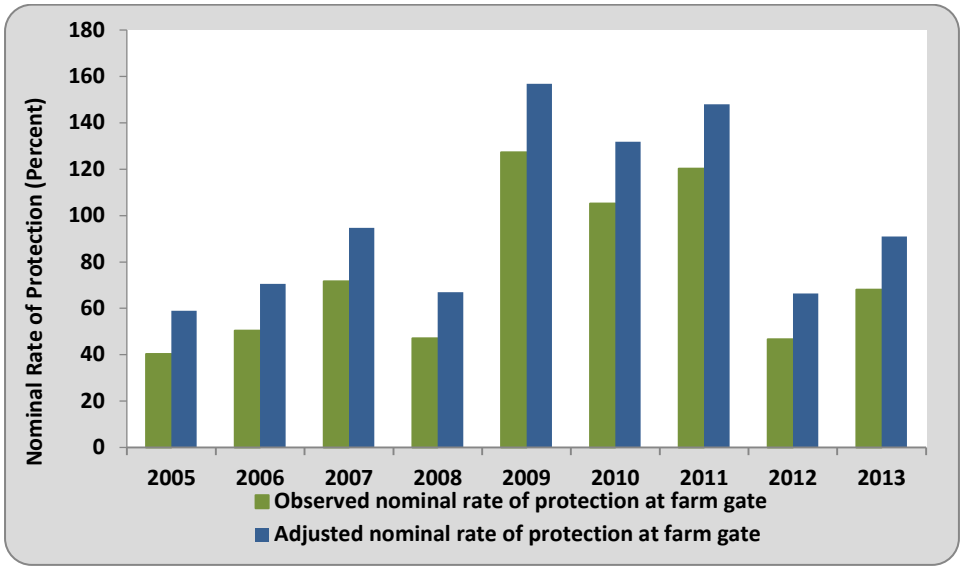
SUMMARY OF THE NOTE

Product: **Rice**
Period analyzed: **2005 – 2013**
Trade status: **Import in all years**

COMMODITY CONTEXT

- Rice is the third most important staple food in Kenya after maize and wheat. Historically, rice is a cash crop for rural producers.
- Rice consumption has been growing much more rapidly than production, at an average rate of 11 percent per year between 1963 and 2013. This rate appears to have slowed to 3 percent per year since 2005, but the country's import dependency ratio for the decade remains high, at 88 percent.
- Kenya imports nearly all of its rice from the East Asia, with Pakistan accounting for 74 percent of total rice imports during the period 2006-2013.
- Three main value chains can be identified within the Kenyan rice sector: the vertically integrated large farm chain, the highly concentrated chain on the National Irrigation Board (NIB) schemes and the traditional market value chain of the non-NIB irrigated production and rainfed producers.

Observed and Adjusted Nominal Rate of Protection at Farm Gate for Rice in Kenya, 2005-2013 (%)



- The observed Nominal Rate of Protection (NRP, green bar) in the graph above measures the effect of policy distortions and overall market performance on price incentives for producers. The adjusted NRP (blue bar) captures the same elements as the observed NRP in addition to any market distortions resulting from inefficiencies in the commodity's value.
  - Both indicators indicate that rice producers received significant price incentives throughout the period analyzed.
  - The producer incentives are due in part to the tariff on rice imports from countries outside the East African Community (EAC). However, supply shocks appear to be also a significant determinant of producer prices as during the period of 2009-2011.

- While the tariff regime as well as other factors such as the high cost of rice imports provided considerable protection to rice producers, the high prices of rice in Kenya ultimately affect consumers.
- The protection to rice producers through tariff may partly explain the recent expansion in rice production in Kenya. However, the lower tariff rate currently applied in Kenya compared to its neighbors is likely to encourage informal, cross-border trade. This may explain the continuous increase in rice imports despite the recent increase in production.

DRIVING FACTORS

- The variable ad-valorem tariff on rice imports from outside East African Community is in part one of the major driving factors of price incentives to producers. Initially, imports from Pakistan were subject to a preferential lower tariff but the tariff has been unified at 35 percent on all rice imports since mid- 2010.
- Production shocks resulting from droughts is important driving factor with significant impact on producer prices in rural markets. This is evident in the high rice prices during 2009-2011.
- The perceived consumer preference for the domestic rice tends to give a price premium to domestic rice, particularly the aromatic type.

RECOMMENDATIONS

- The Government of Kenya may consider promoting adoption of yield enhancing technologies as a means to reduce the average cost of production rather than increasing producer price of rice. This will increase rice profitability even when prices decline and maintain competitiveness of domestic rice production without the need for distorting trade policies such as tariffs. This requires increasing investment in research to develop new high yielding and water efficient rice varieties and improved agronomic practices.
- Given the reported cost of doing business in Kenya, the government may consider measures to reduce the excessive cost of importing resulting from the excessive documentation requirements and fees paid by importers. Such measures, not only reduce rice price paid by consumers, but also reduce the cost of imported inputs for farmers. This may encourage application of fertilizer and other imported inputs to improve productivity.

1. PURPOSE OF THE NOTE

This technical note measures, analyses and interprets price incentives for rice in Kenya over the period 2005-2013.

For this purpose, yearly averages of domestic 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 reference prices and domestic prices along the commodity's value chain indicate the extent to which incentives (positive gaps) or disincentives (negative gaps) were present at the farm gate and wholesale level. The price gaps are expressed in relative terms as a percentage of the reference price, referred to as the Nominal Rate of Protection (NRP). These key indicators are used by MAFAP to assess the effects of policy and market performance on prices.

This technical note begins with a review of the commodity's production, consumption/utilization, marketing and trade, value chain and policy context (Chapter 2). It also provides a detailed description of how key data elements were obtained and indicators were calculated (Chapter 3). The indicators were then interpreted in light of existing policies and market characteristics (Chapter 4), and key policy recommendations were formulated on the basis of this interpretation (Chapter 5). Finally, the note concludes with a few main messages, limitations of the analysis and areas identified for further research to improve the analysis (Chapter 6).

The results and recommendations presented in this analysis of price incentives can be used by stakeholders involved in policy-making for the food and agriculture sector. They can also serve as input for evidence-based policy dialogue at the national, regional or international level.

This technical note should not be interpreted as an in-depth value chain analysis or detailed description of the commodity's production, consumption/utilization, marketing and trade or policy context. 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.

All information in this technical note is subject to review and validation.

2. COMMODITY CONTEXT

Rice is the third most important staple food in Kenya after maize and wheat. Historically, rice is a cash crop for rural producers but rice consumption has been growing rapidly since 1960s. With consumption far exceeding production, Kenya's rice import bill is considerable. The annual national consumption is increasing at a rate of 12% as compared to 4% for wheat and 1% maize, which is the main staple food (Ministry of Agriculture, 2008). This is attributed to progressive change in eating habits. The national rice consumption is estimated at 300,000 metric tonnes compared to an annual production range of 45,000 to 80,000 metric tonnes (Ministry of Agriculture, 2008). Promotion of rice production will therefore improve food security, increase smallholder farmers' income contribute to employment creation in rural areas and reduce the rice import bill.

PRODUCTION

There are a number of different estimates for rice production and area in Kenya. The two most often cited are those of the Ministry of Agriculture (MOA) for all milled rice production and those of the National Irrigation Board (NIB) for paddy rice production on its irrigation schemes. Both are listed in Table 1, with the NIB production estimates converted at a rate of five tonnes of milled rice from eight tonnes of paddy (rough or unmilled rice).

The MOA estimates for rice production and area should be larger than the NIB estimates because they include non-NIB irrigated production and production on lowland and highland rainfed rice fields. Non-NIB irrigated production includes private rice irrigation enterprises and small-scale irrigation schemes established by other agencies, such as the Lake Basin Development Authority. It also includes production from Dominion Farms Ltd. (DFL), a new, large-scale, vertically integrated farm with about 7 000 ha of irrigable land in the Yala Swamp region near Lake Victoria[1]. This is a very different value chain from that on the NIB schemes.

Table 1: Milled Rice Production, Area and Yield in Kenya, 2005-2013

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total										
Production	Tonne	57,942	64,840	47,256	21,881	42,202	85,536	111,229	122,465	146,696
Area	Ha	15,940	23,106	16,457	16,734	21,829	20,181	28,031	25,197	28,000
Yield	T/ha	3.6	2.8	2.9	1.3	1.9	4.2	4.0	4.9	5.2
NIB Schemes										
Production	Tonne	39,173	39,366	33,196	25,041	24,179	47,125	52,159	54,322	58,812
Area	Ha	10,832	12,501	9,626	9,092	10,072	17,611	21,101	21,872	21,313
Yield	T/ha	3.6	3.1	3.4	2.8	2.3	2.6	2.5	2.5	2.8

Source: Total rice data are from MOA, ERA 2010 Table 5.7 for 2005-2010 and 2010 and 2013 production from the MOA CountryStat website; NIB Schemes data are from KNBS, SA Table 67 and ES Table 8.18.

[1] This is equivalent to about 67% of the average amount of irrigated land on the NIB schemes between 2005 and 2010. However, it seems likely that only about 1,000 ha were developed for irrigation by 2010. See Annex III for additional details.

It seems likely that rain-fed value chains are also quite different from the NIB scheme value chains. Emongór et al. (2010) report that the price for rain-fed lowland rice was only 56 percent of the price for NIB scheme rice in 2009. This could be because they produce a different rice variety while Kenyans prefer the aromatic basmati rice grown on the schemes.

Chemonics Inc. (2010) and Gitau et al. (2010) estimate that about 95 percent of rice production comes from the NIB irrigation schemes. This has likely been typical in the past, but the data in Table 1 indicates that the NIB schemes produced, on average, only 62 percent of production between 2005 and 2013 from 67 percent of the acreage. However, there are obvious uncertainties due to the apparent inconsistency of these two data sources in 2008 and 2010. Extremely low production reported by the MOA for calendar year 2008 could be masked in the NIB production data reported by crop year, while the MOA's 2010 estimate for total production may be revised upwards. Based on the data from MOA, rice production has increased significantly since 2010 reaching 147,000 tonnes by 2013 (Table 1).

There are four NIB schemes currently producing rice including Mwea in central Kenya and Ahero, Bunyala and West Kano in Western Kenya. Mwea is by far the largest, accounting for 78 percent of the irrigated area, 88 percent of production and 98 percent of the gross value of output between 2005 and 2013, according to NIB data.

Ruigi (1998) provides a description of the history of the rice schemes in Kenya and their management. The Mwea Scheme began in the mid-1950s as a means to provide livelihoods for landless and unemployed Africans by former Mau Mau detainees[2]. The schemes adopted a paternalistic command and control management system with extensive powers vested in the Scheme Administration. Plot holders did not and still do not own their land but are tenants with a renewable annual lease. The lease is heritable, but plot-holders may lose their rights if they did not manage their plots as required by the scheme administrators. Plot holders were required to follow administration directions on rice cultivation, had to market their paddy through the NIB milling plant, and could only raise other crops or livestock subject to administration approval. Mwea plot holders also had to make an annual rent or service payment, which went to cover NIB administration expenses and losses incurred on the other NIB schemes.

Long-term trends on rice production, area and yield on the NIB schemes are illustrated in **Figure 1** for the period 1993-2013. While area is more stable with limited tendency to expand over the period, yield and production are highly variable. All three show little change, and neither a trend up or down, between 1993 and 1998 despite the implementation of a large Japanese project in support of improved rice production on the Mwea scheme during most of this period. However, production appear to expand between 1993 and 2013, albeit with two large down cycles: one in 1999/2000 and the other between 2007 and 2009.

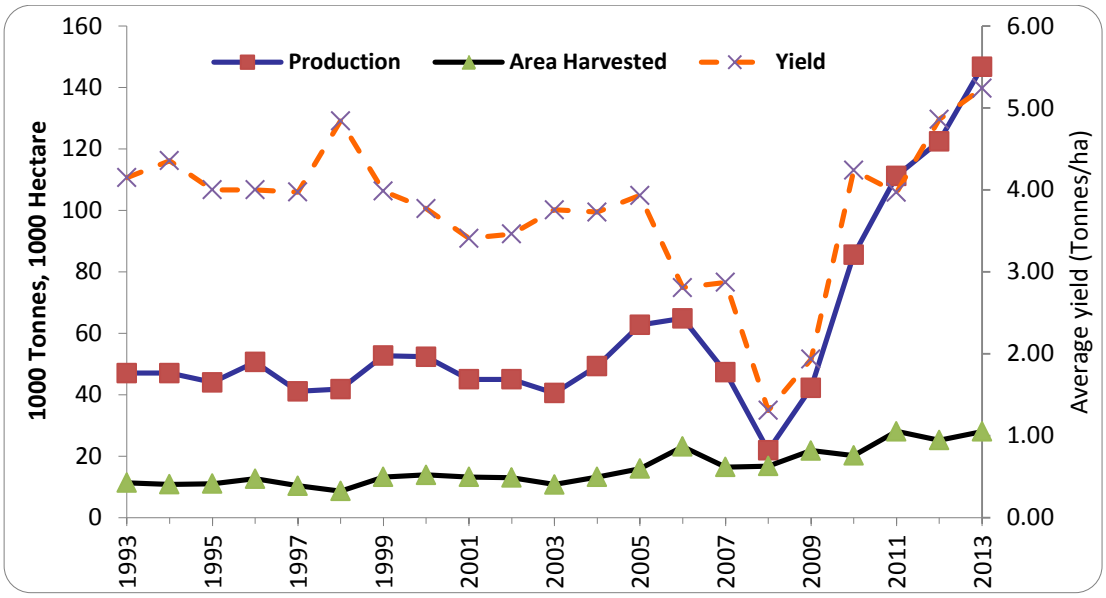
The fall in production and yields in 1999-2003 may have in part been related to a particularly widespread drought in that period, but it is more directly related to a rebellion on the part of plot holders on Mwea Irrigation Scheme in 1998. This led to a collapse of production on the other schemes also because the NIB had been cross-subsidizing their operations with revenues from the

[2] The Mau Mau was the name given to freedom fighters during the colonial era.

Mwea scheme up to this point. It also provoked a crisis at the NIB itself because it was too dependent on excess revenue from the Mwea scheme.

The fall in production in 2007-2009 likely has several causes. The spike in world commodity prices in 2007-2008 may have affected costs and availability of fertilizers needed to maintain rice yields. In

Figure 1: Milled Rice Production, Area and Yield on Government Irrigation Schemes, 1993-2013



Source: FAOSTAT (2014)

2008 and 2009, production was also affected by the civil disturbances that followed the December 2007 election and the subsequent droughts[3].

The Mwea Rice Farmer's Cooperative Society (MRFCS) managed the scheme until 2003. The NIB was restructured in 2002 to adapt to the government policy on liberalization. In 2003, an agreement between the NIB and water users associations resulted in a new joint management system. Producers maintained their greater ability to make production and marketing decisions, but they still do not own their plots and still pay a rent, which in 2009 was about KES 62,000/ha (USD 800/ha)[4]. Between 2003 and 2005, the rehabilitation of the other schemes with FAO support enabled them to resume production.

The overall upward trend in yield and production since 1999 is likely related to the liberalization of the production controls that prevailed before 1999 as well as reduced market access costs for producers, but is also related to better milled rice prices further up the value chain. Despite this upward in trends, rice yields in Kenya are quite variable over time. With the limited crop area of 28,000 ha, Kenya is still largely dependent on rice imports to meet the increasing demand for rice.

[3] In the case of maize, the civil disturbances resulted in the destruction of 0.3 million tonnes according to African Centre for Open Governance and a 20 percent reduction in the area planted during long rains in 2008 (World Bank 2009). Rice production too may have been similarly affected.

[4] This is based upon the Mwea Development Guide 2009 quoted in Gitau et al. (2010). The NIB web site indicates that NIB received only about 4,900 Ksh/ha for their services from farmers in 2008. The difference could be absorbed by the water users associations.

CONSUMPTION/UTILIZATION

Consumption patterns of rice in Kenya are likely to have been evolving over time. For example, Mwea rice farmers in the 1980s used to sell most of the rice and relied on maize and beans they grew off the scheme for their own consumption (Ruigi, 1998). In effect, rice was a cash crop mainly consumed by people in urban areas at the time. Currently, rice is the third most important food staple in Kenya after maize and wheat. The consumer price index (CPI) expenditure weights for rice indicate its relative importance for different groups of consumers. For low income consumers in Nairobi, rice accounts for 3.9 percent of food expenditure compared to 11.5 percent and 10.7 percent for maize and wheat, respectively. Expenditure on rice is 4.8 percent of food expenditure in other urban areas compared to 13.5 percent for maize and 9.7 percent for wheat (Gitau, et al., 2010).

In Kenya rice consumers prefer the aromatic basmati rice which also has superior cooking qualities compared to the other local and imported varieties. (Ministry of Agriculture, 2008). A preference for basmati rice may have been developed among other Kenyans over the years also because a large part of the rice available in Kenya is basmati. Considering that basmati rice is relatively high value rice, it seems likely that low income Kenyans may prefer less expensive imported rice.

Table 2 shows milled rice production, trade and apparent consumption for the period 2005-2013. Rice consumption has been growing much more rapidly than production throughout the nearly 50 years since independence. Consumption has grown at an average rate of 11 percent per year since 1960. As a result, imports have increased rapidly and the dependency ratio has climbed higher in most decades since 1960: averaging 23 percent in the 1960s, 15 percent in the 1970s, 53 percent in the 1980s and 88 percent in the 1990s. The growth in consumption appears to have slowed to 3 percent per year since 2005, but the dependency ratio for the decade remains at 88 percent.

Table 2: Milled Rice Production, Trade and Apparent Consumption (Tonnes) in Kenya, 2005-2013

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Production	57,942	64,840	47,256	21,881	42,202	45,313	72,299	82,159	95,317
Imports	228,206	232,305	261,712	299,070	308,158	398,000	408,771	417,535	500,258
Exports	n.a.	801	597	1,481	2,310	1,640	11,945	11,845	6,419
Apparent consumption	279,800	296,344	308,371	319,470	348,050	383,000	520,000	577,600	646,900
Import dependency ratio	80%	78%	85%	93%	87%	86%	79%	72%	77%

Source: Imports: MOA ERA 2010 for production 2005-10 & 2011 - 2013 and consumption in 2005 2011-2013; SA Table 46 for 2005 exports (likely HS 100620,100630, 100640), GTA for imports and exports 2006 - 10 (HS 1006).

MARKETING AND TRADE

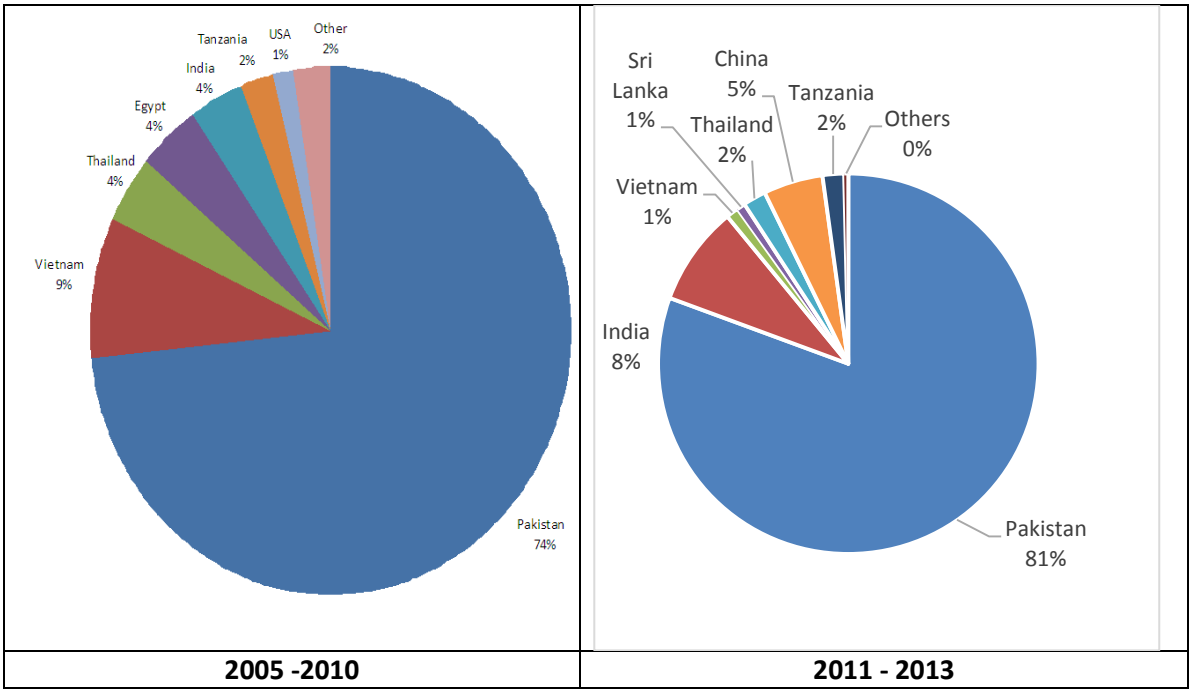
Domestic rice is marketed at two stages: the paddy and milled rice. Generally, the paddy marketing is controlled by brokers and/middlemen who control over 65 percent of market share, followed by private millers with around 20 Percent, and farmers' cooperatives with about 10 percent market share (Emongór et al., 2010). The NIB has not been very active lately and receives less than 5 percent of paddy marketed. Most of the brokers and/ middlemen (> than 20%) store the milled rice temporarily and later sell it to the local retailers and outside agents for higher profit margins. The same case applies to rice bought by the private millers.

Kenya is a net importer of rice. Rice imports between 2005 and 2013 have been growing significantly doubling from 228,000 tonnes in 2005 to over 500,000 tonnes by 2013 (Table 2). Kenya's imports are dominated by rice from Pakistan, which accounts for over 74 percent of rice imports over this period, as shown in Figure **2**. Vietnam is the second largest source of imports in this period with a 7 percent share, while Thailand, India and Egypt have each a 4 percent share. However, between 2011 and 2013, Pakistan widened the lead to 84 percent, followed by India as a distant second at 8 percent and third China at 5 percent (Figure 2).

The dominance of Pakistan in all years between 2006 and 2013 may be the result of the tariff regime. Under the East African Community (EAC) common external tariff (CET) agreement, Kenya was to increase its external tariff to a 75 percent ad valorem duty or USD 200/tonne, whichever is greater. However, Kenya has obtained an exemption for rice imports from Pakistan throughout the period. A tariff of 35 percent has been charged on imports from Pakistan and reduced further to 25 per cent between July 2007 and July 2009. The 35 percent tariff rate was extended to all rice exporters who were facing the higher CET in July 2010 (Vitale, Morrison and Sharma, 2013). USDA (2010) argues that the increase in tariffs has resulted in higher consumer prices and slower growth in rice consumption since 2003. Certainly it may have been a factor, but the favorable treatment accorded to rice from Pakistan would seem to weaken this treatment somewhat, while the surge in rice prices in global markets in 2007-2008 and relatively high prices since that are likely equally important.

Despite its substantial imports, small quantities of rice are exported or re-exported to neighboring countries (Table 2). There may also be other rice exports through the informal cross-border trade. The lower tariff on rice imports in Kenya compared to neighboring countries may have encouraged this trade.

Figure 2: Rice Imports by Source, 2005-2013



Source: Compiled from data from the Global Trade Atlas (GTA) (2014)

DESCRIPTION OF THE VALUE CHAIN

The three main rice market chains within the Kenyan rice sector are shown in Figure 3. The vertically integrated Dominion Firms Ltd (DFL)/Dominion Mills chain is shown on the left, while the Non-National Irrigation Board (NIB) irrigated and rain-fed chain is shown on the right. The NIB, shown in the middle, is the major producer of rice in Kenya producing about 62 percent of production, on average. This value chain is originated in the NIB irrigation scheme. The major difference between the three chains is with respect to milling services.

The NIB and the Mwea Rice Farmer's Cooperative Society jointly own Mwea Rice Mills Ltd. (MRML), which has four mills on the Mwea irrigation settlement. Milled rice from MRML is sold to supermarkets and the National Cereals and Produce Board (NCPB) under their Nafaka brand**.** There is a similar arrangement in Western Kenya where Western Kenya Rice Mills (WKRM) Ltd. is jointly owned by NIB and the farmers of the Ahero, Bunyala and West Kano schemes through their respective co-operative societies.

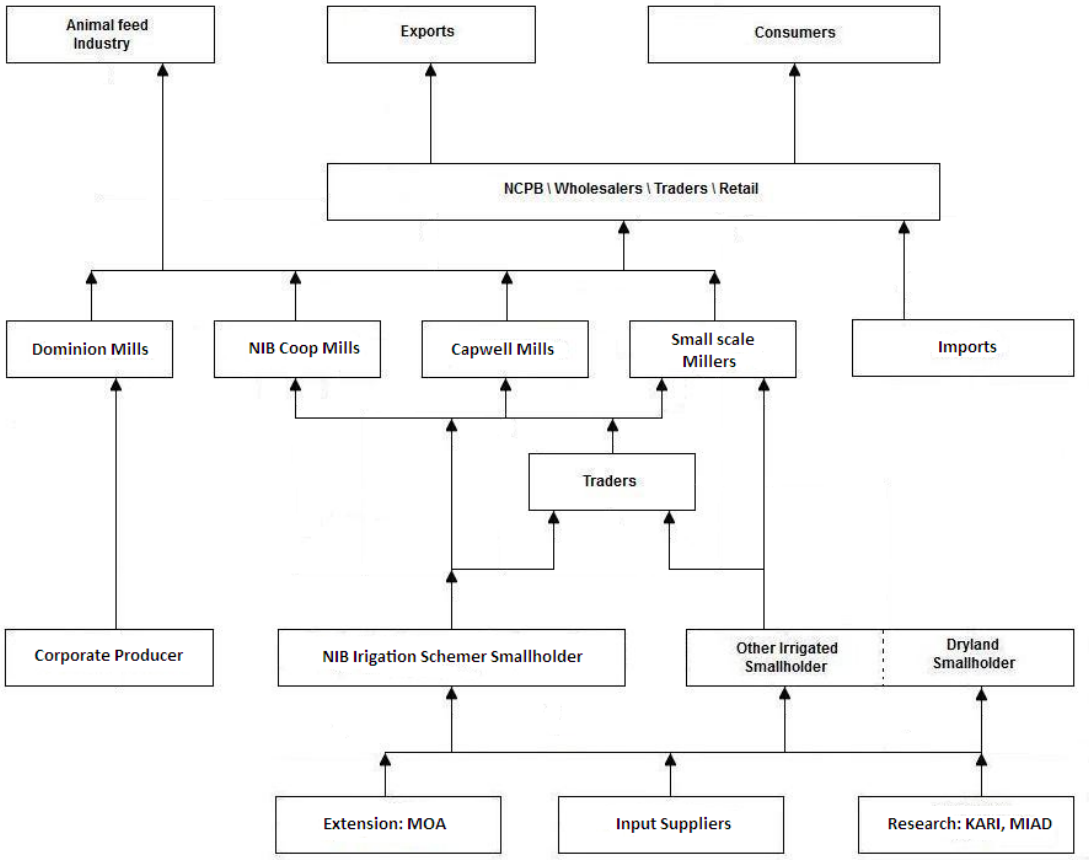
Farmers on the NIB irrigation schemes are now free to market their own rice and there are a large number of traders and small scale rice millers that form a local wholesale market. According to Gitau et al. (2010), the introduction of diesel powered mills has increased the number of options in the milling industry. This rice may be sold as generic rice or find its way into a branded product line. Chemonics Inc. (2010) indicates that a large share of Mwea rice was milled by a single large scale private sector miller and marketed under its brand name. Other irrigated rice and rainfed rice is likely mostly marketed through traders and smaller mills as generic rice[5].

[5] Low income consumers in rural areas might be more likely to consume generic rice sold rather than the one of the branded packages.

The NIB chain shares features of both other two chains. Like the DFL/Dominion Farm chain, it produces high quality rice most of which is processed in its own mills and sold as branded rice, in this case through the National Cereals and Produce Board (NCPB). The location of the Mwea scheme gives the NIB chain an advantage in terms of market access. Mwea is only about 100 km northeast of the principle market, Nairobi. DFL, in contrast, is over 350 km west of Nairobi and over 800 km from Mombasa.

Like the Non-NIB irrigated and rain-fed chain, rice from the NIB schemes may also be sold through traders and/or small scale millers and sold as generic rice. A significant portion of rice from both NIB chain and the Non-NIB irrigated and rain-fed chain may be consumed on farm but Ruigi (1998) indicates that most rice farmers in the 1980s sold most rice they produced and relied on maize and beans produced on non-irrigated land for subsistence.

Figure 3: Simplified Rice Value Chain for Kenya



Source: Ministry of Agriculture (2008)

POLICY DECISIONS AND MEASURES

The Ministry of Agriculture has been involved and affected by the various reforms and plans of the Government over the years. These reforms such as Poverty Reduction Strategy Paper (PRSP), Economic Recovery Strategy (ERS), Agriculture Sector Development Strategy (ASDS) and Vision 2030 are mainly geared to ensuring food security, food self-sufficiency and poverty reduction of the people of Kenya (Ministry of Agriculture, 2008).

In the past rice was not considered a strategic crop for food security. However, its production has been supported through the existing Government policy documents on food security, such as ASDS, and vision 2030. With consumption continuously outstripping production and In response to the 2007-2008 spikes in global commodity markets, the MOA released in 2008 its long-term strategy to become self-sufficient in rice by 2030 ("National Rice Development Strategy 2008-2018").

Kenya has followed the same policy goals for rice that it followed for the other two major staple crops (maize and wheat). Kenya's long-term goal is self-sufficiency for all three staples. Based upon policy decisions, price stability is another important objective, although it has been perhaps less clearly enunciated and more of a short-term issue. The overall goal of NRDS is to improve food security and income of Kenyans through sustainable rice production, marketing and utilization. The overall objective is to double rice production in both rains fed and irrigated conditions by 2018 through:

- Expansion of area under rainfed and irrigated rice.
- Reduction in field and storage losses of rice.
- Improved farmer's access to credit and to high quality inputs.
- Improved farmers' access to certified rice seed.
- Provision of advisory extension support services.
- Provision of effective monitoring and evaluation (M&E) system, and,
- Strengthened human resource development.

The self-sufficiency goal for rice has been pursued as well through various projects to maintain and expand irrigated production. However, the various schemes are supposed to operate on a cost recovery basis. Kenya has long maintained that it has up to 540,000 ha of land that could be irrigated, although less than 10 percent of this area is currently irrigated[6]. Various proposals have been put forward over the years for irrigating different areas, but were challenged because of their high cost and low benefit cost ratios. Because of the on-going lack of profitability with the smaller NIB schemes in western Kenya, there has been a reluctance to engage in large-scale irrigation projects in Kenya.

The NRDS strategy stresses the importance of extension research and a strong seed dissemination system to achieve its objective. It also indicates the need for rehabilitation and expansion of existing irrigation schemes. The NIB's Long-Term Irrigation Plan produced in 2008 proposes expanding the area irrigated on existing rice-producing schemes from about 8,000 ha to 20,000 ha and an additional 24,000 ha irrigated on new schemes.

This type of strategy requires donor support and some of it is turning up. The World Bank began a new Natural Resource Management Project in 2007 with an important irrigation component. JICA has agreed to new project to expand irrigation on the Mwea Irrigation Scheme. The Coalition for African Rice Development (CARD) is a group of bilateral and multilateral donors and African/international institutions established May 2008 with the aim of doubling the African rice production in ten years. These are just two of the 17 projects in Kenya that CARD lists with a rice component.

[6] According to MOA, the area irrigated could be increased further to 1.3 million ha with innovative management technologies.

The strategy also requires GOK support and it appeared in the 2009/10 budget within the Economic Stimulus Program. It included a project to promote rice production through rehabilitation and expansion in the area irrigated. The total cost of this package in fiscal 2009/2010 was 2.3 bKsh. Most of this is on rehabilitation and expansion of infrastructure but it includes 71.2 mKsh in farmer input subsidies. The budget allocation for 2010/11 was an additional 1.8 bKsh.

In the 2011 budget speech, the Minister of Finance announced "an irrigation expansion program intended to gradually cover the 1.7 million acres of potential irrigable land in order to transform the country into a food secured and net exporter of food." The budget included 8.6 bKsh for the National Irrigation Board for various irrigation projects countrywide, 1.2 bKsh the Ministry of Regional Development to initiate a large irrigation project in Nyanza, and 0.4 bKsh for the Ministry of Water and Irrigation for small scale irrigation projects.

Trade policy has been a major means of achieving both objectives. Rice is one of the sensitive products under the Common External Tariff (CET) of the Eastern Africa Community (EAC). The CET rates for rice is a compound tariff of ad valorem rate of 75 percent or US$200/ tonne, whichever is higher. However, the desire on the part of Kenya, since the inception of the CET, is to provide Pakistan better market access to its rice market, in return for better access for Kenyan tea. A tariff of 35 percent has been charged on imports from Pakistan and reduced further to 25 per cent between July 2007 and July 2009. Kenya continued to apply the CET rate to rice imports from other countries until mid-2010 when the 35 per cent was extended to all rice exporters (Vitale, Morrison and Sharma, 2013). A paper from KIPPRA (2010) takes a regional perspective and places trade policy as an important parameter in the determination of food prices in the region. It points to potential difficulties arising from the disparities in the application of tariffs on sensitive products, which, together with exemptions and duty remission schemes, lead to price disparities in the region and encourage anti-competitive practices such as hoarding and smuggling.

3. METHODOLOGY

MAFAP methodology seeks to measure price incentives for producers and other marketing agents in key agricultural value chains. The analysis is based on the comparison between observed domestic prices and constructed reference prices. Reference prices are calculated from the international price of the product at the country's border, where the product enters the country (if imported) or exits the country (if exported). This price is considered the benchmark price free of influence from domestic policies and markets. MAFAP estimates two types of reference prices – observed and adjusted. *Observed reference prices* are those that producers and other marketing agents could receive if the effects of distortions from domestic market and trade policies, as well as overall market performance, were removed. *Adjusted reference prices* are the same as observed reference prices, but also exclude the effects of any additional distortions from domestic exchange rate policies, structural inefficiencies in the commodity's value chain, and imperfect functioning and non-competitive pricing in international markets.

MAFAP's price incentives analysis is based on the law of one price, which is the economic theory that there is only one prevailing price for each product in a perfectly competitive market. This law only applies in the case of homogeneous goods, if information is correct and free, and if transaction costs are zero. Thus, this analysis was conducted for goods that are either perfectly homogeneous or perfect substitutes in the local market in terms of quality, or, failing that, are simply comparable goods. Indicators calculated from reference and domestic prices will, therefore, reveal whether domestic prices represent support (incentives) or a tax (disincentives) to various agents in the value chain.

Domestic prices are compared to reference prices at two specific locations along commodity value chains – the farm gate (usually the main production area for the product) and the point of competition (usually the main wholesale market where the domestic product competes with the internationally traded product). The approach for comparing prices at each location is summarized below, using an imported commodity as an example. In this situation, the country is importing a commodity that arrives in the port at the benchmark price (usually the unit value CIF price at the port of entry). In the domestic market, we observe the price of the same commodity at the point of competition, which is in this case the wholesale market, and at the farm gate. We also have information on observed access costs, which are all the costs associated with bringing the commodity to market, such as costs for processing, storage, handling, transport and the different margins applied by marketing agents in the value chain. These include access costs between the border and wholesale, as well as between the farm gate and wholesale.

The benchmark price is made comparable to the domestic price at wholesale by adding the access costs between the border and wholesale, resulting in the observed reference price at wholesale. This takes into account all the costs incurred by importers and other agents to bring the commodity to market, which in effect, raises the price of the commodity. The reference price at wholesale is further made comparable to the domestic price at the farm gate by deducting the access costs between the farm gate and wholesale, resulting in the observed reference price at farm gate. This takes into account all the costs incurred by farmers and other agents to bring the commodity from the farm to the wholesale market. Mathematically, the equations for calculating the observed

reference prices at wholesale (RP_{owh}) and farm gate $\left(RP_{ofg}\right)$ for an imported commodity are as follows:

$$RP_{owh} = P_b + AC_{owh}$$

$$RP_{ofg} = RP_{owh} - AC_{ofg}$$

where AC_{owh} are the observed access costs from the border to wholesale, including handling costs at the border, transport costs from the border to the wholesale market, profit margins and all observed taxes and levies, except tariffs, and P_b is the benchmark price. AC_{ofg} are the observed access costs from the farm gate to wholesale, including handling costs at the farm, transport costs from farm to wholesale market, processing, profit margins and all observed taxes and levies.

The same steps described above can be taken a second time using benchmark prices and access costs that have been adjusted to eliminate market distortions due to exchange rate misalignments, structural inefficiencies in the commodity's value chain[7] and imperfect functioning and non-competitive pricing in international markets, where possible and relevant. The adjusted benchmark prices and access costs are then used to generate a second set of *adjusted* reference prices, in addition to the first set of *observed* reference prices calculated.

For exported commodities, a slightly different approach is used. In this case, the border is generally considered the point of competition (wholesale), and the unit value FOB price for the commodity is normally taken as the benchmark price. Furthermore, observed and adjusted reference prices at wholesale are obtained by subtracting, rather than adding, the access costs between the border and wholesale. Mathematically, the equations for calculating the observed reference prices at wholesale (RP_{owh}) and farm gate $\left(RP_{ofg}\right)$ for an exported commodity are as follows:

$$RP_{owh} = P_b - AC_{owh}$$

$$RP_{ofg} = RP_{owh} - AC_{ofg}$$

After observed and adjusted reference prices are calculated for the commodity, they are subtracted from the domestic prices at each point in the value chain to obtain the observed and adjusted price gaps at wholesale and farm gate. *Observed price gaps* capture the effect of distortions from trade and market policies directly influencing the price of the commodity in domestic markets (e.g. price ceilings and tariffs), as well as overall market performance. *Adjusted price gaps* capture the same as the observed, in addition to the effect of any distortions from domestic exchange rate policies, structural inefficiencies in the commodity's value chain, and imperfect functioning and non-competitive pricing in international markets. Mathematically, the equations for calculating the observed price gaps at wholesale (PG_{owh}) and farm gate $\left(PG_{ofg}\right)$ are as follows:

$$PG_{owh} = P_{wh} - RP_{owh}$$

$$PG_{ofg} = P_{fg} - RP_{ofg}$$

[7] Structural inefficiencies in commodity value chains may include government taxes and fees (excluding fees for services), high transportation and processing costs, high profit margins captured by various marketing agents, bribes and other non-tariff barriers.

where P_{fg} is the domestic price at farm gate, RP_{ofg} is the observed reference price at farm gate, P_{wh} is the domestic price at wholesale, and RP_{owh} is the observed reference price at wholesale.

A positive price gap, resulting when the domestic price exceeds the reference price, means that the policy environment and market functioning as a whole generate incentives (support) to producers or wholesalers. For an imported commodity this could be due to distortions such as the existence of an import tariff. On the other hand, if the reference price exceeds the domestic price, resulting in a negative price gap, this means that the policy environment and market functioning as a whole generate disincentives (taxes) to producers or wholesalers. For an imported commodity this could be due to distortions such as a price ceiling established by the government to keep domestic prices low.

In general, price gaps provide an absolute measure of the market price incentives (or disincentives) that producers and wholesalers face. Therefore, price gaps at wholesale and farm gate are divided by their corresponding reference price and expressed as a ratio, referred to as the ***Nominal Rate of Protection (NRP)***, which can be compared between years, commodities, and countries.

The *Observed Nominal Rates of Protection* at the farm gate (NRP_{ofg}) and wholesale (NRP_{owh}) are defined by the following equations:

$$NRP_{ofg} = \frac{PG_{ofg}}{RP_{ofg}} \; ; \; NRP_{owh} = \frac{PG_{owh}}{RP_{owh}}$$

where PG_{ofg} is the observed price gap at farm gate, RP_{ofg} is the observed reference price at the farm gate, $PG_{owh}$is the observed price gap at wholesale and RP_{owh} is the observed reference price at wholesale.

Similarly, the *Adjusted Nominal Rates of Protection* at the farm gate (NRP_{afg}) and wholesale (NRP_{awh}) are defined by the following equations:

$$NRP_{afg} = \frac{PG_{afg}}{RP_{afg}} \; ; \; NRP_{awh} = \frac{PG_{awh}}{RP_{awh}}$$

where PG_{afg} is the adjusted price gap at farm gate, RP_{afg} is the adjusted reference price at the farm gate, $PG_{awh}$is the adjusted price gap at wholesale and RP_{awh} is the adjusted reference price at wholesale.

If public expenditure allocated to the commodity is added to the price gap at farm gate when calculating the ratios, the ***Nominal Rate of Assistance (NRA)*** is generated. This indicator summarizes the incentives (or disincentives) due to policies, market performance and public expenditure.[8] Mathematically, the Nominal Rate of Assistance is defined by the following equation:

$$NRA = \frac{PG_{afg} + PE_{csp}}{RF_{afg}}$$

[8] The NRA indicator was not calculated for any of the commodities analyzed because of insufficient data on public expenditure. However, it will be developed in the forthcoming reports, as the public expenditure analysis is improved and better data are made available.

where PE_{csp} is commodity-specific public expenditure that has been identified and measured as monetary units per tonne.

Finally, MAFAP methodology estimates the ***Market Development Gap (MDG),*** which is the portion of the price gap that can be attributed to "excessive" or inefficient access costs within a given value chain, exchange rate misalignments, and imperfect functioning of international markets. "Excessive" access costs may result from factors such as poor infrastructure, high processing costs due to obsolete technology, government taxes and fees (excluding fees for services), high profit margins captured by various marketing agents, bribes and other non-tariff barriers. Therefore, the total MDG at farm gate is comprised of three components – gaps due to "excessive" access costs, the exchange rate policy gap and the international market gap. When added together, these components are equivalent to the difference between the observed and adjusted price gaps at farm gate.

Similar to the price gaps calculated, the MDG is an absolute measure, which is also expressed as a ratio to allow for comparison between years, commodities, and countries. This relative indicator of the total MDG affecting farmers is derived by calculating the ratio between the total MDG at farm gate and the adjusted reference price at farm gate as follows:

$$MDG_{fg} = \frac{(ACG_{wh}+ACG_{fg}+EXPG+IMG)}{RP_{afg}}$$

where ACG_{wh} is the access cost gap at wholesale defined as the difference between observed and adjusted access costs at wholesale, ACG_{fg} is the access cost gap at farm gate defined as the difference between observed and adjusted access costs at the farm gate, ERPG is the exchange rate policy gap, and IMG is the international market gap.

A more detailed description of the methodology applied in this analysis is available on MAFAP's website at : **www.fao.org/in-action/mafap**.

4. DATA REQUIREMENTS AND CALCULATION OF INDICATORS

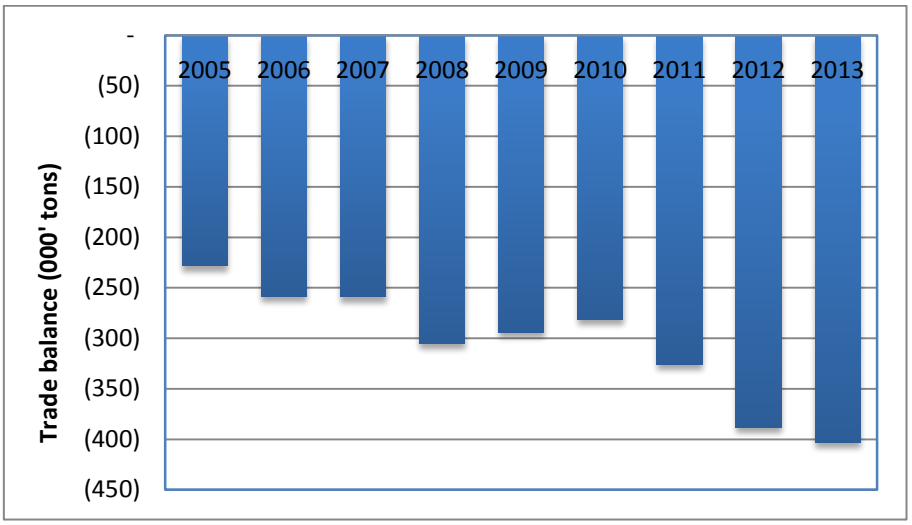
To calculate the indicators needed to estimate market price incentives or disincentives for rice farmers in Kenya (NRP) as well as the Market Development Gaps (MDGs), several types of data are needed. They were collected and are presented and explained hereafter.

This analysis is carried out at two levels: unmilled rice usually marketed by producers and milled rice usually imported and marketed at the wholesale and retail levels. For lack of data, the analysis cannot be disaggregated by type of rice, e.g., aromatic versus non-aromatic and irrigated versus upland. All available price data is expressed as averages for all rice.

TRADE STATUS OF THE PRODUCT

As mentioned above, Kenya has long been a net rice importer and there were substantial volumes of rice imported throughout the 2005-2013 period. Consequently, the rice trade balance during this period is negative and increasing over time (Figure 4) estimated from trade data obtained from GTA (2014).

Figure 4: Trade status for Rice in Kenya



Source: computed from data from GTA (2014).

MARKET PATHWAY ANALYSED

As shown in Figure 3, there are three main rice market chains within the Kenyan rice sector. While the corporate value chain is vertically integrated, the NIB and non-NIB are similar in terms of the flow of rice from producers to consumers. Moreover, most of rice produced in Kenya is coming from the NIB chain. As such, the analysis here focuses on the two smallholder value chains which cover NIB irrigated smallholder producers, other irrigated smallholder producers and dryland smallholder producers as presented in Figure 3. The analysis here is based on national average producer prices and marketing costs in this value chain. Rice produced from these systems may be sold as unmilled rice through traders and/or small scale millers or custom-milled by farmers and sold as generic or branded rice at the wholesale/retail markets. The point of competition is thus the wholesale market in Nairobi where the domestically produced rice competes with imported rice.

BENCHMARK PRICES

Observed

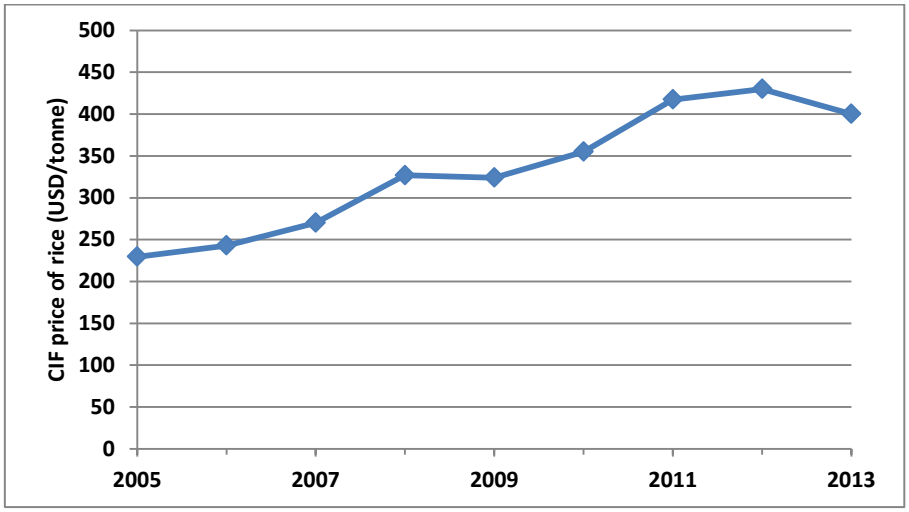
The basis for calculating a reference price to determine whether rice producers receive market incentives or disincentives is to establish a benchmark price, which represents the price for rice free of domestic policy and market distortions. Since Kenya was a net importer of rice during the 2005-2013 time period, the benchmark price considered is the CIF price for the imported rice.

Benchmark price

Observed

The CIF price used is the average price of imported rice from different sources at Mombasa port. This trade data is published by the Kenya National Bureau of Statistics (KNBS) in its annual *Statistical Abstract.* Figure 6 shows the benchmark CIF price of imported rice expressed in USD/tonne. The CIF prices of rice appear to have been increasing over time with marked hikes in 2008 and 2010 - 2012 with a slight decline in 2013.

Figure 5: Benchmark price of rice (2005-2013)



Source: KNBS *Statistical Abstract, 2010 and 2013.*

Adjusted

The observed CIF prices accurately measure the opportunity cost of rice imports to Kenya. Therefore, adjustment of the benchmark prices is unnecessary.

DOMESTIC PRICES

Observed prices at point of competition

In this analysis, the point of competition is considered the wholesale market in Nairobi where the domestically produced rice competes with imported rice. The observed prices at the point of competition used here represent the average wholesale prices of rice in Nairobi reported by the Ministry of Agriculture, Livestock and Fisheries[9]. The wholesale price in Nairobi is shown in Figure 7. The wholesale price does not exhibit any clear trend over time as it is apparently influenced by

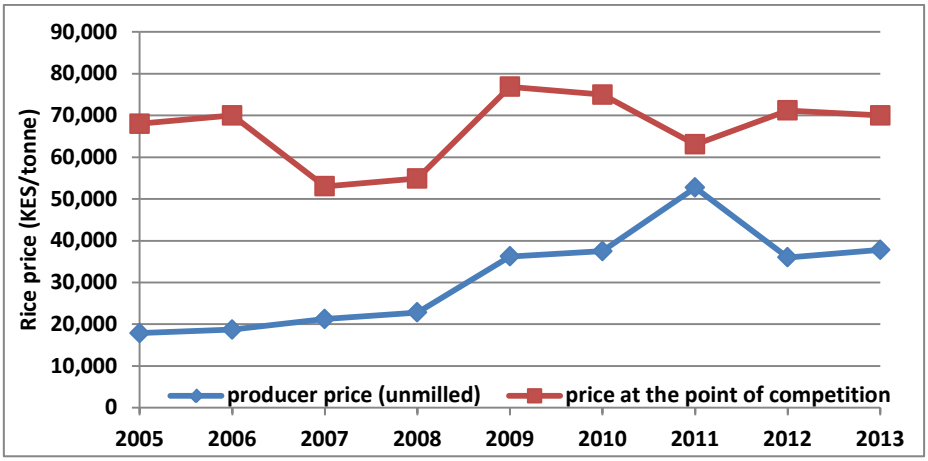
[9] The available data does not distinguish between domestic and imported rice or the type of rice. It represents an average of all.

several conflicting factors including the world price trends, the effective tariff, domestic production and demand.

Observed prices at farm gate

The national average producer price of unmilled rice reported in the KNBS' Statistical Abstract 2010 & 2014 are used. Unlike the wholesale prices in Nairobi, the producer prices of unmilled rice show consistent upward trend from 2006 to 2011 with noticeable decline in 2012-2013 (Figure 7). While the surge in the price of 2011 was caused by the severe drought in Kenya, the decline in 2012-2013 which may be attributed to the increased rice imports into Kenya following the change in tariff. The producer prices during this period do not follow the wholesale prices in Nairobi very closely.

Figure 6: Domestic prices at point of competition (2005-2013)



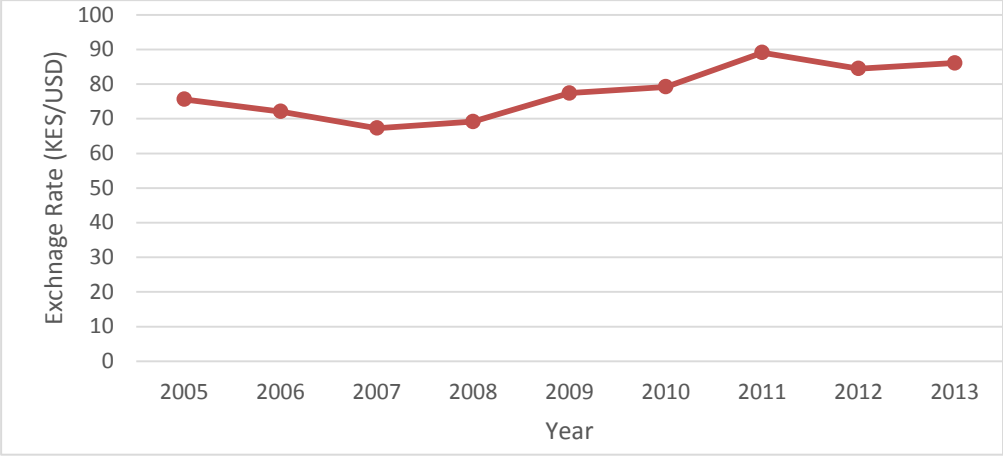
Source: KNBS (2010) and (2014) and Ministry of Agriculture (2014)

EXCHANGE RATES

Observed

Average nominal exchange rates between the Kenya Shilling and the US Dollar were used in this analysis to convert the benchmark price (US$ per tonne) into local currency (KES per tonne). The average rate for each year under review was calculated from monthly data obtained from the International Monetary Fund (IMF) database on exchange rates. While the Kenyan Shilling appreciated between 2005 and 2009, it has depreciated since 2010 (Figure 8).

Figure 8: Exchange Rate KES/dollar (2005-2013)



Source: IMF (2014)

Adjusted

Kenya is adopting a liberal foreign exchange regime during the period of analysis where the exchange rate is determined freely with no direct intervention from the Central Bank. As such, the observed exchange rate appears to be an accurate measure of the real exchange rate and, therefore, no adjustments were made.

ACCESS COSTS

Observed

Border to point of competition

The market access cost between the border and the point of competition (the Nairobi wholesale market) is the sum of the cost incurred at the port to clear customs and the transportation costs from Mombasa to Nairobi. This consists of port charges paid to Kenya Port Authority (KPA), other fees paid to Kenya Agricultural Research Institute (KARI) and Ministry of Health, import document fees, storage, fumigation and transportation. Table 3 presents the various costs from the border to the point of competition based on estimates provided in Gitau et al. (2010).

Port charges used in the estimate of market access costs are USD 24/tonne plus 5.375 percent of the Mombasa CIF price. Import documents fees, fees paid to KARI and fees paid to the Ministry of health are levied as a percentage of the CIF price of the imported good and amounts to 2.25, 1.00 and 0.20 per cent, respectively. In addition, some minimal fumigation charges are levied. Other costs include transportation to warehouse in Mombasa, storage and handling and transportation to Nairobi (Table 3). Based on Nathans Associates (2011), transportation cost from Mombasa to Nairobi is estimated at USD 53/tonne.

Table 3. Estimated access cost from the border to the point of competition (2010)

Cost item	Cost KES/tonne
Import documents fee (2.25% C&F)	1,030
KPA handling charges	2,240
KARI (1% C&F)	412
Min. of Health (0.2% of C&F)	82
Transport to warehouse	240
Storage and handling charges	120
Fumigation charges	120
Road haulage to Nairobi	4,198
Total	8,442

Source: Gitau et al. (2010); road hauling estimated from Nathan Associates (2011)

The costs in Table 3 were used to extrapolate the access costs from the border to the point of competition for years before and after 2010. First, the import documents fees, KARI levy and the levy charged by the Ministry of Health were computed as percentage of the CIF price for each year and then converted into local currency using the observed exchange rate[10]. Second, KPA handling charges were calculated by adding 5.375 percent of the CIF price to the flat rate of US$24 per tonne and converting the sum into local currency using the observed exchange rate. Finally, the remaining costs were deflated/inflated using the CPI (with base year of 2010). This procedure is thought to result in more accurate estimates of the access costs since some of the charges are fixed percentages of the CIF price of imported rice.

Profit margins for rice importers were not reported in Gitau, et al. (2010). These are difficult to estimate for this market segment for lack of specific prices of imported rice. In this study, we assumed that importers earn a profit margin of 20 percent of the landed cost of imported rice in Nairobi (excluding the tariff). This margin, not only covers the profit but also the cost of branding and advertising. The costs are categorized into major categories (e.g., transportation, handling and taxes) and presented in Table 4.

Table 4: Observed access Cost from the border to Point of Competition for rice in Kenya (2005-2013)

Data	2005	2006	2007	2008	2009	2010	2011	2012	2013
	KES/ton milled rice								
Transport	4,007	3,821	3,567	3,668	4,102	4,198	4,722	4,479	4,563
Margins	4,650	4,651	4,747	5,744	6,375	7,060	9,152	8,927	8,543
Handling	1,039	1,053	1,092	1,344	1,487	1,655	2,160	2,126	2,034
Taxes and fees	599	604	627	780	865	970	1,283	1,253	1,189
Others	82	87	91	104	115	120	137	150	158
Total Observed Access Costs	10,541	10,390	10,305	11,849	13,176	14,244	17,728	17,234	16,803

Source: Extrapolated from estimates presented in Table 3.

[10] As some of the costs, e.g., the import documents fees, KARI levy and the levy charged by the Ministry of Health were computed as percentage of the CIF price used in this study (see Figure 6), our estimates for 2010 differs from those reported in Gitau, et. al., (2010).

Farm gate to point of competition

The market access cost from the farm gate to the Nairobi wholesale market is based on detailed estimated costs for paddy or paddy equivalent as reported in Gitau et al. (2010) and presented in Table 5. These costs include transport cost from the farm gate to the mill, milling cost and transport cost from the mill to Nairobi. Gitau et al (2010) estimate transport cost from the farm gate to the mill at 60 KES/80 kg per bag and milling cost at 120 KES/80 kg bag.

Milling costs is the major cost item and represents over one-third of all marketing costs followed by transportation from the farmgate to the mill and from the mill to Nairobi. Other costs (storage, security and licensing fees) are minimal.

Table 5. Detailed marketing costs of rice from the farmgate to the wholesale market in Nairobi in 2010.

Cost item	Estimated cost	
	Ksh/80 kg bag	**KSh/Tonne**
Gunny bags	42	525
Transport from farm	60	750
Milling cost	120	1,500
Transport to Nairobi	48	600
Drying	34	429
Unloading	14	174
Loading	12	154
Storage fees	6	72
Watchman	3	34
Licensing fees	1	8
Electricity	0.2	2
Total	340	4,248

Source: Gitau et al. (2010)

Gitau et al. (2010) estimates of marketing costs are the only comprehensive costs available for rice. These estimates are used to extrapolate the access costs for years before and after 2010. This is done by deflating/inflating the costs reported in 2010 using the consumer price index (CPI) with 2010 as the base year. This is equivalent to assuming that costs did not change over time in real terms. As they are difficult to estimate and rarely reported, profit margins were not reported in Gitau et al. study. The traders' margin is estimated as the difference between the wholesale price and the cost of rice and access costs in 2010 amounts to 12 percent of the operating cost. This estimate is used and added to the above costs. Table 5 presents the estimated observed access costs per tonne of unmilled rice from the farmgate to the point of competition (Nairobi wholesale market).

Table 6: Observed Access Cost from the farm gate to the point of competition of unmilled rice (2005-2013)

Data	2005	2006	2007	2008	2009	2010	2011	2012	2013
	KES/tonne paddy rice								
Transport	922	978	1,019	1,173	1,297	1,350	1,539	1,684	1,780
Margins	2,494	2,615	2,933	3,183	4,837	5,010	6,908	4,958	5,210
Processing	1,317	1,397	1,456	1,677	1,854	1,929	2,200	2,406	2,544
Handling	583	618	644	742	820	853	973	1,064	1,125
Taxes and fees	5	5	6	7	7	8	9	9	10
Others	73	78	81	93	103	108	123	134	142
Total Observed Access Cost	5,395	5,691	6,141	6,875	8,918	9,257	11,751	10,255	10,810

Source: Authors' extrapolation from data in Gitau et al. (2010).

Adjusted

Border to point of competition

The adjusted access costs from the border to the point of competition were derived directly from the observed access costs presented in Table 4. Import document fees and levy to KARI are considered as taxes and, therefore, not included in the calculation of adjusted access costs. However, the fees paid to the Ministry of Health are excluded as these were paid for health inspection services. The profit margins for importers were assumed at 10 percent of the landing cost of rice in Nairobi (excluding tariffs). Table 7 presents the adjusted access costs from the border to the point of competition.

Table 7: Adjusted access Cost from the border to Point of Competition for rice in Kenya (2005-2013)

Data	2005	2006	2007	2008	2009	2010	2011	2012	2013
	KES/Tonne of milled rice								
Transport	4,171	3,995	3,748	3,876	4,333	4,438	4,996	4,778	4,880
Margins	2,269	2,269	2,315	2,798	3,106	3,439	4,455	4,345	4,159
Handling	1,039	1,053	1,092	1,344	1,487	1,655	2,160	2,126	2,034
Taxes and fees	35	35	36	45	50	56	74	73	69
Others	82	87	91	104	115	120	137	150	158
Total adjusted Access Costs	7,595	7,438	7,281	8,168	9,091	9,708	11,822	11,472	11,300

Source: Authors' extrapolation from data in Table 4.

Farm gate to point of competition

As the case for the adjusted access costs from the border to the point of competition, adjusted access costs from the farmgate to the point of competition were derived directly from the observed access costs in Table 6. Two main adjustments were done. First, profit margins accrued to agents in the value chain is reduced to 10 per cent of the operating cost. Second, the marketing taxes, although small, are excluded as these were not paid for a specific service. The resulting access costs from the farmgate to the point of competition are categorized in Table 8.

Table 8: Adjusted Access Cost from the farm gate to the point of competition of unmilled rice (2005-2013)

Data	2005	2006	2007	2008	2009	2010	2011	2012	2013
	KES/tonne of paddy rice (or paddy rice equivalent)								
Transport	922	978	1,019	1,173	1,297	1,350	1,539	1,684	1,780
Margins	2,078	2,179	2,444	2,652	4,030	4,174	5,756	4,132	4,342
Processing	1,318	1,397	1,457	1,677	1,854	1,929	2,200	2,406	2,544
Handling	583	618	644	742	820	853	973	1,064	1,125
Others	73	78	81	93	103	108	123	134	142
Total adjusted access cost	4,973	5,249	5,646	6,337	8,104	8,414	10,591	9,420	9,932

Source: Authors' extrapolation from data in Table 6.

BUDGET AND OTHER TRANSFERS

The PE database does not indicate any specific support to rice and the attribution of expenditure allocated to group of commodities that may include rice (such as research and extension) cannot be made. Specifically, rice is one of the commodities supported under the Economic Stimulus Project which provided inputs to farmers. These estimates, when available, represent the direct and indirect budget transfer to wheat. Therefore, nominal rate of assistance cannot be estimated for lack of the required data.

QUALITY AND QUANTITY ADJUSTMENTS

In order to compare the observed producer price for unmilled rice with a relevant reference price, a quantity conversion factor must be applied to convert the reference price of milled rice at the wholesale level to the equivalent price of unmilled rice at the farm-gate. A conversion factor, commonly reported, of 0.65 is used in this analysis as a quantity conversion factor. This ratio is ubiquitous in this context in Kenya though the actual conversion rate may vary slightly from one year to another and depending on the milling machines used.

Consumers' preference for the aromatic rice produced locally is reflected in higher price at the retail level. As such, a quality difference is apparent between locally produced rice and imported rice. Unfortunately, it is not possible to establish a quality conversion factor for lack of price data differentiating rice by origin or type at any level[11]. In this analysis, we assume no quality difference between imported rice and domestically produced rice but the estimated indicators may be overestimated in this case.

DATA OVERVIEW

Following the discussions above, Table 9 summarizes the main data sources used and methodological decisions taken for the analysis. As can be seen, the analysis draw heavily on available data from national sources. Summary of the data used and estimation of the price incentives indicators for rice in Kenya is presented in Appendix 1.

[11] At the retail supermarkets in Nairobi, the authors find it difficult, or nearly, impossible to compare the retail prices of imported rice and local rice due to branding and the difference in characteristics of rice.

Table 9: Data sources and methodological decisions

Variable		*Description*	
		Observed	***Adjusted***
Benchmark price		*Average CIF price of rice imports excluding rice in the husk. See Figure 6*	*Not Applicable (N.A.)*
Domestic price at point of competition		*Average wholesale price of milled rice obtained from Economic Review of Agriculture (2014). See Figure 7*	*N.A.*
Domestic price at farm gate		*Farmgate price of paddy (unmilled rice) obtained from KNBS (2010 and 2014). See Figure 8*	*N.A.*
Exchange rate		*Average market exchange rate obtained from IMF (2014). See Figure 9*	*N.A.*
Access cost from the point of competition to the border		*Extrapolated from cost estimates in Gitau et al. (2010) by deflating/inflating the 2010 estimates in years before/after it. See Table 3 and Table 4*	*Derived directly from observed access costs by omitting import document fees and levy to KARI. See Table 7.*
Access costs from the point of competition to farm gate		*Extrapolated from cost estimates in Gitau et al. (2010) by deflating/inflating the 2010 estimates in years before/after it. See Table 5 and Table 6.*	*Derived directly from observed access costs by omitting license fees and adjusting profit margin slightly to 10%. See Table 8*
QT adjustment	Bor-PoC	*N.A.*	*N.A.*
	PoC -FG	*A conversion factor of 0.65 is used to convert the reference price of milled rice at the wholesale into the equivalent unmilled rice at the farm-gate.*	*N.A.*
QL adjustment	Bor- PoC	*N.A.*	*N.A.*
	PoC -FG	*N.A.*	*N.A.*

SUMMARY OF INDICATORS

Table 10. MAFAP Price Gaps for rice in Kenya: 2005-2013 (KES/tonne)

	Trade status for the year	Observed price gap at point of competition	Adjusted price gap at point of competition	Observed price gap at farm gate (unmilled)	Adjusted price gap at farm gate (unmilled)
2005	*m*	40,097	43,043	5,140	6,633
2006	*m*	42,091	45,043	6,267	7,744
2007	*m*	24,517	27,540	8,863	10,333
2008	*m*	20,436	24,117	7,306	9,161
2009	*m*	38,607	42,691	20,286	22,126
2010	*m*	32,637	37,173	19,221	21,326
2011	*m*	8,146	14,052	28,778	31,457
2012	*m*	17,640	23,402	11,460	14,369
2013	*m*	18,744	24,247	15,313	18,011

Source: Authors' calculations using data as described above.

Table 11 : MAFAP Nominal Rates of Protection and Assistance for rice in Kenya: 2005-2013 (KES/tonne)

	Trade status for the year	Observed NRP at point of competition	Adjusted NRP at point of competition	Observed NRP at farm gate	Adjusted NRP at farm gate	Observed NRA at farm gate	Adjusted NRA at farm gate
2005	*m*	143.7%	172.5%	40.3%	59.0%	40.3%	59.0%
2006	*m*	150.8%	180.5%	50.3%	70.6%	50.3%	70.6%
2007	*m*	86.1%	108.2%	71.6%	94.8%	71.6%	94.8%
2008	*m*	59.3%	78.3%	47.1%	67.0%	47.1%	67.0%
2009	*m*	100.9%	124.9%	127.2%	156.9%	127.2%	156.9%
2010	*m*	77.0%	98.3%	105.2%	131.9%	105.2%	131.9%
2011	*m*	14.8%	28.7%	120.2%	147.9%	120.2%	147.9%
2012	*m*	32.9%	49.0%	46.7%	66.4%	46.7%	66.4%
2013	*m*	36.6%	53.0%	68.0%	90.9%	75.0%	90.9%

Source: Authors' calculations using data as described above.

Table 12. MAFAP Market Development Gaps for rice in Kenya: 2005-2013 (KES/tonne)

	Trade status for the year	Access costs gap to point of competition	Access costs gap to farm gate	Market Development Gap
2005	*m*	1,914.8	(421.3)	13.3%
2006	*m*	1,918.8	(441.8)	13.5%
2007	*m*	1,965.3	(495.1)	13.5%
2008	*m*	2,392.3	(537.7)	13.6%
2009	*m*	2,654.7	(814.2)	13.0%
2010	*m*	2,948.1	(843.2)	13.0%
2011	*m*	3,838.6	(1,159.8)	12.6%
2012	*m*	3,745.3	(835.7)	13.4%
2013	*m*	3,577.0	(878.3)	13.6%

Source: Authors' calculations using data as described above.

5. RESULTS AND INTERPRETATION

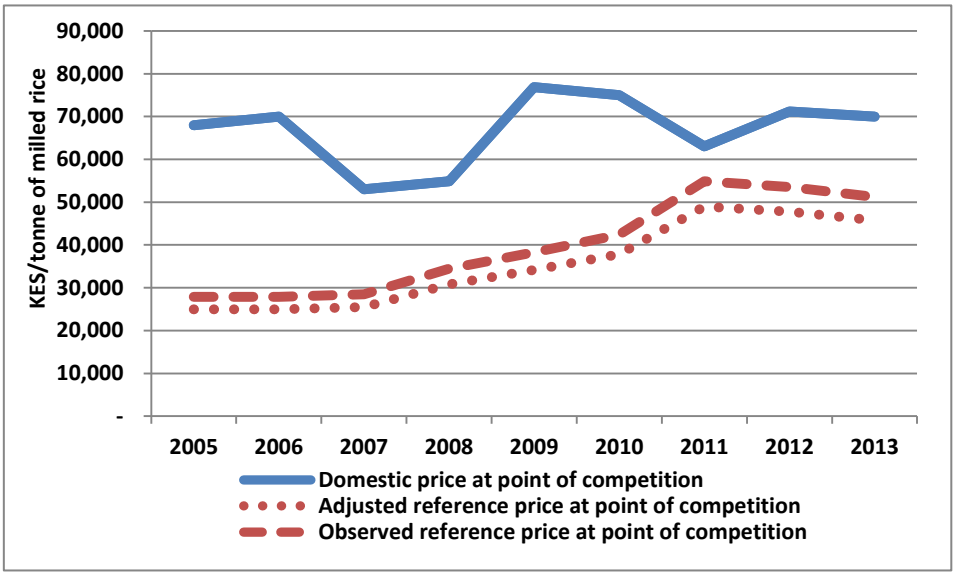
Price gaps are market price differentials between the commodity's domestic and reference price in each respective year. More conceptually, they provide an absolute measure of price incentives or disincentives that rice producers face. The estimated price gaps at both market levels are summarized in Table 10. The price gaps are also expressed as a percentage of the reference prices, yielding the nominal rates of protection (NRPs) presented in Table 11.

Indicators at the point of competition

The price gaps at the point of competition, the rice wholesale market in Nairobi, measures the deviation of the domestic wholesale prices from comparable competitive prices without government interventions in the world market. While the observed price gap is measured by the vertical distance between the domestic wholesale price and the observed reference price, the adjusted price gap is measured as the vertical distance between the domestic price and the adjusted reference price (Figure 8).

The observed price gaps at this market level vary from over KES 8 000 per tonne of milled rice in 2011 to over KES 42 000 per tonne in 2006 (Table 10) and averages KES 26 991 per tonne. In contrast, the adjusted price gap is relatively higher. It ranges from KES 14,052 to 45,043 per tonne of milled rice. The adjusted price gap averages KES 31,256 per tonne of the period of analysis. Both measures suggest that the domestic price of rice at the wholesale markets is much higher than comparable competitive prices without government interventions in the world market. However, the two indicators exhibit considerable variation over the period of the analysis due to the variability of their underlying causes. The estimated price gaps at this level measure the impact of trade policies, specifically the import tariff imposed on wheat imports as well as the impact of the market structure of rice wholesale markets.

Figure 8. Domestic Price vs. Adjusted Reference Price at Point of Competition for Rice in Kenya, 2005-2013 (KES/Tonne of milled rice)



Source: MAFAP, 2014

The nominal rate of protection (NRP) expresses the price gap as a percentage of the reference price. The observed nominal rates of protection at the point of completion (wholesale market in Nairobi) varied from 15 percent to 151 percent and averaged 78 percent for the entire period (2005-2013), as shown in Figure 9. On the other hand, the adjusted nominal rates of protection at the farm gate varied from 29 percent to 180 percent and averaged 99 percent for the entire period (2005-2013). In contrast to the observed, the adjusted nominal rate of protection is relatively higher due to the higher observed profit margin assumed and the fees and levies charged on imports such as the import declaration fee charged on rice imports amounting to 2.25 percent of the CIF price of the commodity.

In absence of market imperfections, non-tariff barriers and additional taxation, the nominal rate of protection should approximate the applied tariff since the reference price at wholesale is the sum of the benchmark price at the border and market access costs from the border to the wholesale market. The above results suggest that rice market in Kenya is strongly influenced by factors other than the tariff.

The tariff regime and its trends over time explain in part both the level of the indicators and their variability over time. As presented earlier, rice imports from Pakistan were subject to a lower tariff rate, initially 35 percent until 2007, 25 percent from 2007 to 2009 and 35 percent thereafter. Other rice imports were subject to the established CET rate of 75 percent or USD 200 per tonne whichever is higher until mid-2010 when the tariff rate on rice in Kenya was unified at 35 percent on all rice imports from outside Eastern Africa (Vitale, et al., 2013). As Table 11 indicates, the level of the nominal rates of protection is distinctly higher during the period of 2005-2010 as compared to its level of 2011-2013 when the tariff rate was unified at the lower level. This suggests that the wholesale price of rice in Kenya was likely to have been determined by the higher tariff rate during the earlier period although Pakistan is the source of 74-81 percent of Kenya imported rice[12] (Figure 2). Consequently, the nominal rates of protection in the wholesale market were higher than the 75 percent tariff rate during the period of 2005-2010, taking into consideration the impact of other market imperfections.

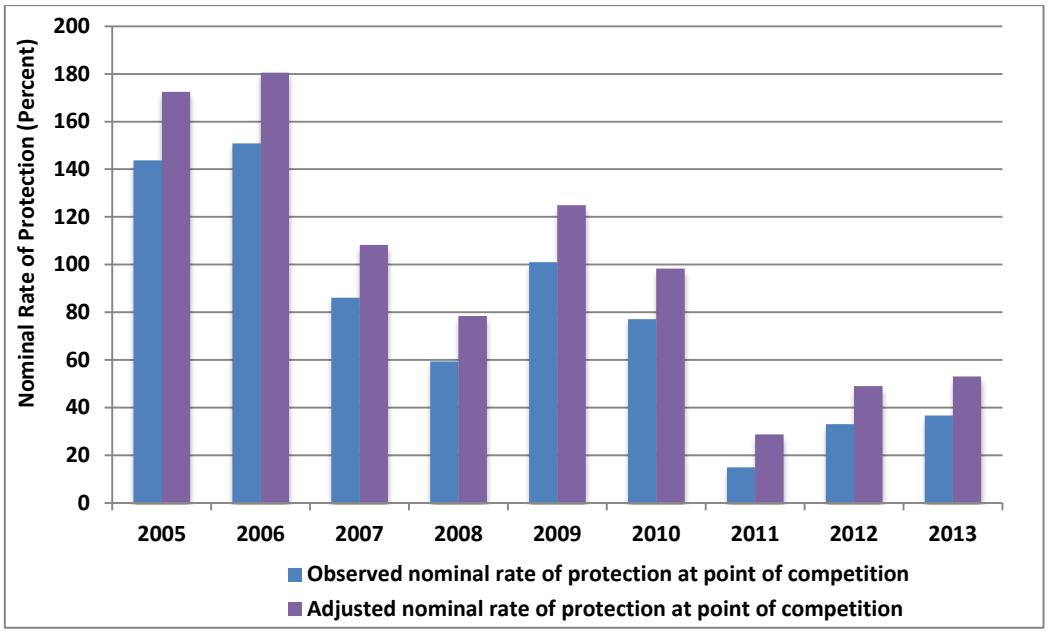
Another factor explaining the relatively higher levels of the nominal rate of protection is related to wholesale market structure. Rice is mainly imported by packers and millers who sell packaged and branded rice. In other words, rice is sold as a differentiated product where branding and advertising has a major role in determining market share. The rent captured by importers in this process tends to raise the domestic price and, hence, may explain part of the nominal rate of protection.

Finally, there are additional "hidden costs" that are difficulty to monetized. For example, it is estimated that 9-14 import documents are required by the authorities in Kenya while it takes 24-37 days to import a shipment in Kenya (World Bank, 2014). These costs are likely to be taken into account by importers. Such costs tend to raise the landing cost of rice imports and raise the domestic prices[13].

[12] It is to be noted that rice importers may import from several sources at the same time. Also, there is no evidence that Pakistani rice is cheaper than rice imported from elsewhere.

[13] If these costs were possible to monetize in this analysis, the reference prices will be higher and both the price gaps and nominal rate of protection will be smaller.

Figure 9: The Observed and Adjusted NRP at point of competition and farmgate for rice in Kenya



Source: MAFAP, 2014

Farm-gate Indicators

As unmilled rice traded at the farm-gate is relatively low value product compared to milled rice, the price gaps at the farm-gate are smaller than at the wholesale for all years except in 2011, a year characterized by severe drought. The observed price gap per tonne of unmilled rice at the producer level ranged from KES 5,140 in 2005 to KES 28,778 in 2011 and averaged KES 13,626. On the other hand, the adjusted price gap per tonne of unmilled rice at the producer level ranged from KES 6,633 in 2005 to KES 31,457 in 2011 (Table 10) and averaged KES 53,685. The persistently positive price gap suggest that trade policies effectively provide consistent incentives to rice producers.

As presented in Table 11, the nominal rate of protection varies significantly over the period of the analysis. For instance, the observed nominal rate of protection ranged from about 40 percent in 2005 to about 127 percent in 2009 and averaged 75 percent. The adjusted nominal rate of protection is significantly higher averaging 98 percent over the period of analysis. However, two patterns can be distinguished over this period. The period of 2009-2011 was characterized by exceptionally high levels of both observed and adjusted nominal rate of protection exceeding 100 percent. During the rest of the years from 2005 to 2013, the level of both indicators is reasonably low ranging from 40 percent to 72 percent.

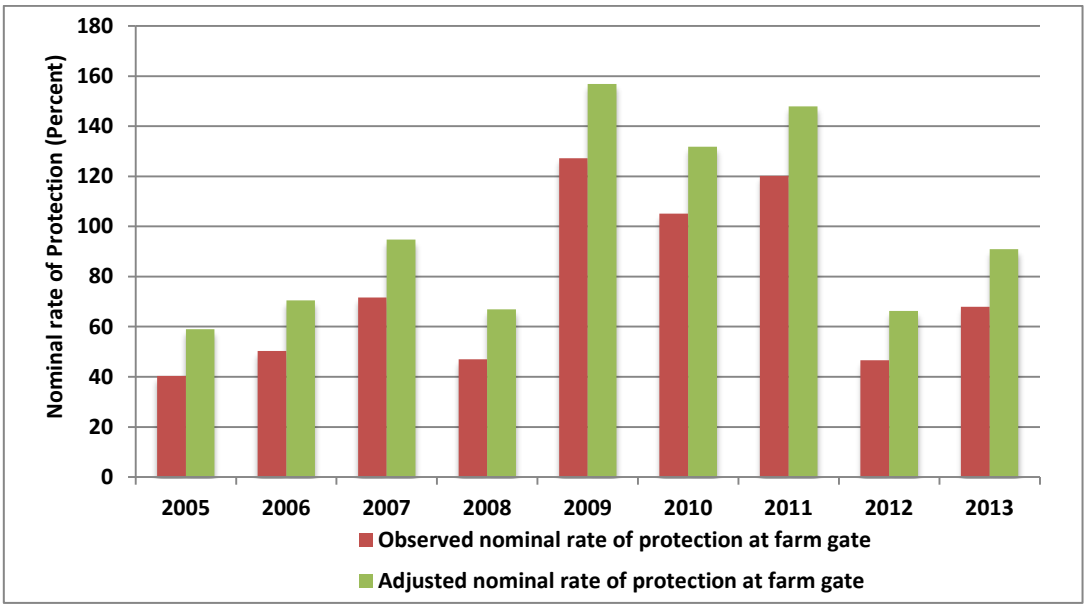
As a result of the post-election political unrest in late 2007 and severe drought in 2009, rice production reached a record low in 2007-2009 (Figure 1). This resulted in a significant producer price hike in 2009 where producer price of un-milled rice increased by 59 percent from its 2008 level as a result of the supply shock. The price hike persisted in 2010 as well, only to be made worse by another wave of drought in 2011 resulting in another price hike with producer price reaching KES 52,721 per tonne of un-milled rice (Figure 7). In other words, the exceptionally high levels of both observed and adjusted nominal rate of protection during 2009-2011 is related to domestic supply of rice in the rural markets. It is to be noted that the wholesale markets have shown similar strong

response in 2009-2010 but weaker response in 2011 (Figure 7). This is mainly attributed to the moderating effect of imports.

The lower tariff on all rice imports in Kenya since mid-2011 may have created a price wedge between the rice prices in Kenya and neighboring countries in recent years. This might encouraged informal cross-border trade in rice with neighboring countries, particularly Uganda, where rice imports are still under the CET. This may explain the increased imports of rice in 2012-2013 despite production increase. As most of the informal cross-border trade takes place directly from rural markets, this explains why the nominal rate of protection at the farm-gate in 2012-13 was higher than the reduced tariff of 35 percent.

Another factor explaining the relatively high nominal rate of protection for rice in Kenya is the perceived consumer preference for local rice. This may lead to price premium for local rice. This price premium appears to be higher at the point of competition than at the farmgate [14]. The price premium at the point of competition may overestimate the measured indicators. Unfortunately, data is unavailable to account for this premium.

Figure 7: The Observed and Adjusted nominal rate of protection at farmgate for un-milled rice in Kenya



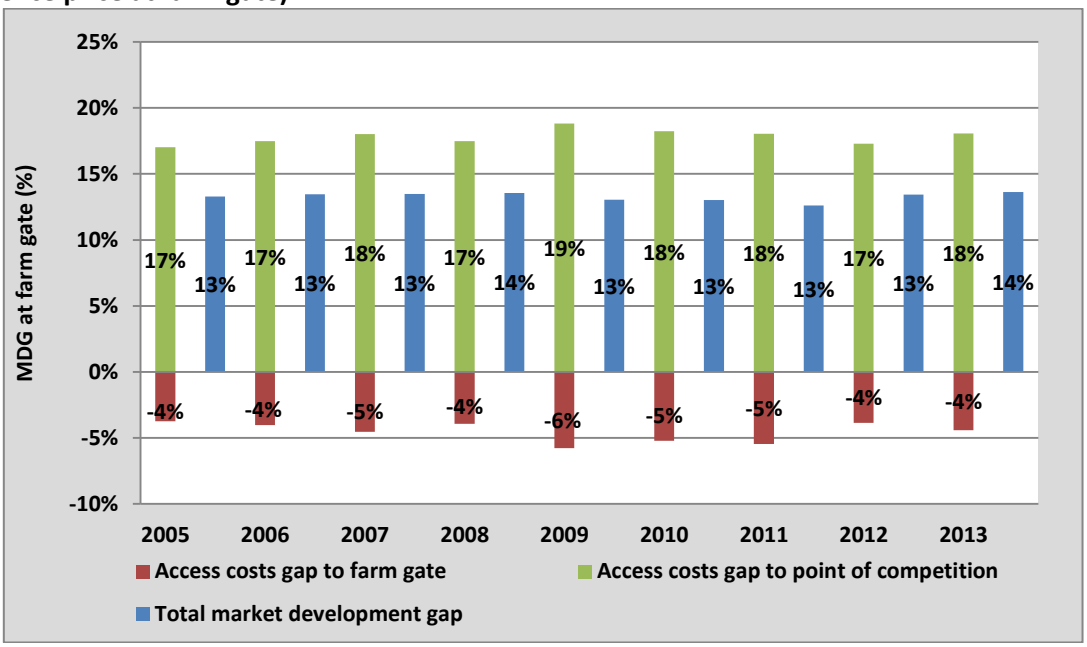
Source: MAFAP, 2014

Market Development Gap (MDG) measures the aggregate impact of the market distortions and excessive access costs in the domestic value chain between the border and the point of competition and between the point of competition and the farm gate on producers' incentives. The presence of MDG affects price incentives and disincentives for rice producers as well as the overall marketability and trade of rice in Kenya. The excessive taxation and fees on rice imports including port clearance and import documentation and excessive import margins tend to increase the cost of imported rice and hence its price at the wholesale. This represents an additional protection to producers beside the import tariff and other factors ranging amounting to 17-19 percent of the reference price (Figure

[14] The available price data at the point of competition cannot be disaggregated based on the origin and type of rice. The reported wholesale price for rice is an average of lower imported rice price and the higher domestic rice. This tend to underestimate both the price gap and the nominal rate of protection.

11). On the other hand, the domestic rice market from the farm gate to wholesale level appears to be competitive and characterized by low levels of profit margins and low levels of local taxation. As such, the access cost gap to farmgate is negative but small (-4 to -6 percent). The total market development gap represents an additional protection of 13-14 percent of the reference price at the farmgate (Figure 11). This suggests that the factors leading to MDG tend to raise rice prices at both the farm gate and wholesale levels.

Figure 11: Composition of Market Development Gap for Rice in Kenya, 2005-2013 (as % of adjusted reference price at farm gate)



Source: MAFAP, 2014

6. CONCLUSION AND RECOMMENDATIONS

Domestic rice markets in Kenya have been characterized by high levels of protection especially at the wholesale level. In fact, the protection at the wholesale level was excessive until 2011 when the level of protection declined significantly. While the tariff on rice imports has been partly responsible for keeping the domestic prices high and, hence, provides the aforementioned protection to producers, the short-term adjustment of the CET in Kenya explains most of the variability in the level of protection. Beside the tariff, the rent captured by importers and packers at the wholesale and retail markets through product differentiation and branding of rice may explain partly the high domestic price of rice in Kenya. The "hidden costs" of importing into Kenya including 9-14 import documents required by the authorities in Kenya with a waiting time of 24-37 days to import a shipment in Kenya raise the landing cost of rice imports and raise the domestic prices. Therefore, the driving forces for the high levels of protection at the wholesale level include both the trade policy adopted by the Government and the short-term adjustment of such instruments as well as market structure for rice as a differentiated product.

However, the incentives to rice producers appear to exhibit slightly different patterns. While the tariff policy certainly is the major determinants of the incentives to producers, production shocks may also explain producers' price hikes such as those of 2009-2011. The indicators estimated in this study suggest that producers receive consistent but variable levels of incentives.

The protection and the price incentives to producers through the tariff are meant to encourage production. Indeed, rice production more than doubled over the period of analysis (2005-2013) (Figure 1). This production expansion is due in part to the lucrative prices received by producers as a result of protection. However, the high price effect of the tariff on rice imports may be criticized for encouraging production mostly via area expansion rather than intensification and for its undesirable impact on consumers. Indeed, the high prices at the wholesale market translate into high prices at the retail level which may not be affordable to low income consumers. This may lead to imports of cheaper and low quality rice. The application of lower tariffs on rice than in other countries in the region may have encouraged informal, cross-border trade. This is evident in the continuously increasing levels of rice imports into Kenya since 2005.

RECOMMENDATIONS

Although the CET aimed at increasing regional trade, this goal seems to be difficult to achieve. However, the tariff on rice appears to be successful in advancing substantial incentives to producers and significant protection at the wholesale level. There are two disadvantages to the tariff. First, it leads to resource misallocation through increasing production by land expansion. It does not provide incentives for technological change that leads to productivity increase. Secondly, it imposes costly tax on consumers. Therefore, alternative measures to tariff that will provide incentives to producers without leading to resource misallocation and without taxing rice consumers need to be thought.

The Government of Kenya may consider promoting adoption of yield enhancing technologies as a means to reduce the average cost of production. This will increase rice profitability even when prices decline and maintain competitiveness of domestic rice production without the need for distorting trade policies such as tariffs. This requires increasing investment in research to develop new high yielding and water efficient rice varieties and improved agronomic practices.

Given the reported cost of doing business in Kenya, the government may consider measures to reduce the excessive cost of importing resulting from the excessive documentation requirements and fees paid by importers. Such measures, not only reduce rice price paid by consumers, but also reduce the cost of imported inputs for farmers. This may encourage application of fertilizer and other imported inputs to improve productivity.

MAIN MESSAGE

The tariff and other market imperfections in the rice markets have provided substantial protection to rice farmers as reflected in nominal rate of protection exceeding the tariff rate. The tariff represents a transfer from rice consumer to producers and the government treasury. Besides, the adoption of the CET was associated with frequent adjustments causing significant market uncertainty and substantial variability in price incentives to producers. While the incentives resulting from the tariff protection may explain the recent increase in rice production in Kenya, there is a need for measure to further enhance vertical expansion through productivity-increasing technological change. This needs to be taken into consideration in designing the relevant food security strategy of the government.

LIMITATIONS

The analysis undertaken utilized national annual average values for prices and other parameters. There are certainly variations in incentives based on type of rice grown and the specific value chain through which rice is marketed. However, the results obtained here may reflect the incentives to the average rice producer. The study was unable to establish the perceived quality differences between imported and domestic rice for lack of data.

FURTHER INVESTIGATION AND RESEARCH

A disaggregated data on prices at wholesale level on the basis of origin and type of rice would enrich the analysis further. A comprehensive value chain analysis with detailed access costs to update current cost estimates is also needed.

BIBLIOGRAPHY

Charity Kabutha and Clifford Mutero. 2001. “From Government to Farmer-Managed Smallholder Rice Schemes: The Unresolved Case of the Mwea Irrigation Scheme,” International Water Management Institute.

Chemonics International Inc. 2010. “Staple Foods Value Chain Analysis Country Report – Kenya,” January. Report prepared for USAID, Kenya.

David Zarembka. 2010 “Agricultural Imperialism?” AGLI - Report from Kenya - March 28, 2010 http://www.aglifpt.org/kenyareports/report129.pdf

Emongór R.A., F.M. Mureithi1, S.N. Ndirangu, D.M. Kitaka and B.M. Walela. 2010. “The Rice Value Chain in Kenya with Reference to Rice Producers,” KARI Headquarters, P.O. Box 57811 – 00200, Nairobi

Food and Agriculture Organization. 2011. Rice Market Monitor Vol. XIV (3). FAO, Rome.

Grain Bulk Handlers Ltd. 2011. “GBHL Tariff Sheet effective 1st January 2011,” Grain Bulk Handlers Ltd. 2011. Mombasa, Kenya.

Grain Bulk Handlers Ltd. 2008. “Grain Bulk Handlers Profile,” Grain Bulk Handlers Ltd. 2011. Mombasa, Kenya.

Government of Kenya. 2011. “Budget Statement for the Fiscal Year 2011/2012 (1st July – 30th June)”. Nairobi, Kenya.

Justus Ochieng. 2011. “Kenya: Dominion Farms Chief Fears for His Life,” Nairobi Star, Kenya.

Kiugi Thairu Nicholas, 2010. ‘’Agricultural Production and Irrigation Management: The Case of Irrigated Rice Production in Kenya,” MA Report, Graduate School of Development Studies, The Hague, The Netherlands, November, 2010

Leo Odera Omolo. 2006. “Dominion Farm in Yala Swamp to Reduce Kenya’s National Rice Import Bus by 90,000 Tons Annually,” LUOCOME-MEDIA, Kisumu, Nov. 23, 2006.

Milu Muyanga, T.S. Jayne, G. Argwings-Kodhek, Joshua Ariga. 2010. “Staple Food Consumption Patterns in Urban Kenya: Trends and Policy Implications,” Tegemeo Working Paper No. 16,

Ministry of Agriculture. 2010. “ESP Progress Report as at December 2010”. Ministry of Agriculture, Nairobi, Kenya.

Ministry of Agriculture. 2008. “National Rice Development Strategy (2008-2018),” Ministry of Agriculture, Nairobi, Kenya.

Ministry of Water and Irrigation. 2009. “National Irrigation and Drainage Policy,”. Ministry of Agriculture, Nairobi, Kenya.

PKF Consulting Ltd. 2005. “Grain Production in Kenya”. The Export Processing Zones Authority, Nairobi, Kenya.

Gitau, R., Samuel Mburu, Mary K. Mathenge and Melinda Smale. 2010. “Trade and Agricultural Competitiveness for Growth, Food Security and Poverty Reduction: A Case of Wheat and Rice Production in Kenya,” Tegemeo Institute of Agricultural Policy and Development, WPS 45/2011

Reardon, T., A. Gulati, and B. Minten. 2010. “The Transformation of Food Retail in India and its Impact Downstream and Upstream in the Food System,” joint report MSU and IFPRI New Delhi Office.

Ruigi, George M. 1998. “Large-Scale Irrigation Development in Kenya Past Performance Future Prospects,” Report No. 23, Food and Nutrition Planning Unit, Ministry of Planning and National Development, 1998.

Silas Irea. 2010 “Mapping of Poverty Reduction Strategy Papers, Sector Strategies and Policies related to Rice Development in Kenya,” Coalition for African Rice Development, October 2010

Tim Siegenbeek van Heukelom. 2010. “Dominion Farms and food security in Kenya,” June 10, 2011 http://farmlandgrab.org/post/view/19072

USDA FAS. 2010. “EAC Rice Import Tariffs and Food Security,” GAIN Report, Mar 17, 2010. USAID Kenya.

World Bank Poverty Reduction and Economic Management Unit Africa Region. 2009. “Kenya Economic Update Still Standing: Kenya’s Slow Recovery from A Quadruple Shock,” Edition No. 1. World Bank. Washington D.C.

World Bank. 1990 “Project Completion Report, Kenya Bura Irrigation Settlement Project,” Report No. 8493, March, 1990. World Bank. Washington D.C.

World Bank. 2014. Doing Business in the East African Community 2014. The International Bank for Reconstruction and Development/The World Bank. Washington DC

ANNEX I: 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	2011 m	2012 m	2013 m
Benchmark Price													
	Observed	US$/TON	$P_{b(int\$)}$		**230**	**241**	**266**	**320**	**314**	**344**	**406**	**424**	**394**
	Adjusted	US$/TON	P_{ba}										
Exchange Rate													
	Observed	US $/KSh	ER_o		76	72	67	69	77	79	89	85	86
	Adjusted	US $/KSh	ER_a										
Access costs border - point of competition													
	Observed	KSh/TON	ACo_{wh}		3,688	3,816	3,958	4,691	5,166	5,547	6,770	7,078	7,135
	Adjusted	KSh/TON	ACa_{wh}		3,123	3,252	3,377	3,971	4,376	4,662	5,596	5,913	6,031
Domestic price at point of competition		KSh/TON	P_{dwh}		**40,417**	**39,414**	**40,488**	**51,824**	**55,220**	**70,123**	**73,462**	**68,506**	**113,206**
Access costs point of competition - farm gate													
	Observed	KSh/TON	ACo_{fg}		4,692	4,703	5,611	7,174	6,248	7,330	8,429	9,334	9,604
	Adjusted	KSh/TON	ACa_{fg}		4,885	4,878	5,872	7,554	6,481	7,664	8,349	9,133	9,654
Farm gate price		KSh/TON	P_{dfg}		**17,000**	**15,000**	**23,500**	**35,000**	**20,000**	**41,667**	**35,033**	**39,556**	**38,889**
Externalities associated w ith production		KSh/TON	E										
Budget and other product related transfers		KSh/TON	BOT		-	-	-	-	-	-	-	-	1,571
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}		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Quality conversion factor (point of competition - farm gate)		Fraction	QL_{fg}										

CALCULATED PRICES		Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012	2013
Benchmark price in local currency												
	Observed	KSh/TON	$P_{b(loc\$)}$	17,374	17,367	17,877	22,150	24,303	27,231	36,134	35,834	33,965
	Adjusted	KSh/TON	$P_{b(loc\$)a}$	17,374	17,367	17,877	22,150	24,303	27,231	36,134	35,834	33,965
Reference Price at point of competition												
	Observed	KSh/TON	RPo_{wh}	21,062	21,183	21,834	26,841	29,469	32,778	42,904	42,911	41,101
	Adjusted	KSh/TON	RPa_{wh}	20,498	20,618	21,253	26,121	28,679	31,893	41,730	41,747	39,997
Reference Price at Farm Gate												
	Observed	KSh/TON	RPo_{fg}	8,999	9,066	8,581	10,272	12,907	13,976	19,459	18,558	17,111
	Adjusted	KSh/TON	RPa_{fg}	8,438	8,524	7,943	9,425	12,161	13,067	18,775	18,003	16,344

INDICATORS		Unit	Symbol	2,005	2,006	2,007	2,008	2,009	2,010	2,011	2,012	2,013
Price gap at point of competition												
	Observed	KSh/TON	PGo_{wh}	19,355	18,231	18,654	24,983	25,751	37,345	30,558	25,595	72,105
	Adjusted	KSh/TON	PGa_{wh}	19,919	18,796	19,235	25,703	26,541	38,230	31,732	26,759	73,209
Price gap at farm gate												
	Observed	KSh/TON	PGo_{fg}	8,001	5,934	14,919	24,728	7,093	27,691	15,574	20,998	21,778
	Adjusted	KSh/TON	PGa_{fg}	8,562	6,476	15,557	25,575	7,839	28,600	16,258	21,553	22,545
Nominal rate of protection at point of competition												
	Observed	%	$NRPo_{wh}$	91.89%	86.07%	85.44%	93.08%	87.38%	113.93%	71.22%	59.65%	175.44%
	Adjusted	%	$NRPa_{wh}$	97.18%	91.16%	90.51%	98.40%	92.54%	119.87%	76.04%	64.10%	183.04%
Nominal rate of protection at farm gate												
	Observed	%	$NRPo_{fg}$	88.92%	65.45%	173.86%	240.72%	54.96%	198.13%	80.04%	113.15%	127.27%
	Adjusted	%	$NRPa_{fg}$	101.47%	75.97%	195.87%	271.36%	64.47%	218.88%	86.59%	119.72%	137.94%
Nominal rate of assistance												
	Observed	%	NRAo	88.92%	65.45%	173.86%	240.72%	54.96%	198.13%	80.04%	113.15%	136.45%
	Adjusted	%	NRAa	101.47%	75.97%	195.87%	271.36%	64.47%	218.88%	86.59%	119.72%	147.56%

Decomposition of PWAfg	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012	2013
International markets gap	KSh/TON	IRG	-	-	-	-	-	-	-	-	-
Exchange policy gap	KSh/TON	ERPG	-	-	-	-	-	-	-	-	-
Access costs gap to point of competition	KSh/TON	ACG_{wh}	367.03	366.87	377.64	467.92	513.40	575.26	763.33	756.99	717.52
Access costs gap to farm gate	KSh/TON	ACG_{fg}	193.37	174.78	260.84	379.75	232.88	334.23	(79.95)	(201.85)	49.96
Externality gap	KSh/TON	EG	-	-	-	-	-	-	-	-	-
Market Development Gap	KSh/TON	MDG	560.40	541.66	638.49	847.67	746.28	909.48	683.38	555.14	767.48
Market Development Gap	%	MDG	7%	6%	8%	9%	6%	7%	4%	3%	5%

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