MAFAP
SPAAA

Monitoring African Food and Agricultural Policies

Suivi des politiques agricoles et alimentaires en Afrique

ANALYSIS OF INCENTIVES AND DISINCENTIVES

FOR MAIZE IN KENYA

FEBRUARY 2013

SUMMARY OF THE NOTE

Product: Maize
Period analyzed: 2005 – 2010
Trade status: Import

- Maize is by far the most important food crop in Kenya, playing an integral role in national food security.
- Kenya produces around 3 million tonnes of maize per year; about 15 percent is sold directly to the National Cereals and Produce Board (NCPB) and large millers, most of which comes from medium and large farms in surplus regions of western Kenya.
- Kenya faces a growing structural deficit in maize production, which is normally met through duty free imports from Uganda and Tanzania at prices below those in world markets.
- Civil unrest following the December 2007 election and subsequent drought conditions severely strained Kenya's ability to provide affordable maize and maize meal to consumers in 2008 and 2009, resulting in a major maize shortage, high domestic prices and increased duty free imports from the international market (i.e. South Africa) at world prices.
- Linkages among sub-national maize markets and with international maize markets are weak, highly variable and ephemeral in nature.
- NCPB's participation in Kenya's maize market has increased since 2000, as it often intervenes by purchasing maize, mainly from medium and large farms, and selling below the cost of procurement to incentivize production, while keeping prices low for consumers.
- There are two distinct value chains for maize in Kenya – one for smallholder farms and one for medium and large farms. This analysis measures market price incentives along both value chains. The key results for each are presented in the graphs below.

SMALLHOLDER FARMS
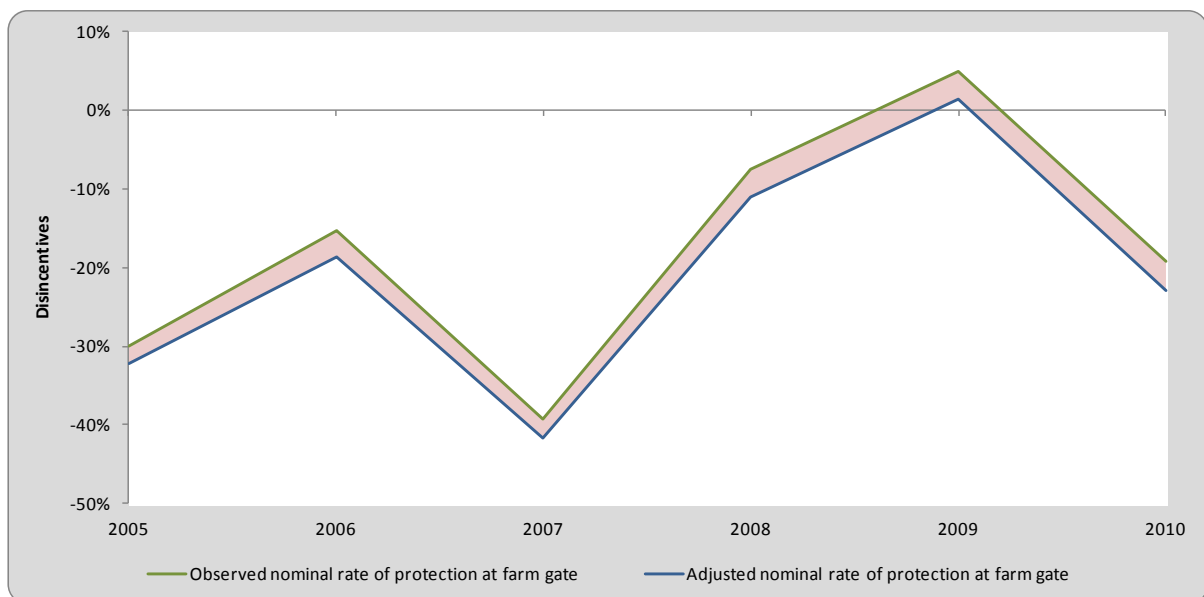
MEDIUM AND LARGE FARMS
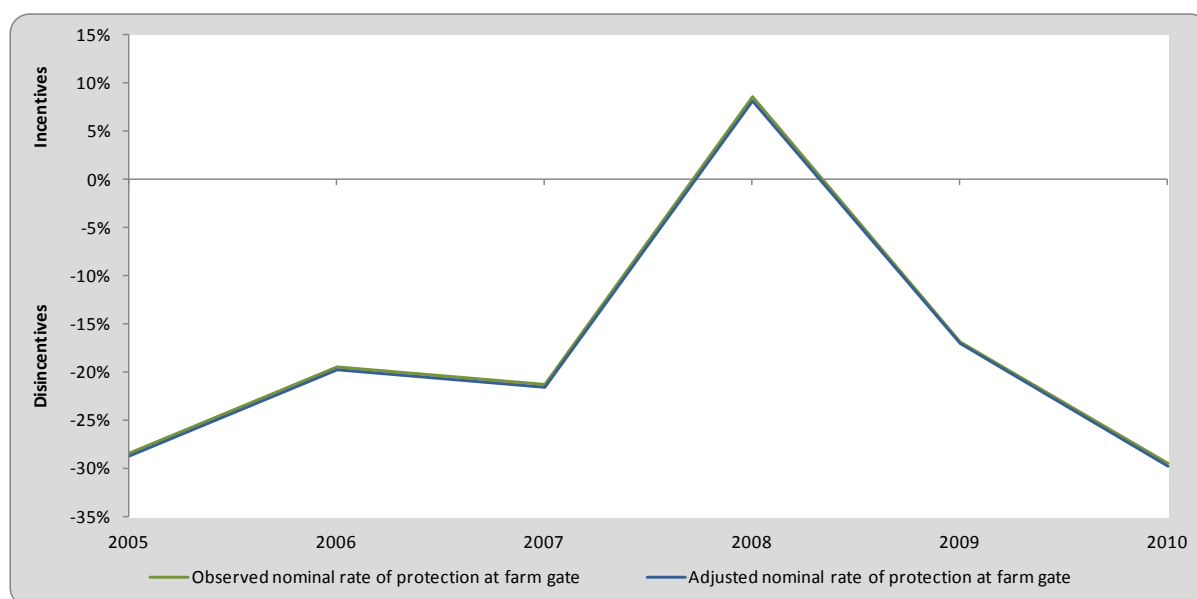
The observed Nominal Rate of Protection (NRP, green line) in the graphs above indicates that both producer groups faced market price disincentives in normal production years and almost no incentives (or disincentives) in 2008 and 2009, during the food crisis. The adjusted NRP (blue line) captures the effects of market inefficiencies on farmers. The area in red shows the cost that these inefficiencies represent for producers.

- Our results show that disincentives in normal production years arise from 1) weak integration among regional markets and with international markets, possibly due to high market access costs, price volatility and relatively low maize prices during normal production years, 2) the interventions of the NCPB to stabilize prices, and 3) significant post harvest losses due to a lack of adequate storage facilities forces farmers to sell at low prices immediately after harvest.

- Extremely low rates of protection in 2008 and 2009 indicate that regional maize markets do interact with each other and with international markets under exceptional circumstances. In these years, tariffs on imports from outside the EAC were waived and domestic prices were close in value to world market prices (i.e. the import parity price for maize from South Africa).

- On-again, off-again connection to regional and world markets is likely a major risk factor in Kenya's maize markets, contributing to high marketing margins and variability in the level of protection for producers.

- Actions to be taken to reduce disincentives could include 1) improve farmers' access to adequate storage facilities, 2) further investigate the effects of the NCPB's activities on various agents of the supply chain, 3) increase maize stocks, 4) shift Kenya's policy approach from reactive to proactive to better prepare for food shortages and reduce risk, and 5) invest in infrastructure to reduce access costs and increase trade between regional maize markets.

CONTENTS

1. PURPOSE OF THE NOTE

This technical note aims to describe the market incentives and disincentives for maize in Kenya. 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 (NRPs). These key indicators are used by MAFAP to highlight the effects of policy and Market Development Gaps (MDGs) 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 were obtained. Using this data, the MAFAP indicators were then calculated and interpreted in light of existing policies and market characteristics. The analysis is commodity and country specific and covers the period 2005-2011. The indicators were calculated using available data from different sources for this period.

The results of this analysis can be used by 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.

All information is preliminary and still subject to review and validation.

2. COMMODITY CONTEXT

Maize is the primary staple food for most Kenyans, accounting for 36 percent of all calories consumed and 65 percent of staple food calories consumed. The importance of maize availability in Kenya was underscored by the civil unrest that followed the December 2007 election and a subsequent drought in 2009. These events resulted in a spike in maize imports and prices and increased interest in policies to assure supplies. However, maize accounts for only about 8 percent of the total value of agricultural production, while other commodities (e.g. cattle, milk and tea) are more important by value.

PRODUCTION

Kenya's annual maize production in recent years has remained around three million tonnes. Parts of the Rift Valley Province in western Kenya, particularly the districts of Trans Nzoia and Uasin Gishu, produce a large maize surplus, primarily on medium and large farms[1]. Most other regions are self-sufficient or face a maize deficit on an annual basis. However, much of Kenya is semi-arid and subject to significant production volatility. About 15 percent of total maize production is sold directly to the National Cereals and Produce Board (NCPB) and large millers, much of which comes from medium and large farms in the surplus region (see Table 1).

The events of 2008 and 2009 severely strained Kenya's normal ability to provide affordable maize and maize meal. Civil disturbances following the December 2007 election resulted in the destruction of 0.3 million tonnes of maize (African Centre for Open Governance) and a 20 percent reduction in the total area planted to maize during long rains in 2008 (WB, 2009b). This was followed by a drought that affected the next two harvests. As a result, total production fell 19 percent in 2008 and did not recover to normal levels until 2010, according to official estimates (see Table 1).

Sales to the NCPB and large millers fell even more dramatically, by 33 percent in 2008 and 44 percent in 2009. This is mainly due to the fact that smallholder producers retained a larger share of their crop in the face of shortages and steeply rising food prices.

Table 1: Kenya Maize Production, 2005-2010 (1 000 tonnes)

	2005	2006	2007	2008	2009	2010
Production	2,916	3,249	2,925	2,367	2,439	3,222
Sales to NCPB and large millers	416	471	509	341	191	295
Share of sales to NCPB and large millers	14%	14%	17%	14%	8%	9%
Other maize produced	2,500	2,778	2,416	2,027	2,248	2,927
Share of other maize produced	86%	86%	83%	86%	92%	91%

Sources: *Economic Survey 2011* (Table 8.9 & 8.11), *Statistical Abstract 2010* (Table 60), and Ministry of Agriculture, *Economic Review of Agriculture 2010* (Table 5.2)

Medium- and large-scale producers may be more motivated by income earned from maize production. In this case, the expected price is a more important consideration, and there is no preference for maize production per se. Decisions about which crops to produce might focus as

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[1] Political divisions in Kenya will change with the new constitution and parliament. Current provinces will likely be eliminated, and current districts will become counties comprised of smaller districts.

much on price risk as they do on production risk. Risk management would need to consider the relative advantages of prices and price volatility of cash crops (perhaps with additional exchange rate risk) versus food crops (perhaps with additional risk caused by inelastic demand functions).

CONSUMPTION/UTILIZATION

Table 2 shows Kenya's maize supply and disposition for the period 2005-2010. Kirimi, Sitko et al. estimate maize consumption at about 88 kg/capita/year, which is consistent with disappearance numbers in Table 2 and a negligible average change in inventories and other uses.

Table 2: Kenya Maize Supply and Disposition, 2005-2010 (1000 tonnes)

	2005	2006	2007	2008	2009	2010
Production	2,916	3,249	2,925	2,367	2,439	3,222
Imports	252	275	254	288	1,600	349
Exports	11	15	43	18	102	1
Available supply	3,157	3,509	3,136	2,637	3,937	3,570
Self-sufficiency ratio	92%	93%	93%	90%	62%	90%
Normal consumption	3,044	3,152	3,265	3,381	3,501	3,626
Surplus/shortage	114	357	-128	-744	436	-56
Possible inventory	114	470	342	-402	34	-23

Sources: Global Trade Atlas, RATIN and WB, 2009b

Available supply in Table 2 is merely net production plus net imports and does not include changes in inventories. Net imports in this case include both official and unofficial trade[2]. Use of maize as livestock feed is negligible according to Kenya National Bureau of Statistics (KNBS) food balance tables in the *Economic Survey 2011*.

The available supply averaged 91 kg per capita over the six years analyzed. The "normal consumption" figures in Table 2 were derived by multiplying this average per capita supply by the population in each year. The difference between available supply and normal consumption is shown as a surplus or shortage in each year, which would need to be covered by changes in inventory to maintain consumption at the normal level. Estimates in Table 2 indicate that it may have been necessary to reduce maize inventories by about 744,000 tonnes (11 percent of normal consumption) in 2008 to maintain consumption at normal levels. However, it seems that this amount was not available, resulting in a large consumption shortfall that year and a spike in prices[3].

The continued shortfall in supplies resulted in temporary policy changes (see section below on policy) that allowed for a large increase in imports from South Africa (see Figure 1) in 2009. The spike in imports resulted in increased inventories that were carried into 2010. The KNBS estimates that

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[2] Estimates of unofficial imports are from Regional Agricultural Trade Intelligence Network (RATIN) food balance sheets for East Africa at www.ratin.net/. These provide estimates of cross-border trade resulting from underreporting official trade and legal practices, such as off-loading trucks on one side of the border and transporting maize across the border on bicycles, one bag at a time, to stay under the import exemption limit. For most years, unofficial trade is greater than official trade.

[3] Some of this shortfall could have been met with other staple food substitutes and some could have been met by people going hungry (i.e. consuming less).

inventories increased by 545,000 tonnes in 2010. High prices, however, kept per capita consumption below the normal average throughout 2008-2010.

MARKETING AND TRADE

Maize marketed sales in Kenya are highly concentrated. Although almost all farmers grow maize, it is estimated that only 2 percent of farmers in the smallholder sector account for over 50 percent of the national marketed supply. Jayne et al. found that only 32 percent of rural households who grow maize are net maize sellers.

About 57 percent of smallholder producers are maize deficit (buying more than they sell), and about 11 percent are purely subsistence producers (neither buying nor selling maize).

Domestic maize production has increasingly lagged behind population growth, especially in urban areas, where the population is growing at 4 percent per annum. Since 2000, it has become clear that Kenya has a structural deficit in maize production. This deficit has increased to about 10 percent of production since 2005. Most of this deficit is filled by imports, both official and unofficial, from Uganda and Tanzania (see Figure 1).

Unofficial imports are primarily from Uganda and Tanzania, which are generally regarded as having lower costs of production than Kenya and competitive access costs to some of Kenya's population centers (see, for example, Nyoro, 2000 and Nyoro, Wanzala & Awour, 2001). Kenya is normally able to import sufficient maize to meet its needs from the two countries at prices below those in world markets. However, Uganda and Tanzania were not able to respond to the shortfall in production in 2008 and 2009, so Kenya resorted to imports from the international market at world prices.

There are several reasons why Uganda and Tanzania were not able to respond. Kenya required imports over five times its normal import level in 2008 and 2009, and this additional volume was simply not available from Uganda and Tanzania. In fact, Tanzania closed its border to maize exports to protect its own consumers. Moreover, production in Uganda and Tanzania was likely affected by the same drought conditions as Kenya. All three countries have two rainy seasons, with minor differences in the onset of rains and harvests.

Figure 1: Official and Unofficial Maize Trade in Kenya by Region, 2006 – August 2011 (tonnes)
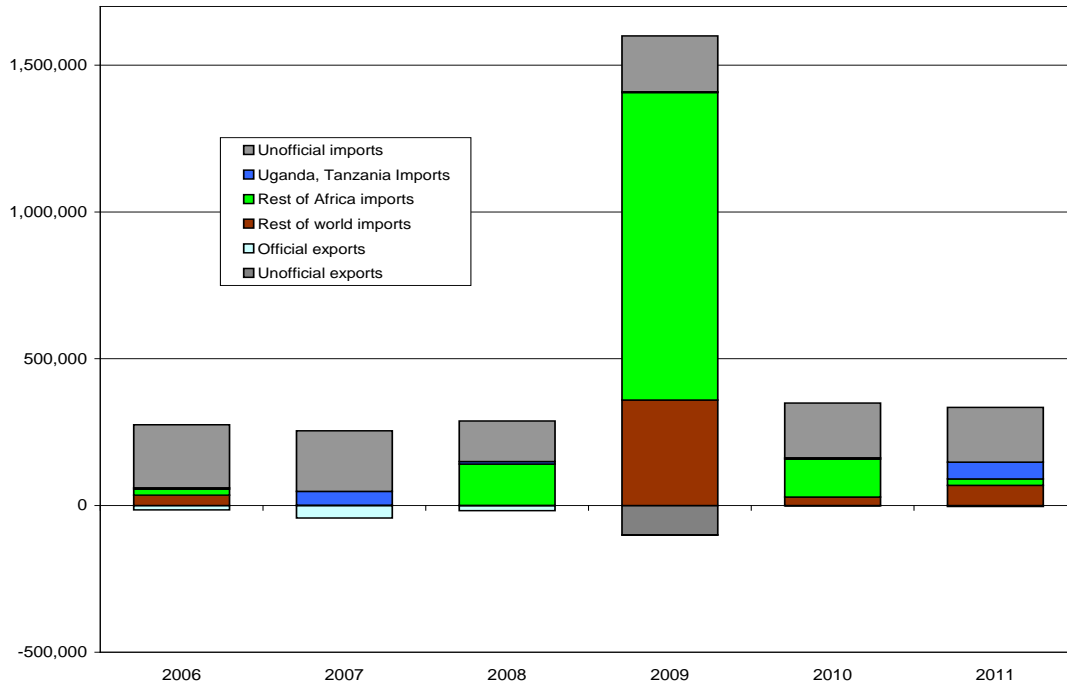
Since all three countries are members of the East African Community (EAC), a common external tariff of 50 percent is normally levied on maize imports from countries outside of the EAC, but fees are limited to 2.75 percent on trade with each other. However, Tanzania has frequently implemented export bans, while Kenya has often been forced to waive tariffs in situations of supply shortfall. As shown in Figure 2, maize prices in Kenya were generally well below the import parity from South Africa even without a tariff, except during major supply shortages between 2008 and 2010.

Figure 2: Nairobi Wholesale Prices and Import Parity from South Africa with and without tariffs, 2006-August 2011 (USD/T)
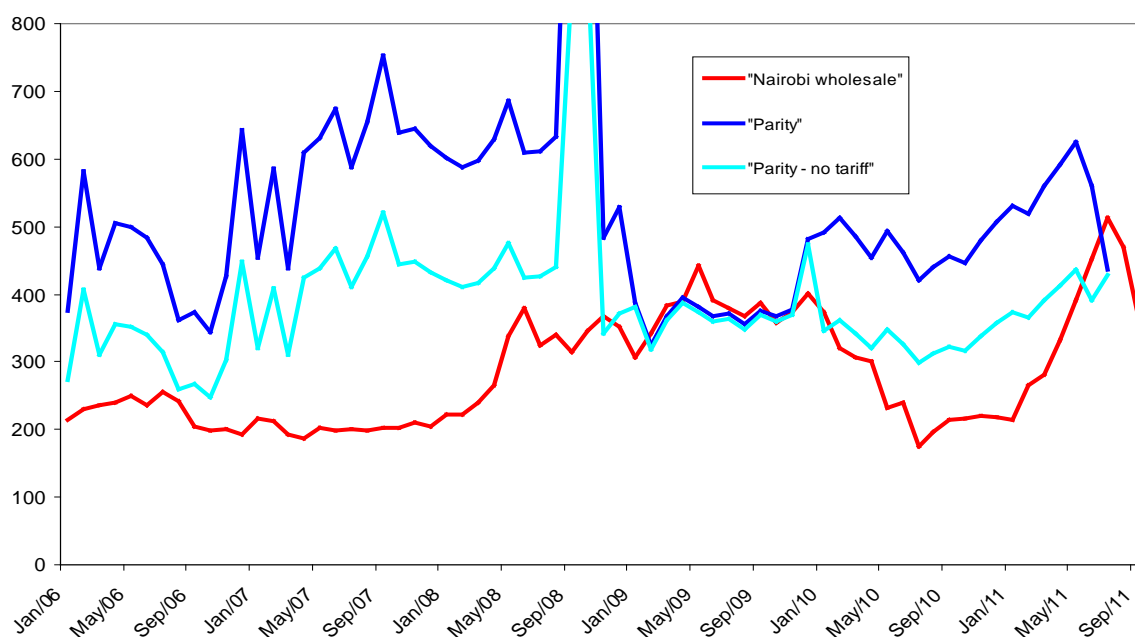
In 2008, the NCPB imported nearly 150 000 tonnes of maize from South Africa through Kenya's main port in Mombasa at a CIF price of over USD 400/tonne. This high import price is a result of the surge in world prices that hit global markets in 2007-2008. NCPB imports from South Africa all occurred in the second half of 2008, after world prices had declined from their peak; however, prices paid on deliveries from South Africa were high perhaps relating to the timing of orders and deliveries as well as the uncertainties in world markets. A 50 percent tariff, port charges and transportation costs to Nairobi would raise the parity price to over USD 600, but the NCPB sold it at well below the USD 400 CIF price[4].

Kenya waived its tariff on maize imports in 2009, and millers and wholesalers were able to import maize directly at an average price below USD 300/T. The measure resulted in massive imports, amounting to 1 599,617 tonnes or about half of normal production.

It is clear from Figure 2 that throughout 2009, average monthly wholesale prices in Nairobi closely approximated import parity prices. Nairobi was clearly integrated with the global market through maize imports from South Africa, but prices were high and above the more usual prices of 2006 and 2007.

Domestic distribution costs are another important feature of the maize market in Kenya. Major population centers are located far from surplus districts and from each other, resulting in large market access costs. Nairobi is nearly 500 km from Kenya's main port in Mombasa, which is the second largest city in the country, and 300 km from maize surplus regions in the Rift Valley. Large population concentrations in parts of central and western Kenya with high agricultural potential are

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[4] Whether the GOK collects a tariff from maize imported by the NCPB is probably a moot issue from a budget point of view.

separated by vast semi-arid zones, while most of the north and the area between Nairobi and Mombasa ranges from semi-arid to arid.

Wholesale prices for most major market centers in Kenya are available from the FAO GIEWS database[5]. However, an examination of the bases, the price differences between these markets, shows that trade between market centers is often not justified by price differentials. It is very hard to see a pattern of price differentials consistent with market integration.

Figures 3-6 show the difference in monthly prices between major maize markets in Kenya. Price differences that fall within the shaded areas are less than transportation costs between the two markets analyzed in each graph. In the months when price differences are less than transportation costs, it does not pay to ship maize from one city to the other. In other months, price differentials should cluster around the border of the shaded area as arbitrage becomes profitable. In Figure 3, for example, one would expect to see price differentials near the top boundary of the shaded area when Nairobi has a shortage and near the lower boundary when it would be more profitable to ship maize to Mombasa. Arbitrage between the two markets would eliminate/reduce outliers.

Figure 3 shows that for most of the period between 2006 and 2008, it was not profitable to move maize in either direction, so Nairobi and Mombasa markets were not well integrated. In 2009, price differentials justified shipping maize from Mombasa to Nairobi. In fact, price differences were significantly above transportation costs, raising the question of why prices in Mombasa remained so low when large quantities were being imported to meet the shortage in Nairobi and elsewhere. Price differences were more variable in 2010 and 2011, but did not appear to justify trade in most months.

Price differentials were sufficient to justify shipments from Mombasa to Nairobi in only 13 of the 68 months shown in Figure 3. Seven of these months were in 2009, when Nairobi prices approximated import parity prices for South Africa. Conversely, price differentials were sufficient to justify shipments from Nairobi to Mombasa in only 4 of the 68 months. There is no seasonal pattern, but rather arbitrage between both markets seemed random and short-lived, except in 2009.

Thus, Mombasa and Nairobi did not appear to be integrated markets in 51 of the 68 months between 2006 to August 2011 and only weakly integrated in the other 17 months.

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[5] These appear to be identical to the prices published by RATIN and in some GOK publications. Prices are not collected for market centers in the former Eastern Province, even though this area is semi-arid and a good location to monitor for drought induced shortages. The KNBS has a much longer series of retail prices for four market centers, which it collects for its CPI estimation. The NCPB collects retail and wholesale prices (defined as the price of a one kg container of maize and a 90 kg bag of maize, respectively) for a large number of locations, but these are not generally available as a time series.

Figure 3: Maize Price Differences (Nairobi minus Mombasa), 2005-2011 (USD/T)
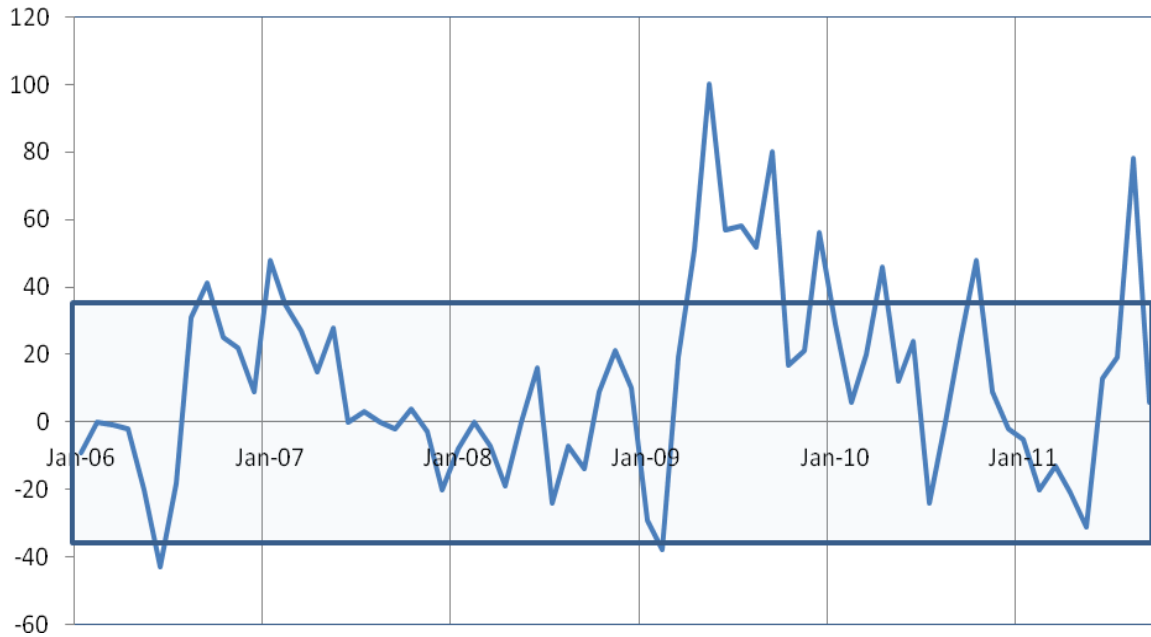
Figure 4 shows price differentials between Nairobi and Eldoret[6]. Eldoret is the major market center in the maize surplus region of western Kenya, while Nairobi is the major deficit market. In this case, there does seem to be at least a seasonal pattern of arbitrage between the two regions. Price differentials between October and March are often sufficient to justify shipments from Eldoret to Nairobi. There was a sustained period in which trade was profitable in 2006 and 2007. This pattern was disrupted in 2008 and 2009, when there was a national maize shortage, but resumed in 2010 and 2011.

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[6] Mombasa is about 485 km from Nairobi, while Eldoret is about 320 km from Nairobi. A number of authors, however, provide a similar transportation cost of approximately USD 35/T to transport maize from either Mombasa or Eldoret to Nairobi (see Annex 4).

Figure 4: Maize Price Differences (Nairobi minus Eldoret), 2005-2011 (USD/tonne)
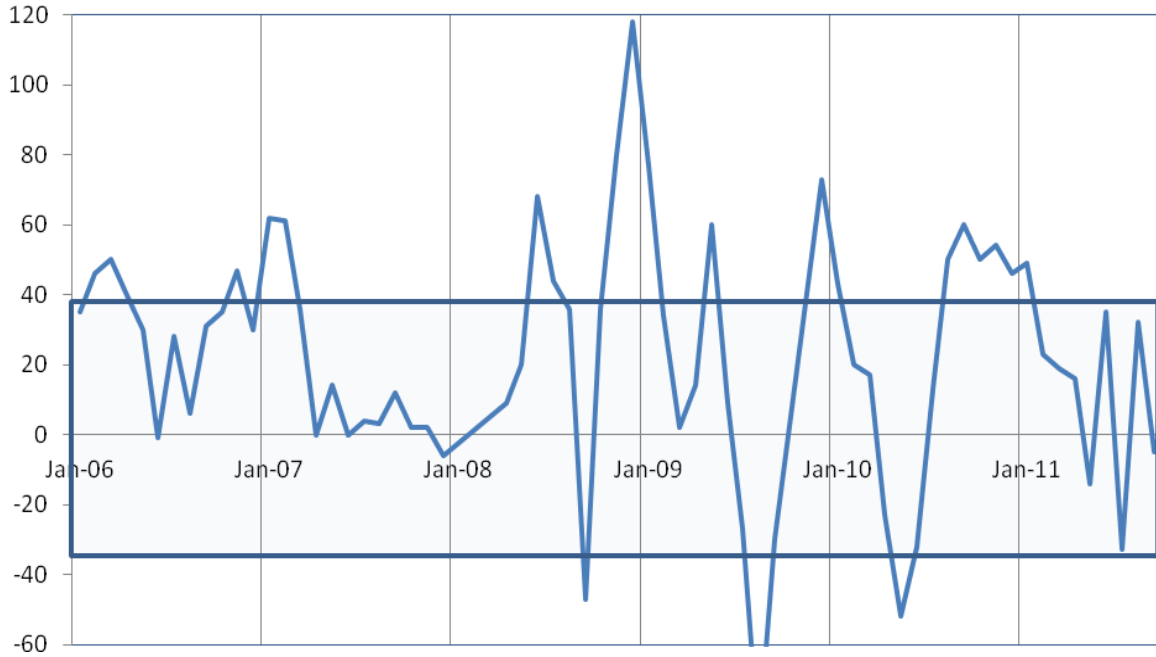
Figures 5 and 6 show price differentials between Kisumu and the two markets, Nairobi and Eldoret, respectively[7]. Kisumu is the capital of the Nyanza Province in southwest Kenya. Maize prices in Kisumu are often higher than maize prices in Nairobi by more than USD 35/T, even though the distance between Eldoret and Kisumu is only about two-thirds the distance between Eldoret and Nairobi. Figure 5 shows that there were brief periods when price differentials were sufficient to justify shipments from Nairobi to Kisumu, but the overall trend does not show a pattern consistent with arbitrage.

Price differentials between Kisumu and Eldoret in Figure 6 are extremely large relative to the distance between the two markets. This could have something to do with the size of the market in Kisumu or that Kisumu is a subsistence type market, with only a small amount of production or consumption traded, raising risks and costs of dealing in this market. Perhaps the lack of market integration between Eldoret and Kisumu is the reason Kirimi et al. found that the Nyanza Province is a major destination for imports from both southeast Uganda and northwest Tanzania.

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[7] Kisumu is about 345 km from Nairobi, but only 135 km from Eldoret.

Figure 5: Maize Price Differences (Kisumu minus Nairobi), 2005-2011 (USD/tonne)
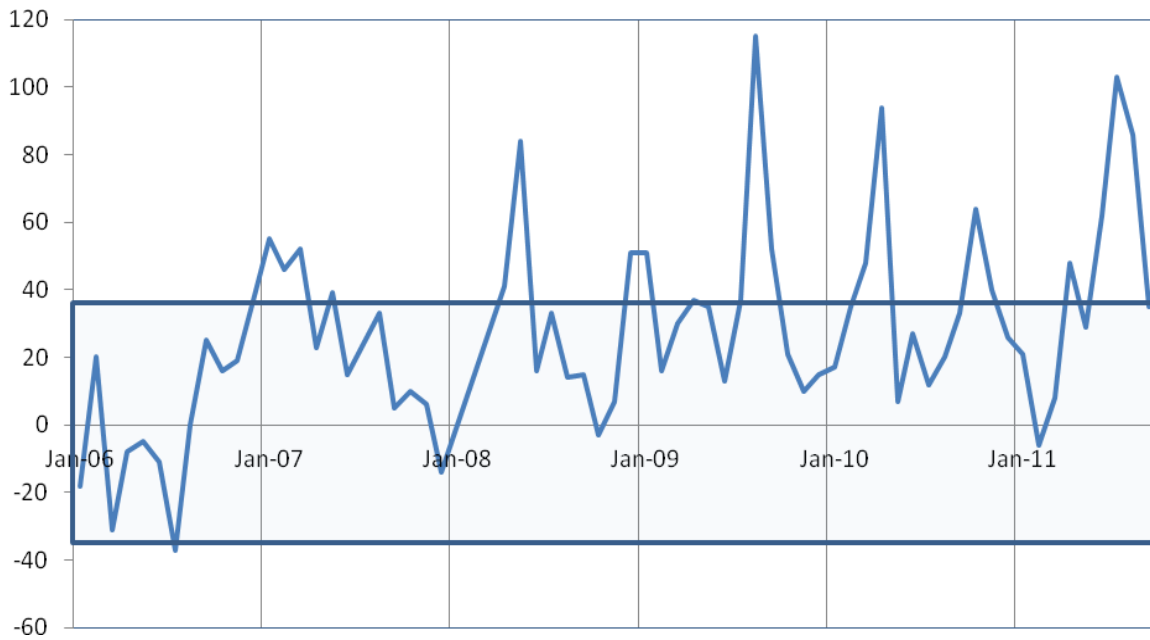
Figure 6: Maize Price Differences (Kisumu minus Eldoret), 2005-2011 (USD/tonne)
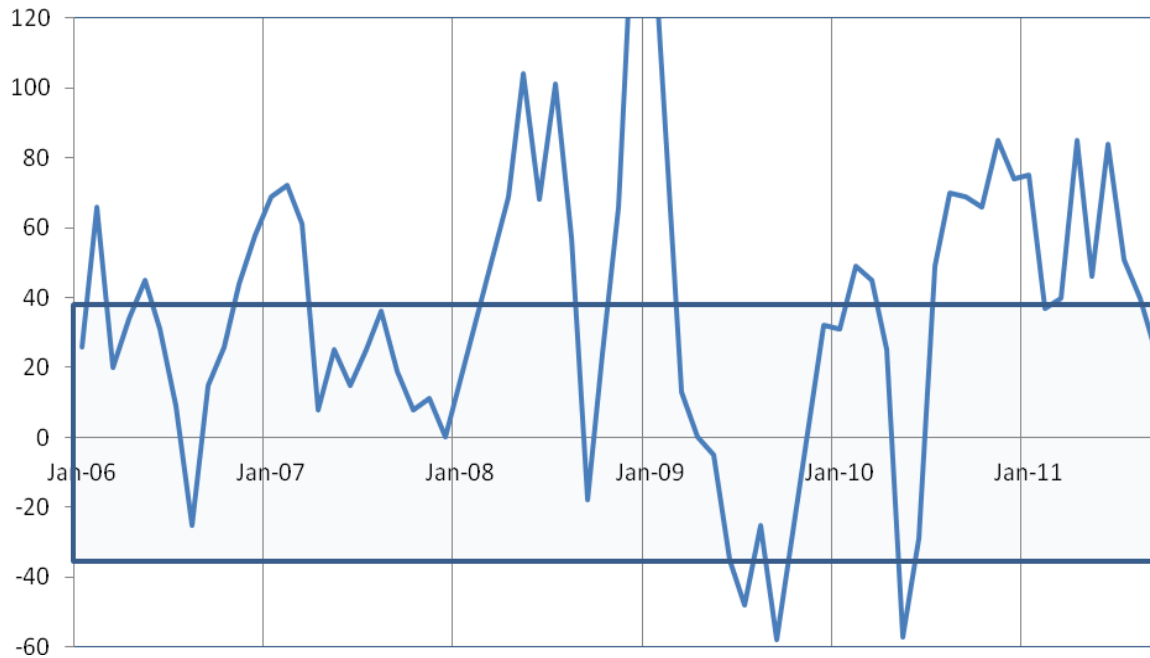
DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

Figure 7 shows a simplified representation of the maize value chains in Kenya. The origin of maize supply is either medium and large farms or smallholder farms. According to Chemonics Inc., "Medium to large scale producers sell virtually all their harvested produce except for very small quantities (less than 1 percent) for home consumption, animal feed and seeds-in some instances." They sell their maize either to the NCPB or directly to large-scale millers.

The NCPB buys from medium- and large-scale farmers and from smallholders in a few major surplus zones, such as Trans Nzoia and Uasin Gishu (Kirimi et al.). It increases its purchases in a good production season and reduces its purchases in a poor production season to stabilize maize prices (Jayne, Myers, and Nyoro).

Kirimi et al. found that only 3 percent of the 1,275 farm households in the Tegemeo Rural Surveys sold maize to the NCPB. While some maize may be sold directly to consumers in local markets, most is sold to local traders, who sell it to larger wholesalers up the chain, where it may go on to the retail market, the NCPB or large-scale millers. Smallholders and consumers, who buy maize, may pay posho mills to have the maize milled into meal. The maize sold to large-scale millers is processed into branded, higher quality maize meal that competes with other brands in local markets on the basis of price and quality.

Figure 7: Simplified Diagram of the Maize Value Chain in Kenya
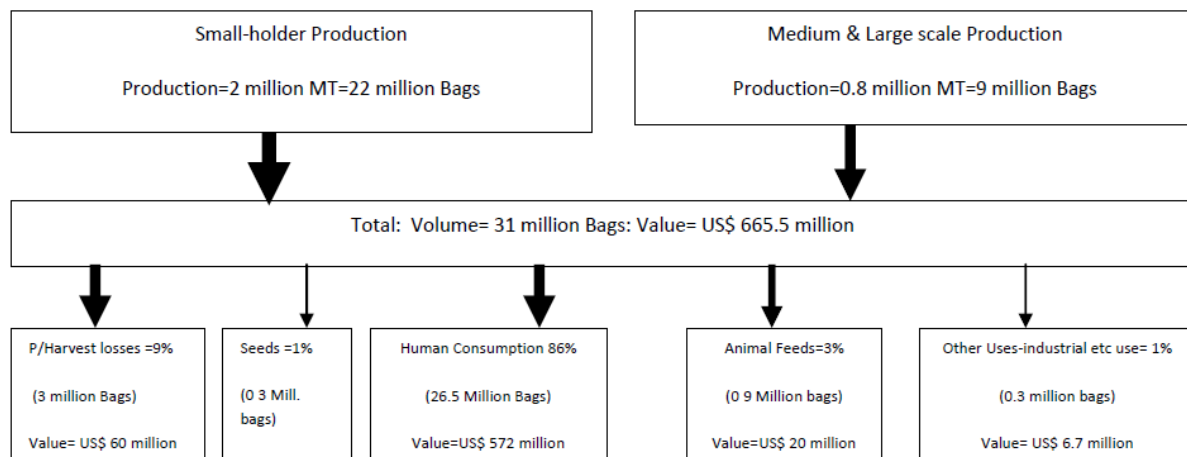
Source: Chemonics, 2010

POLICY DECISIONS AND MEASURES

The major short- and medium-term policy objective for maize is maintaining its availability at stable, affordable prices for Kenyan consumers. The NCPB is the main agency responsible for implementing this policy (see Annex II for details about Kenyan policy with regard to the NCPB). Certainly, longer term policy focuses on increasing production through research, extension and other similar means. The Government of Kenya (GOK) has occasionally responded to low maize prices with higher tariffs, but market interventions have mainly focused on maintaining supplies, especially in the major deficit market of Nairobi.

Before maize market liberalization in the 1990s, the GOK set producer and into-mill prices for maize grain and prices for maize meal sold by millers and by retailers to consumers. The NCPB monopolized internal and external trade. It purchased 2-3 million bags (over 20 percent of production) during this period, while only limited private trade was permitted. Traders were required to apply for movement permits to transport grain across district boundaries. NCPB losses were covered by transfers from the government's budget.

With liberalization, movement restrictions were eliminated, the role of the NCPB was more circumscribed and the share of maize purchased by the NCPB reduced. The NCPB focused more on food security and less on price stabilization, but the same general mechanisms of floor prices and sales with losses remained in place. Buying has been concentrated in the maize surplus regions of western Kenya. Large millers also concentrate their buying activities in the same region.

The NCPB's cost of procurement is the amount paid to medium- and large-scale producers plus marketing costs. Sales at prices below the cost of procurement effectively create a wedge or gap between the prices paid to medium- and large-scale producers and that charged to consumers, raising the former and decreasing the latter. This effectively is a subsidy to medium- and large-scale producers, which tends to encourage their production, possibly putting downward pressure on market prices received by smallholders and their market share.

The NCPB's participation in maize markets increased considerably after 2000, but their market share has remained well below pre-liberalization levels. The years 2006 and 2007 were largely a continuation of the policy framework for maize since 2000. However, civil unrest and drought in 2008 and 2009 severely strained Kenya's ability to provide affordable maize and maize meal.

The NCPB buying price in 2008 was set at Ksh 1,950/90 kg bag, while the selling price was set lower, between Ksh 1,435 and Ksh 1,835/90 kg bag. In 2008, the NCPB imported maize from South Africa at an average cost of Ksh 3,400/bag (4,800 with duty) and sold most at about Ksh 1,700/bag.

As already indicated, the import tariff was waived in 2009, and millers and grain dealers were allowed to import maize directly. Going forward, it seems likely that Kenya will continue to change its policies frequently to adapt to the various pressures confronting the government. Policy in 2010 was relatively quiet with a less active role played by the NCPB and a resumption of the 50 percent tariff for countries other than Uganda and Tanzania. (However, see Annex II for some of the measure announcements affecting maize in the July 2011 budget). There is renewed interest in promoting domestic production through subsidized fertilizer provided by the NCPB, a new system that allows farmers to store their maize in NCPB depots and sell it later in the year when prices are higher, and support for irrigation as part of an economic stimulus package.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

To calculate the indicators needed to estimate market price incentives or disincentives for maize producers in Kenya, several types of data are needed. They were collected and are presented and explained hereafter.

Since maize produced by medium and large farms is mainly sold to large millers and the NCPB, while maize produced by most smallholder farms is either consumed on-farm or sold at wholesale markets, separate value chains were analyzed for small and large producers.

TRADE STATUS OF THE PRODUCT

As mentioned earlier, Kenya was a net importer of maize throughout the period 2005-2010. In most years, Kenya's production deficit was met through duty-free imports from Uganda and Tanzania. However, these countries were not able to meet Kenya's extraordinary need for imports in 2008 and 2009. During this period, Kenya turned to exporters who trade on more global markets, principally South Africa and a number of non-African exporters (e.g. the United States, Ukraine and India). In all other years, nearly all imports came from Uganda and Tanzania. Wholesale prices in Uganda and Tanzania are similar, but generally a bit lower than wholesale prices in Kenya.

BENCHMARK PRICES

Observed

Due to the lack of reliable import prices for maize in Kenya, Uganda's FOB price for all maize exports was taken as the benchmark price in this analysis. This price was calculated by dividing the total value of maize exports by the total quantity exported each year. Export value and quantity data was obtained from Uganda's Statistical Abstract (2010 & 2011).

Adjusted

No adjustments to the benchmark prices were made.

EXCHANGE RATES

Observed

Average nominal exchange rates between the Kenya Shilling and the US Dollar were used in this analysis. The average rates for each year under review were obtained from the World Bank's World Development Indicators database.

Adjusted

The observed (free market) exchange rate is believed to measure the equilibrium exchange rate. Therefore, no adjustment was necessary.

DOMESTIC PRICES

Two domestic prices were required for this analysis – the price at the point of competition (the wholesale price) and the price at the farm gate.

For medium and large farms, the observed wholesale price is the average annual price paid by large millers and the NCPB, as reported by KNBS. According to Kirimi, Sitco et al., 92 percent of maize sold by traders from Trans Nzoia (Eldoret) is sold to millers or the NCPB in Nairobi. Therefore, Nairobi was assumed to be the point of competition, where domestic maize competes at world market prices.

The farm gate price was calculated from the observed wholesale price by subtracting the estimated cost of transporting maize from medium and large farms to Nairobi. These costs are described under the section on access costs below.

For smallholder farms, the observed wholesale price is the average annual wholesale price for maize in Nairobi, as reported by the Regional Agricultural Trade Intelligence Network (RATIN). Thus, Nairobi was also assumed to be the point of competition for smallholders. The farm gate price was calculated from the observed wholesale price by subtracting the estimated cost of transporting maize from smallholder farms to Nairobi. These costs are described under the section on access costs below.

ACCESS COSTS

Observed

Observed access costs reflect the actual cost of bringing domestic or imported maize to the wholesale market (i.e. the point of competition). These costs include all marketing costs and margins, whether they are paid-for services, bribes or taxes.

As shown in Table 3, market access costs were estimated for five different segments of the maize value chains analyzed. Costs for each segment were obtained from a maize marketing study conducted by the World Bank (2009b). It was assumed that these access costs were based on data collected in 2008, the year before the study was published. Since market access costs were only available for a single year, Kenya's Consumer Price Index (CPI) obtained from the KNBS was used to extrapolate them for each year analyzed, with 2008 as the base year (see Table 4).

Table 3: Value Chain Segments Analyzed

Segment	Small farm value chain		Large/medium farm value chain	
	Farm gate to wholesale	Border to wholesale	Farm gate to wholesale	Border to wholesale
(1) Farm gate to primary market	X			
(2) Primary to secondary market	X			
(3) Secondary to wholesale market	X		X	
(4) Busia border crossing costs (Kenya side only)		X		X
(5) Long haul route - Busia to Nairobi		X		X

Source: World Bank, 2009b

For small farms, total access costs between the farm gate and wholesale were calculated as the sum of the costs from the farm gate to the primary market, the primary to the secondary market and the secondary to the wholesale market, as reported by the World Bank (2009b). However, for medium and large farms, total access costs between the farm gate and wholesale include only the costs from the secondary to the wholesale market. Reported transportation costs for each segment are assumed to include the trader's margin, though the exact amount or share of this margin relative to the trader's total costs are unknown. Table 4 shows the itemized and total observed access costs from the farm gate to the wholesale for both value chains.

Market access costs from the border to the wholesale market in Nairobi were the same for both value chains. These costs include all Busia border crossing costs (specific to Kenya's side of the border only) and long haul transport costs, which were calculated by multiplying the estimated distance between Busia and Nairobi (470 km) by the average unit transport costs for maize (0.11 Ksh/tonne/km) obtained from the World Bank (2009b). These transport costs are inclusive of non-tariff barriers, such as bribes and delays at roadblocks and weighbridges. Table 4 shows the itemized and total observed access costs from the border to the wholesale for both value chains.

Table 4: Observed Access Costs, 2005-2010 (Ksh/tonne)

	2005	2006	2007	2008	2009	2010
Consumer Price Index (CPI)	0.79	0.83	0.87	1.00*	1.11	1.15
Farm Gate to Primary Market (6 Km)						
Storage/rental fee	114	121	126	145	161	167
Transportation charges	47	50	52	60	67	69
Hired labor loading/unloading	77	82	85	98	109	113
Council cess	170	180	188	217	239	249
Roadblocks and weighbridges	51	54	56	64	71	74
(1) Sub-total	459	487	508	585	646	673
Primary to Secondary Market (67 Km)						
Storage/rental fee	136	144	150	173	191	199
Transportation charges	911	966	1,007	1,159	1,282	1,334
Hired labor loading/unloading	310	329	343	394	436	454
Council cess	73	78	81	93	103	107
Roadblocks and weighbridges	182	193	201	231	255	266
Drying tent/empty bags	82	86	90	104	115	119
(2) Sub-total	1,693	1,795	1,872	2,155	2,382	2,479
Secondary to Wholesale Market (300 km)						
Storage/rental fee	152	161	168	194	214	223
Transportation charges	1,633	1,731	1,805	2,078	2,297	2,391
Hired labor loading/unloading	341	361	377	434	479	499
Council cess	155	164	171	197	218	227
Roadblocks and weighbridges	161	171	178	205	226	236
(3) Sub-total	2,442	2,589	2,700	3,108	3,435	3,575
TOTAL - Farm Gate to Wholesale						
Small Farms (1)+(2)+(3)	**4,594**	**4,872**	**5,080**	**5,847**	**6,463**	**6,727**
Medium and Large Farms (3)	**2,442**	**2,589**	**2,700**	**3,108**	**3,435**	**3,575**
Busia Border Crossing Costs (Kenya Side Only)						
PATA clearing agent fee	66	70	73	84	93	97
Kenya Plant Health Inspectorate Services (KEPHIS)	24	26	27	31	34	36
Kenya Bureau of Standards (KEBS)	24	26	27	31	34	36
Health Certificate	24	26	27	31	34	36
Bribe	14	15	16	18	20	21
Road use fee	49	52	54	62	69	72
(4) Sub-total	203	215	224	258	285	297
Busia to Nairobi (470 km)						
(5) Long haul transport costs	2,810	2,980	3,107	3,577	3,953	4,115
TOTAL – Border to Wholesale						
All Farms (4)+(5)	**3,013**	**3,195**	**3,331**	**3,835**	**4,239**	**4,412**

*Base year used to extrapolate costs for all other years.
Source: WB, 2009b, KNBS, 2011

Adjusted

Adjusted access costs reflect the cost of bringing domestic or imported maize to the wholesale market (i.e. the point of competition) in an efficient, well-functioning market. Thus, all government taxes, fees (excluding fees for services), bribes and other non-tariff measures are omitted and "excessive" costs are adjusted. Additionally, "excessive" profit margins exceeding 10 percent of the full financial costs (crop purchase plus access costs) borne by each marketing agent along the value chain are removed.

Adjusted access costs in this analysis were calculated the same way as the observed access costs; however, Council Cess, bribes and delays at roadblocks and weighbridges were removed from the estimates. Table 5 shows the itemized and total adjusted access costs from the farm gate to wholesale and from the border to wholesale for both value chains analyzed.

Table 5: Adjusted Access Costs, 2005-2010 (Ksh/Tonne)

	2005	2006	2007	2008	2009	2010
Consumer Price Index (CPI)	0.79	0.83	0.87	1.00*	1.11	1.15
Farm Gate to Primary Market (6 Km)						
Storage/rental fee	114	121	126	145	161	167
Transportation charges	47	50	52	60	67	69
Hired labor loading/unloading	77	82	85	98	109	113
Council cess	0	0	0	0	0	0
Roadblocks and weighbridges	0	0	0	0	0	0
(1) Sub-total	239	253	264	304	336	349
Primary to Secondary Market (67 Km)						
Storage/rental fee	136	144	150	173	191	199
Transportation charges	911	966	1,007	1,159	1,282	1,334
Hired labor loading/unloading	310	329	343	394	436	454
Council cess	0	0	0	0	0	0
Roadblocks and weighbridges	0	0	0	0	0	0
Drying tent/empty bags	82	86	90	104	115	119
(2) Sub-total	1,438	1,525	1,590	1,831	2,023	2,106
Secondary to Wholesale Market (300 km)						
Storage/rental fee	152	161	168	194	214	223
Transportation charges	1,633	1,731	1,805	2,078	2,297	2,391
Hired labor loading/unloading	341	361	377	434	479	499
Council cess	0	0	0	0	0	0
Roadblocks and weighbridges	0	0	0	0	0	0
(3) Sub-total	2,126	2,254	2,351	2,706	2,991	3,113
TOTAL - Farm Gate to Wholesale						
Small Farms (1)+(2)+(3)	**3,803**	**4,032**	**4,205**	**4,840**	**5,350**	**5,568**
Large Farms (3)	**2,126**	**2,254**	**2,351**	**2,706**	**2,991**	**3,113**
Busia Border Crossing Costs (Kenya Side Only)						
PATA clearing agent fee	66	70	73	84	93	97
Kenya Plant Health Inspectorate Services (KEPHIS)	24	26	27	31	34	36
Kenya Bureau of Standards (KEBS)	24	26	27	31	34	36
Health Certificate	24	26	27	31	34	36
Bribe	0	0	0	0	0	0
Road use fee	49	52	54	62	69	72
(4) Sub-total	189	200	209	240	265	276
Busia to Nairobi (470 km)						
(5) Long haul transport costs	2,558	2,713	2,829	3,256	3,599	3,746
TOTAL – Border to Wholesale						
Small and Large Farms (4)+(5)	**2,747**	**2,913**	**3,037**	**3,496**	**3,864**	**4,022**

*Base year used to extrapolate costs for all other years.
Source: WB, 2009b, KNBS, 2011

EXTERNALITIES

The reduced cost to the trucking industry is assumed to create an externality in terms of road maintenance and safety for other road-users. This, however, does not affect the results for access costs, as it does not affect observed costs and is eliminated in the adjusted costs estimate.

BUDGET AND OTHER TRANSFERS

The main policy instrument used to affect market prices is the trading activities of the NCPB. It does this through purchasing grain and selling it at a price below procurement costs. This was most obvious in 2008 and 2009, when selling prices were actually below purchase prices. But even in other years when the selling price is greater than the purchase price, there will be a subsidy if the

NCPB does not cover all of its marketing costs. Subsidies on imported maize should lower the prices to both producers and consumers and show up in our analysis as reduced or negative nominal rates of protection.

The expected outcome of this activity should result in higher prices for producers than would otherwise be the case and lower prices for consumers. (See Annex V for a more technical explanation.) This is the well-known "high-price" policy, which has been commented on by many observers, but few have mentioned its intended objective of lowering prices for consumers. Many observers have complained about inefficiencies of state operated marketing agencies and instances of corrupt practices that have from time to time been uncovered. This would reduce, but still likely result in, higher producer prices and lower consumer prices.

The situation, however, may be more complex in Kenya because most NCPB activity has been limited to purchasing grain from medium and large farms in the surplus districts and selling it to large millers. Transportation costs and scale economies may prevent other producers and traders from arbitraging between markets. In this case, the subsidy only affects the price paid to those producers. Other producers may be forced to sell their grain to traders or local markets, where it must compete with the subsidized product coming from the large-scale millers. In other words, they are selling at the consumer price rather than producer price.

The subsidies incorporated into the model at this time are fairly small, as shown in Table 4. These numbers may apply only to NCPB domestic market transactions, since import subsidies are obviously much larger than the numbers shown in Table 4, at least for 2008. Since these estimates are market subsidies, they do not enter in the calculations, but likely affect the price gaps and NRPs calculated.

Table 3: Budget Transfers and Loans to the NCPB

	Unit	2005	2006	2007	2008	2009	2010
Total	1000 Ksh	0	500,000	750,000	1,003,337	1,303,245	749,650
Per Unit	Ksh/T	0	154	256	424	534	233

Source: Data for years 2008 – 2011 were provided by country partners, while data for 2006 and 2007 are merely possible values considering traded volumes.

QUALITY AND QUANTITY ADJUSTMENTS

Imported maize from South Africa is considered to be of a higher and more uniform quality than Kenya maize or that imported from Uganda and Tanzania. This makes it more attractive to large-scale millers. However, this relationship is not quantified at this time, so quality differences were not accounted for in the analysis.

This analysis does not go beyond the milling part of the supply chain at this time. The conversion of maize to maize meal involves a 20 percent loss in weight, with the by product valued at about a third of the value of maize meal. Conversion of maize to maize meal by small posho mills or by traditional methods involves different conversion efficiencies and a different quality of maize meal produced. Competition among large, commercial millers and posho mills is another dynamic in the maize supply chains that needs further investigation.

DATA OVERVIEW

Following the discussion above, a summary of the main data sources and methodological decisions taken for this analysis of price incentives and disincentives is provided below.

Table 4: Sources of Data Used in the Calculation of Indicators

Concept		Description	
		Observed	*Adjusted*
Benchmark price		1. *Uganda unit value FOB price for all maize exports obtained from Uganda's Statistical Abstract (2010 & 2011)*	*N.A.*
Domestic price at wholesale		2. *For medium and large farms, the average annual price paid to farmers by the NCPB and large millers in Nairobi was used. Prices were obtained from the KNBS.* 3. *For smallholder farms, the average annual wholesale price in Nairobi was used. Prices were obtained from RATIN.*	*N.A.*
Domestic price at farm gate		4. *For both value chains analyzed, farm gate prices were calculated from observed wholesale prices by subtracting the estimated cost of transporting maize from farm gate to wholesale (i.e. the point of competition).*	*N.A.*
Exchange rate		5. *Average nominal exchange rates reported by the World Bank were used.*	*N.A.*
Access costs from wholesale to the border		6. *Estimated based on access costs reported by the World Bank (2009b), which include Busia border crossing costs (specific to Kenya's side of the border only) and long haul transport costs from Busia to the wholesale market in Nairobi. Kenya's CPI was used to extrapolate these costs for each year analyzed.*	7. *Adjusted access costs were calculated the same way as observed access costs. However, government taxes, bribes and delays from roadblocks and weighbridges were removed.*
Access costs from wholesale to farm gate		8. *Smallholder farms – the sum of all estimated access costs from the farm gate to the primary market, primary to the secondary market and secondary to the wholesale market reported by the World Bank (2009b). Kenya's CPI was used to extrapolate these costs for each year analyzed.* 9. *Medium and large farms – estimated access costs from the secondary market to the wholesale market reported by the World Bank (2009b). Kenya's CPI was used to extrapolate these costs for each year analyzed.*	10. *Adjusted access costs were calculated the same way as observed access costs. However, government taxes, bribes and delays from roadblocks and weighbridges were removed.*
QT adjustment	Bor-Wh	*N.A.*	*N.A.*
	Wh-FG	*N.A.*	*N.A.*
QL adjustment	Bor-Wh	*N.A.*	*N.A.*
	Wh-FG	*N.A.*	*N.A.*
	Wh-FG	*N.A.*	*N.A.*

The data used for this analysis is summarized below.

Table 5: Data and Values Used in the Calculation of Indicators for Smallholder Farms

		Year	2005	2006	2007	2008	2009	2010
		trade status	m	m	m	m	m	m
DATA	Unit	Symbol						
Benchmark Price								
Observed	USD/TONNE	$P_{b(int\$)}$	229	209	235	274	308	233
Adjusted	USD/TONNE	P_{ba}	229	209	235	274	308	233
Exchange Rate								
Observed	KSH/USD	ER_o	76	72	67	69	77	79
Adjusted	KSH/USD	ER_a	76	72	67	69	77	79
Access costs border - wholesale								
Observed	KSH/TONNE	AC_{owh}	3,013	3,195	3,331	3,835	4,239	4,412
Adjusted	KSH/TONNE	AC_{awh}	2,747	2,913	3,037	3,496	3,864	4,022
Domestic price at wholesale	KSH/TONNE	P_{dwh}	15,607	16,228	13,626	21,488	29,114	19,796
Access costs wholesale - farm gate								
Observed	KSH/TONNE	AC_{ofg}	4,594	4,872	5,080	5,847	6,463	6,727
Adjusted	KSH/TONNE	AC_{afg}	3,803	4,032	4,205	4,840	5,350	5,568
Farm gate price	KSH/TONNE	P_{dfg}	11,013	11,356	8,547	15,641	22,651	13,069
Externalities associated with production	KSH/TONNE	E	-	-	-	-	-	-
Budget and other product related transfers	KSH/TONNE	BOT	-	-	-	-	-	-
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}	1.00	1.00	1.00	1.00	1.00	1.00
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}	1.00	1.00	1.00	1.00	1.00	1.00

Table 6: Data and Values Used in the Calculation of Indicators for Medium and Large Farms

		Year	2005	2006	2007	2008	2009	2010
		trade status	m	m	m	m	m	m
DATA	Unit	Symbol						
Benchmark Price								
Observed	USD/TONNE	$P_{b(int\$)}$	229	209	235	274	308	233
Adjusted	USD/TONNE	P_{ba}	229	209	235	274	308	233
Exchange Rate								
Observed	KSH/USD	ER_o	76	72	67	69	77	79
Adjusted	KSH/USD	ER_a	76	72	67	69	77	79
Access costs border - wholesale								
Observed	KSH/TONNE	AC_{owh}	3,013	3,195	3,331	3,835	4,239	4,412
Adjusted	KSH/TONNE	AC_{awh}	2,747	2,913	3,037	3,496	3,864	4,022
Domestic price at wholesale	KSH/TONNE	P_{dwh}	15,239	15,233	15,663	24,454	23,908	17,214
Access costs wholesale - farm gate								
Observed	KSH/TONNE	AC_{ofg}	2,442	2,589	2,700	3,108	3,435	3,575
Adjusted	KSH/TONNE	AC_{afg}	2,126	2,254	2,351	2,706	2,991	3,113
Farm gate price	KSH/TONNE	P_{dfg}	12,797	12,644	12,963	21,346	20,473	13,638
Externalities associated with production	KSH/TONNE	E	-	-	-	-	-	-
Budget and other product related transfers	KSH/TONNE	BOT	-	-	-	-	-	-
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}	1.00	1.00	1.00	1.00	1.00	1.00
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATION OF INDICATORS

The indicators and methodology used in this analysis are 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: Methodology and MAFAP Indicators

Nominal Rate of Protection (NRP)

MAFAP uses four measures of market incentives and disincentives. *First*, there are two observed nominal rates of protection – one at the wholesale and one at the farm gate – which compare domestic market 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, that is brought to the wholesale and farm gate by adjusting for quality, shrinkage and loss, and market access costs.

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

$$NRP_{ofg} = \frac{P_b - AC_{ofg}}{RF_{ofg}} \; ; \; NRP_{owh} = \frac{P_b - AC_{owh}}{RF_{owh}}$$

The NRP_{ofg} captures all trade and domestic policies, inefficiencies along the product's value chain and other factors affecting incentives or disincentives for the farmer. The NRP_{owh} helps identify where incentives and disincentives may be distributed in the commodity market chain.

Second, there are two *Nominal Rates of Protection - adjusted (NRPa) –* one at the wholesale and one at the farm gate – in which the reference prices are adjusted to eliminate any distortions found in the commodity value chain (e.g. excessive transport costs, taxes/levies or excessive profit margins of marketing agents). The equations to estimate the adjusted rates of protection, however, follow the same general pattern as those used to calculate the observed rates of protection:

$$NRP_{afg} = \frac{P_b - AC_{afg}}{RF_{afg}} \; ; \; NRP_{owh} = \frac{P_b - AC_{awh}}{RF_{awh}}$$

Nominal Rate of Assistance (NRA)

If public expenditure allocated to any of the commodities analyzed (PE_{csp}) is added to the price gaps at the 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. Mathematically, the nominal rate of assistance is defined by the following equation:

$$NRA = \frac{(P_b - AC_{afg}) + PE_{csp}}{RF_{afg}}$$

Market Development Gap (MDG)

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, imperfect functioning of international markets and externalities.

"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, illegal bribes and other non-tariff barriers. Therefore, the total MDG at farm gate is comprised of four components – gaps due to "excessive" access costs (ACG_{wh}, ACG_{fg}), the exchange rate policy gap $(ERPG)$, international markets gap (IMG) and externality gap (EXG) . 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 across commodities and countries. Consequently, a 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:

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

In this analysis, only NRPs and MDGs were calculated. The NRA includes budgetary and other transfers to producers. In the case of maize in Kenya, calculations of transfers that can be assigned to maize production will be calculated and incorporated in a revised version of this technical note. When transfers have been included, the NRA will also be calculated.

Table 7: MAFAP Price Gaps for Maize in Kenya, 2005-2010 (Ksh/tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	m	m	m	m	m	m
MEDIUM AND LARGE FARMS						
Observed price gap at wholesale	(5,085.16)	(3,046.42)	(3,505.80)	1,683.88	(4,137.56)	(5,689.85)
Adjusted price gap at wholesale	(4,818.95)	(2,764.15)	(3,211.47)	2,022.68	(3,763.07)	(5,300.06)
Observed price gap at farm gate	(5,085.16)	(3,046.42)	(3,505.80)	1,683.88	(4,137.56)	(5,689.85)
Adjusted price gap at farm gate	(5,134.77)	(3,099.03)	(3,560.66)	1,620.74	(4,207.35)	(5,762.49)
SMALLHOLDER FARMS						
Observed price gap at wholesale	(4,716.58)	(2,051.71)	(5,542.10)	(1,281.76)	1,068.81	(3,107.21)
Adjusted price gap at wholesale	(4,450.37)	(1,769.43)	(5,247.76)	(942.96)	1,443.30	(2,717.43)
Observed price gap at farm gate	(4,716.58)	(2,051.71)	(5,542.10)	(1,281.76)	1,068.81	(3,107.21)
Adjusted price gap at farm gate	(5,241.81)	(2,608.64)	(6,122.84)	(1,950.22)	329.93	(3,876.28)

Source: MAFAP

Table 8: MAFAP Nominal Rates of Protection (NRPs) for Maize in Kenya, 2005-2010 (%)

	2005	2006	2007	2008	2009	2010
Trade status for the year	*m*	*m*	*m*	*m*	*m*	*m*
MEDIUM AND LARGE FARMS						
Observed NRP at wholesale	-25.02%	-16.67%	-18.29%	7.40%	-14.75%	-24.84%
Adjusted NRP at wholesale	-24.03%	-15.36%	-17.02%	9.02%	-13.60%	-23.54%
Observed NRP at farm gate	-28.44%	-19.42%	-21.29%	8.56%	-16.81%	-29.44%
Adjusted NRP at farm gate	-28.63%	-19.69%	-21.55%	8.22%	-17.05%	-29.70%
SMALLHOLDER FARMS						
Observed NRP at wholesale	-23.21%	-11.22%	-28.91%	-5.63%	3.81%	-13.57%
Adjusted NRP at wholesale	-22.19%	-9.83%	-27.80%	-4.20%	5.22%	-12.07%
Observed NRP at farm gate	-29.99%	-15.30%	-39.34%	-7.57%	4.95%	-19.21%
Adjusted NRP at farm gate	-32.25%	-18.68%	-41.74%	-11.09%	1.48%	-22.88%

Source: MAFAP

Table 9: MAFAP Market Development Gaps (MDGs) for Maize in Kenya, 2005-2010 (Ksh/tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	*m*	*m*	*m*	*m*	*m*	*m*
MEDIUM AND LARGE FARMS						
International markets gap	-	-	-	-	-	-
Exchange rate policy gap	-	-	-	-	-	-
Access cost gap to wholesale	266.20	282.27	294.34	338.80	374.49	389.79
Access cost gap to farm gate	(315.81)	(334.87)	(349.19)	(401.94)	(444.28)	(462.43)
Externality gap	-	-	-	-	-	-
Market development gap	(49.61)	(52.60)	(54.85)	(63.14)	(69.79)	(72.64)
Market development gap ratio	-0.28%	-0.33%	-0.33%	-0.32%	-0.28%	-0.37%
SMALLHOLDER FARMS						
International markets gap	-	-	-	-	-	-
Exchange rate policy gap	-	-	-	-	-	-
Access cost gap to wholesale	266.20	282.27	294.34	338.80	374.49	389.79
Access cost gap to farm gate	(791.43)	(839.20)	(875.08)	(1,007.26)	(1,113.37)	(1,158.85)
Externality gap	-	-	-	-	-	-
Market development gap	(525.23)	(556.93)	(580.74)	(668.46)	(738.88)	(769.07)
Market development gap ratio	-3.23%	-3.99%	-3.96%	-3.80%	-3.31%	-4.54%

Source: MAFAP

4. INTERPRETATION OF THE INDICATORS

Figures 8-13 show the results for the set of MAFAP indicators generated, which include price gaps, Nominal Rates of Protection (NRPs) and Market Development Gaps (MDGs). 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 maize producers face, while NRPs express this absolute measure as ratios that are comparable across countries and commodities. MDGs measure distortions in the value chain, such as excessive access costs, which affect price incentives for producers and wholesalers.

At the wholesale level, NRPs were highly variable throughout the period analyzed, mainly due to changes in trade patterns and domestic policies in response to the events of 2008 and 2009. Observed NRPs averaged -15% for medium and large farms and -13% for smallholder farms. Adjusted NRPs at the wholesale level for both producer groups were slightly higher (or less negative) than observed NRPs in each year, averaging -14% for medium and large farms and -12% for smallholder farms. This indicates that market inefficiencies between the border and wholesale represent marginal gains for wholesalers because they actually raise the cost of bringing maize imports from their point of entry to the wholesale market and, therefore, act as natural protection (positive MDGs). These inefficiencies are reflected in the access costs gaps to wholesale shown in Figures 12 and 13.

Figures 8-11 show that both groups of producers faced strong market price disincentives in 2005, 2006, 2007 and 2010, when Kenya had relatively normal levels of production and imported maize duty-free from the region. These results are difficult to reconcile, especially given the liberalized market and the absence of international trade barriers. A result that shows low protection rates close to zero percent (either positive or negative), something like that seen in 2008, is what might be expected in these years.

One plausible explanation for such strong disincentives in these years is that the activities of the NCPB are keeping prices down for millers. Another plausible explanation is that the Nairobi maize market may be weakly integrated with other sub-national and international maize markets, possibly because arbitrage is only profitable for very short periods of time due to low prices and high access costs.

The results suggest that under exceptional circumstances, different sub-national markets do interact, but only for brief periods. Major events, such as political unrest in 2007/2008 and a subsequent drought in 2009, resulted in maize shortages, high prices and an increase in imports. Sub-national markets became much more integrated, and prices were determined more by international prices than by prices in the various regional markets. Consequently, these events generated quite different results from those in other years, and the impacts on smallholder farmers were slightly different from those on medium- and large-scale farmers.

In 2008, imports from South Africa were limited and heavily subsidized by the NCPB. Additionally, Tanzania imposed a ban on exports in the face of the situation in Kenya, but maize markets remained linked to those in Uganda. The benchmark price for maize imports in 2008 was about 25% higher than before the global commodity price crisis of 2007 and 2008.

Prices in Nairobi also increased substantially in response to scarce domestic supply, resulting in an observed NRP at the wholesale level of 7% for medium and large farms and -6% for smallholder farms. These results imply that subsidized imports from South Africa were relatively ineffective in reducing prices for consumers in Nairobi.

In 2009, Kenya waived its tariff on imports from outside the EAC, allowing millers and wholesalers to import maize duty-free from world markets. This resulted in a Nairobi wholesale price that was very close to the import parity price throughout the year, according to RATIN data. Therefore, the observed NRP at wholesale averaged about 4% for smallholders throughout the period analyzed. However, the average price paid by the NCPB and millers was slightly below the Nairobi wholesale price, resulting in an observed NRP at the wholesale level of -15% for medium and large farms.

Farmgate results closely follow those at wholesale by construction. Since reliable farmgate prices were not available, it was necessary to estimate them by subtracting market access costs to the farm gate from observed wholesale prices in each respective year. The absolute price gaps between domestic and reference prices, therefore, are identical at wholesale and farm gate in all years; however, the rates of protection are more extreme (higher if positive, or more negative) at the farm gate because the base of the ratio (the reference price) is much lower than at wholesale level.

Observed NRPs at the farm gate averaged about -18% for both producer groups. As shown in Figures 8-11, adjusted NRPs at the farm gate were only slightly lower (or more negative) than observed NRPs in each year, indicating that market inefficiencies along maize value chains represent marginal opportunity costs for producers. This is because market inefficiencies between the farm gate and wholesale, which represent costs to farmers (negative MDGs), outweighed those between the border and wholesale, which provide natural protection to farmers (positive MDGs), resulting in a negative net MDG at farm gate in all years (see Figures 12 and 13).

On average, the net MDG amounted to about 4% of the adjusted reference price at farm gate for smallholder producers and less than 1% of the adjusted reference price at farm gate for medium- and large-scale producers[8]. Inefficiencies along both value chains analyzed were entirely due to excessive access costs, such as government taxes, illegal bribes and delays at roadblocks and weighbridges. If these distortions were eliminated and the market functioned more efficiently, producers, particularly smallholders, would be slightly better off than under existing market conditions.

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[8] The adjusted reference price at farm gate is the price that farmers should receive in an efficient market (i.e. in the absence of distortions caused by government policy measures and market functioning).

Figure 8: Observed and Adjusted Price Gaps at Wholesale and Farm Gate for Smallholder Maize Farms in Kenya, 2005-2010 (Ksh/tonne)
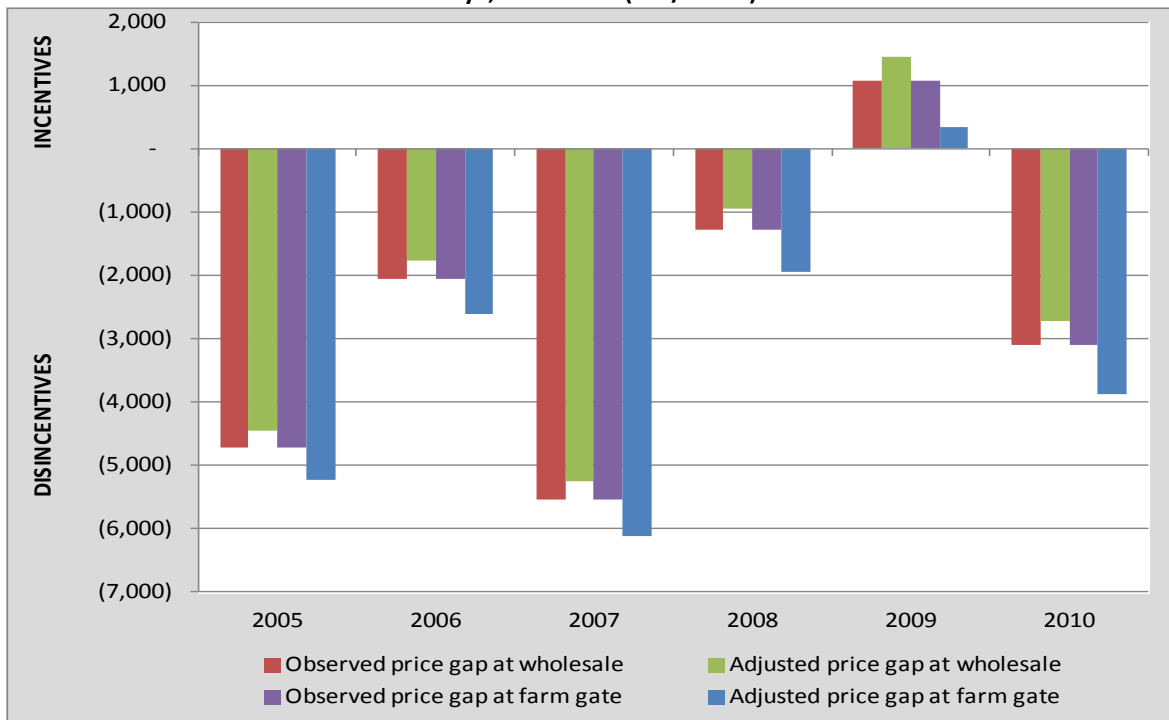
Source: MAFAP

Figure 9: Observed and Adjusted Price Gaps at Wholesale and Farm Gate for Medium and Large Maize Farms in Kenya, 2005-2010 (Ksh/tonne)
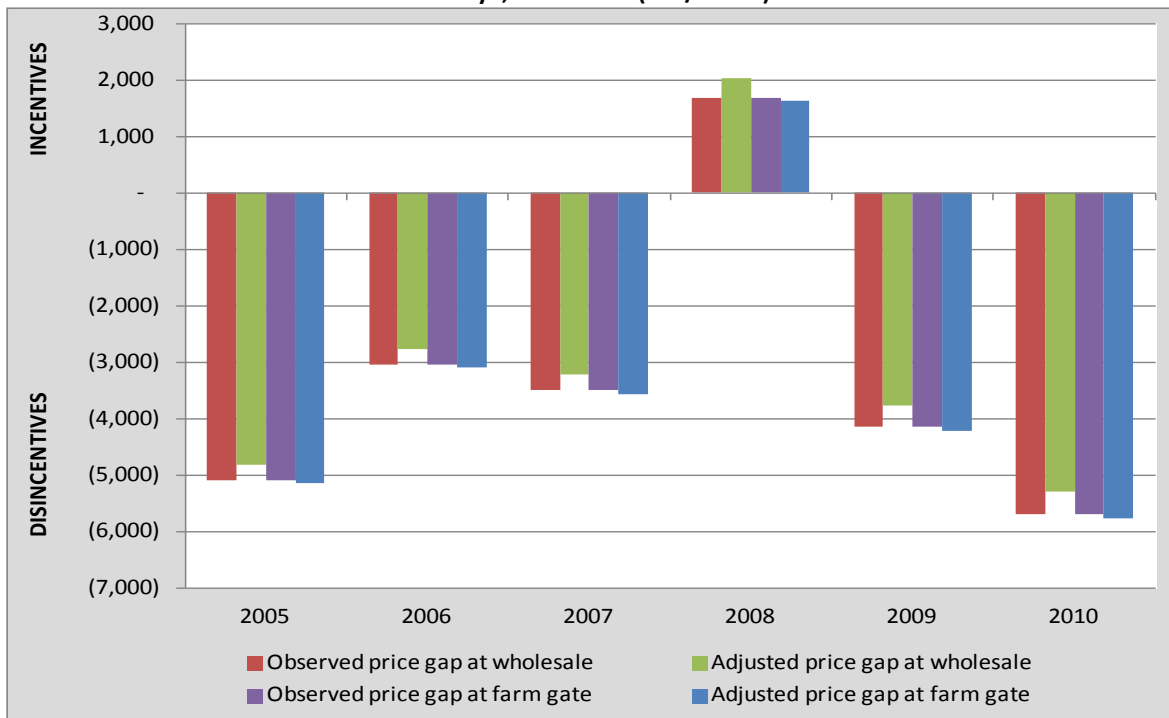
Source: MAFAP

Figure 10: Observed and Adjusted Nominal Rates of Protection at Wholesale and Farm Gate for Smallholder Maize Farms in Kenya, 2005-2010 (%)
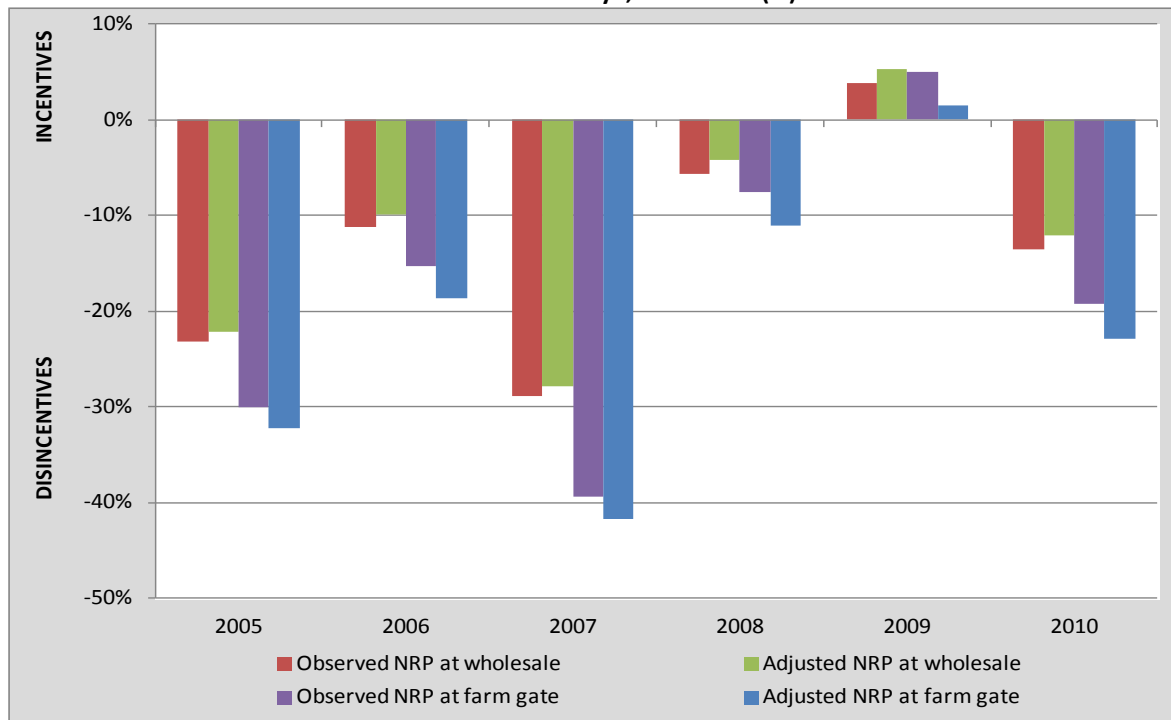
Source: MAFAP

Figure 11: Observed and Adjusted Nominal Rates of Protection at Wholesale and Farm Gate for Medium and Large Maize Farms in Kenya, 2005-2010 (%)

Source: MAFAP

Figure 12: Market Development Gaps (MDGs) for Smallholder Maize Farms in Kenya, 2005-2010 (Ksh/tonne)

Source: MAFAP

Figure 13: Market Development Gaps (MDGs) for Medium and Large Maize Farms in Kenya, 2005-2010 (Ksh/tonne)

Source: MAFAP
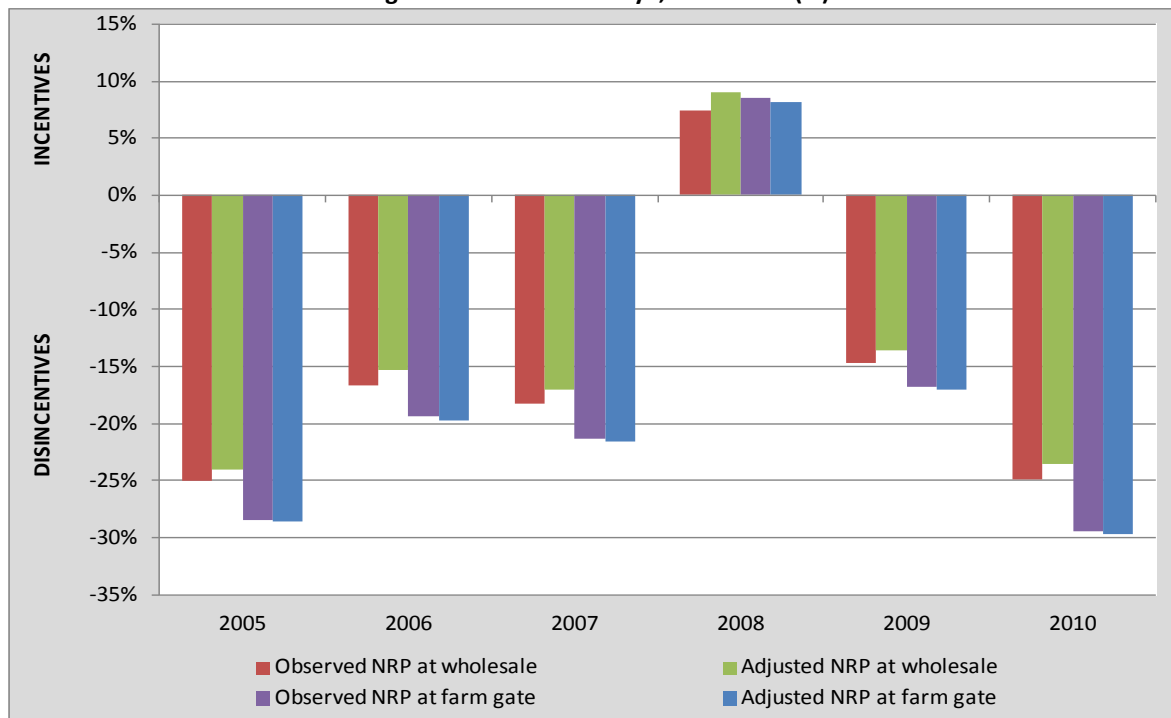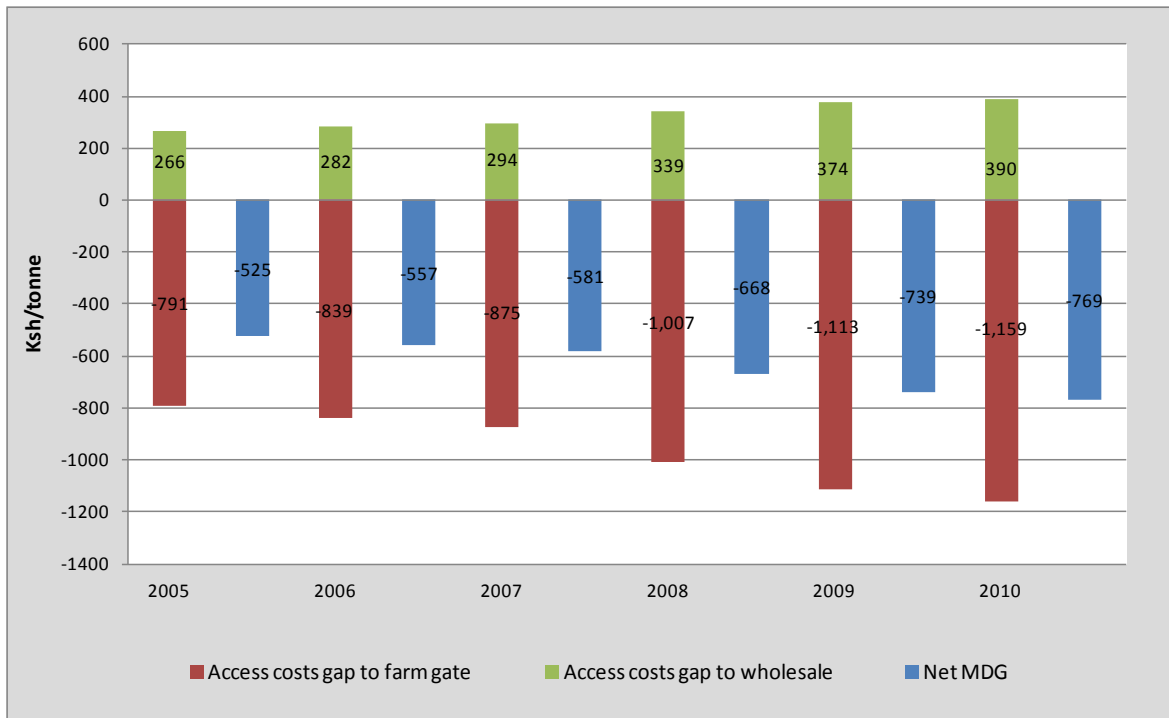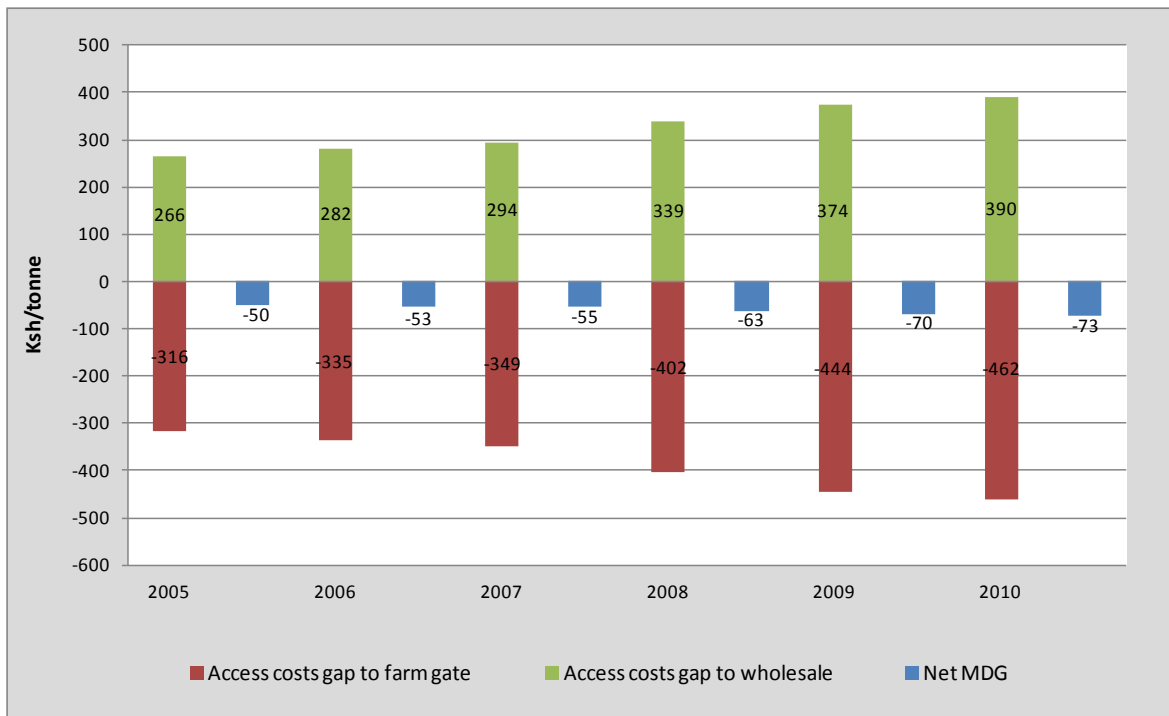
5. PRELIMINARY CONCLUSIONS ARE RECOMMENDATIONS

MAIN MESSAGE

Kenya has had to cope with tremendous instability in its maize market since 2005. This instability was driven by domestic factors, such as shocks to production caused by political unrest in 2007/2008 and a subsequent drought in 2009. These extraordinary events resulted in a large maize deficit, an increase in duty-free imports and high domestic prices. During this period, the Nairobi maize market seemed to be much more integrated with sub-national and international markets than in other years. Consequently, domestic maize prices were close to the import parity in 2008 and 2009, resulting in very low rates of protection (positive or negative) for both groups of producers.

This analysis shows that in normal years (2005-2007 and 2010), Kenya was able to meet its import requirements from Uganda and Tanzania at prices well below those on world markets. Since there were no significant import tariffs or non-tariff trade measures directly affecting domestic prices in these years, low rates of protection (either positive or negative) were expected. However, the analysis shows that both groups of maize farmers actually faced strong market price disincentives. While these strong disincentives cannot be explained by domestic policies, they can, to some extent, be explained by the weak and highly variable integration of Kenya's regional maize markets with other sub-national and international markets.

Certainly there are linkages among the major regional markets in Kenya and with those in Uganda and Tanzania. Some of this is due to the crucial role maize plays in production, consumption and food security in all regions of Kenya. However, these linkages are ephemeral in nature rather than easily predictable or at least seasonal. This on-again, off-again connection to world and regional markets is most likely a risk factor, which contributes to the high marketing margins seen in Kenya, as well as the variability in estimated rates of protection.

Another factor potentially contributing to the variability in protection is the NCPB's activities in stabilizing prices for consumers and lowering prices for millers. However, price trends suggest the NCPB's impact on domestic maize prices is limited. Some argue that the NCPB would need to be much more active than it appears to be and would probably need much higher levels of support from the Treasury for effective price stabilization.

Finally, the MDGs that could be identified were relatively small and seemed to have a marginal impact on the overall level of incentives (or disincentives) received by farmers. It is likely, however, that large MDGs are in fact present; otherwise there would have been evidence that sub-national markets are better integrated. With better yields and more specialized transportation facilities, the region could perhaps compete in global markets.

PRELIMINARY RECOMMENDATIONS

The main policy recommendation would be to further investigate the effects NCPB's activities have on different agents in Kenya's maize value chains. Greater transparency on the cost of NCPB operations is certainly needed.

There are some indications in pronouncements made since July 2011 that Kenya and the NCPB are returning to an earlier model providing floor prices to farmers and ceiling prices to consumers throughout Kenya. One of the gains in recent years has been that a pared down NCPB operates more efficiently. An inflated, old style NCPB is likely to incur large deficits, especially if prices are determined politically rather than set close to parity levels, as does seem to be the case in recent announcements.

LIMITATIONS

All results and conclusions provided are contingent on the quality of the data. Wholesale price data for a number of market centers and benchmark trade data are relatively good and available on a monthly basis. On the contrary, farm level price data are more questionable and are not published on a monthly or regional basis. There has been a lot of academic research on market chains in Kenya, making it possible to estimate marketing margins. The main weakness is better data on subsidies in the system, but this should improve with the analysis of expenditure data.

FURTHER INVESTIGATION AND RESEARCH

There are a number of areas where further research would be useful:

- Clarify the role of food aid shipments in 2009 and how these should factor into the analysis;
- Include more detail on other budget support, such as fertilizer and irrigation subsidies and credit. This data should be available once MAFAP's public expenditure analysis is complete;
- Produce better estimates of NCPB subsidies to measure the nominal rate of assistance for producers. Investigate further how NCPB activities affect different types of farmers (e.g. medium and large farms, small farms and farms which do not market maize), and investigate seasonal and regional impacts;
- Compare MAFAP results for maize to results for other major commodities with different market structures, such as wheat (an import based staple), tea (an export) and potatoes or milk (non-traded commodities). It may be that the comparative analysis would demonstrate the effects of the high degree of policy intervention in the maize market on other commodities;
- Consider additional indicators for impacts on consumers and food security.

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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

SMALLHOLDER FARMS

Name of product		Maize (Small Farms)								
International currency		USD			Local currency		Ksh			

				Year	2005	2006	2007	2008	2009	2010	Notes
DATA		Unit	Symbol	trade status	m	m	m	m	m	m	
Benchmark Price											
1	Observed	USD/Tonne	$P_{b(intl)}$		229.12	209.22	235.26	273.73	307.77	233.38	Uganda FOB price for all maize exports obtained from Uganda's Statistical Abstract 2010 and 2011.
1b	Adjusted	USD/Tonne	P_b		229.12	209.22	235.26	273.73	307.77	233.38	No adjustment.
Exchange Rate											
2	Observed	Ksh/USD	ER_o		75.55	72.10	67.32	69.18	77.35	79.23	Average nominal exchange rate from the World Bank.
2b	Adjusted	Ksh/USD	ER_a		75.55	72.10	67.32	69.18	77.35	79.23	No adjustment.
Access costs border - wholesale											
3	Observed	Ksh/Tonne	ACo_{wh}		3,013.00	3,194.85	3,331.44	3,834.65	4,238.62	4,411.75	Based on the World Bank's 2009 Maize Marketing Study for Eastern Africa (Tables 25, 34 and 42).
3b	Adjusted	Ksh/Tonne	ACa_{wh}		2,746.79	2,912.58	3,037.10	3,495.85	3,864.13	4,021.97	Bribes and costs from roadblocks and weighbridges were removed from access costs.
4 **Domestic price at wholesale**		Ksh/Tonne	P_{wh}		15,607.41	16,227.77	13,626.44	21,488.40	29,114.23	19,796.14	Average wholesale price in Nairobi given by RATIN.
Access costs wholesale - farm gate											
5	Observed	Ksh/Tonne	ACo_{fg}		4,594.24	4,871.52	5,079.81	5,847.09	6,463.08	6,727.07	Based on the World Bank's 2009 Maize Marketing Study for Eastern Africa (Tables 25 and 34).
5b	Adjusted	Ksh/Tonne	ACa_{fg}		3,802.80	4,032.32	4,204.72	4,839.83	5,349.70	5,568.22	Government taxes and costs from roadblocks and weighbridges were removed from access costs.
6 **Farm gate price**		Ksh/Tonne	P_{fg}		11,013.17	11,356.25	8,546.64	15,641.31	22,651.15	13,069.07	Calculated by subtracting access costs between the farm gate and wholesale from the wholesale price in each respective year.
7 Externalities associated with production		Ksh/Tonne	E		-	-	-	-	-	-	
8 Budget and other product related transfers		Ksh/Tonne	BOT		-	-	-	-	-	-	
Quantity conversion factor (border - wholesale)		Fraction	QT_{wh}		1.00	1.00	1.00	1.00	1.00	1.00	
Quality conversion factor (border - wholesale)		Fraction	QL_{wh}		1.00	1.00	1.00	1.00	1.00	1.00	
Quantity conversion factor (wholesale - farm gate)		Fraction	QT_{fg}		1.00	1.00	1.00	1.00	1.00	1.00	
Quality conversion factor (wholesale - farm gate)		Fraction	QL_{fg}		1.00	1.00	1.00	1.00	1.00	1.00	

CALCULATED PRICES		Unit	Symbol		2005	2006	2007	2008	2009	2010	Formula
Benchmark price in local currency											
9	Observed	Ksh/Tonne	$P_{b(local)}$		17,310.99	15,084.63	15,837.10	18,935.51	23,806.79	18,491.60	[1]*[2]
10	Adjusted	Ksh/Tonne	$P_{b(local)a}$		17,310.99	15,084.63	15,837.10	18,935.51	23,806.79	18,491.60	[1b]*[2b]
Reference Price at wholesale											
11	Observed	Ksh/Tonne	RPo_{wh}		20,323.99	18,279.48	19,168.54	22,770.16	28,045.42	22,903.35	([9]*[QTwh]*[QLwh])+[3]
12	Adjusted	Ksh/Tonne	RPa_{wh}		20,057.78	17,997.21	18,874.20	22,431.36	27,670.93	22,513.56	([10]*[QTwh]*[QLwh])+[3b]
Reference Price at Farm Gate											
13	Observed	Ksh/Tonne	RPo_{fg}		15,729.75	13,407.96	14,088.74	16,923.07	21,582.34	16,176.28	(([11]*[QLfg])*[QTfg])-[5]
14	Adjusted	Ksh/Tonne	RPa_{fg}		16,254.98	13,964.89	14,669.48	17,591.53	22,321.22	16,945.35	(([12]*[QLfg])*[QTfg])-[5b]

INDICATORS		Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
Price gap at wholesale										
15	Observed	Ksh/Tonne	PGo$_{wh}$	(4,716.58)	(2,051.71)	(5,542.10)	(1,281.76)	1,068.81	(3,107.21)	[4]-[11]
16	Adjusted	Ksh/Tonne	PGa$_{wh}$	(4,450.37)	(1,769.43)	(5,247.76)	(942.96)	1,443.30	(2,717.43)	[4]-[12]
Price gap at farm gate										
17	Observed	Ksh/Tonne	PGo$_{fg}$	(4,716.58)	(2,051.71)	(5,542.10)	(1,281.76)	1,068.81	(3,107.21)	[6]-[13]
18	Adjusted	Ksh/Tonne	PGa$_{fg}$	(5,241.81)	(2,608.64)	(6,122.84)	(1,950.22)	329.93	(3,876.28)	[6]-[14]
Nominal rate of protection at wholesale										
19	Observed	%	NRPo$_{wh}$	-23.21%	-11.22%	-28.91%	-5.63%	3.81%	-13.57%	[15]/[11]
20	Adjusted	%	NRPa$_{wh}$	-22.19%	-9.83%	-27.80%	-4.20%	5.22%	-12.07%	[16]/[12]
Nominal rate of protection at farm gate										
21	Observed	%	NRPo$_{fg}$	-29.99%	-15.30%	-39.34%	-7.57%	4.95%	-19.21%	[17]/[13]
22	Adjusted	%	NRPa$_{fg}$	-32.25%	-18.68%	-41.74%	-11.09%	1.48%	-22.88%	[18]/[14]
Nominal rate of assistance										
23	Observed	%	NRAo	-29.99%	-15.30%	-39.34%	-7.57%	4.95%	-19.21%	([17]+[8])/[13]
24	Adjusted	%	NRAa	-32.25%	-18.68%	-41.74%	-11.09%	1.48%	-22.88%	([18]+[8])/[14]

Decomposition of PVAfg	Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
25 International markets gap	Ksh/Tonne	IRG	-	-	-	-	-	-	([1]-[1b])*([2]+[2b]/2)*QTwh*QLwh
26 Exchange policy gap	Ksh/Tonne	ERPG	-	-	-	-	-	-	([2]-[2b])*(([1]+[1b])/2)*QTwh*QLwh
27 Access costs gap to wholesale	Ksh/Tonne	ACG$_{wh}$	266.20	282.27	294.34	338.80	374.49	389.79	([3]-[3b])*QLfg*QTfg
28 Access costs gap to farm gate	Ksh/Tonne	ACG$_{fg}$	(791.43)	(839.20)	(875.08)	(1,007.26)	(1,113.37)	(1,158.85)	[5b]-[5]
29 Externality gap	Ksh/Tonne	EG	-	-	-	-	-	-	-[7]
Market Development Gap	Ksh/Tonne	MDG	(525.23)	(556.93)	(580.74)	(668.46)	(738.88)	(769.07)	[25]+[26]+[27]+[28]+[29]
Market Development Gap	%	MDG	-3.23%	-3.99%	-3.96%	-3.80%	-3.31%	-4.54%	MDG/RPafg

MEDIUM AND LARGE FARMS

Name of product	Maize (Large Farms)								
International currency	USD			Local currency	Ksh				

	DATA	Unit	Symbol	Year trade status	2005 m	2006 m	2007 m	2008 m	2009 m	2010 m	Notes
	Benchmark Price										
1	Observed	USD/Tonne	$P_{b(int)}$		229.12	209.22	235.26	273.73	307.77	233.38	Uganda FOB price for all maize exports obtained from Uganda's Statistical Abstract 2010 and 2011.
1b	Adjusted	USD/Tonne	P_b		229.12	209.22	235.26	273.73	307.77	233.38	No adjustment.
	Exchange Rate										
2	Observed	Ksh/USD	ER_o		75.55	72.10	67.32	69.18	77.35	79.23	Average nominal exchange rate from the World Bank.
2b	Adjusted	Ksh/USD	ER_a		75.55	72.10	67.32	69.18	77.35	79.23	No adjustment.
	Access costs border – wholesale										
3	Observed	Ksh/Tonne	ACo_{wh}		3,013.00	3,194.85	3,331.44	3,834.65	4,238.62	4,411.75	Based on the World Bank's 2009 Maize Marketing Study for Eastern Africa (Tables 25, 34 and 42).
3b	Adjusted	Ksh/Tonne	ACa_{wh}		2,746.79	2,912.58	3,037.10	3,495.85	3,864.13	4,021.97	Bribes and costs from roadblocks and weighbridges were removed from access costs.
4	Domestic price at wholesale	Ksh/Tonne	P_{dwh}		15,238.83	15,233.06	15,662.74	24,454.04	23,907.85	17,213.50	Average price paid by the NCPB and millers, as reported by the KNBS (SA Table 61 and ES Table 8.4).
	Access costs wholesale – farm gate										
5	Observed	Ksh/Tonne	ACo_{fg}		2,441.71	2,589.08	2,699.77	3,107.57	3,434.94	3,575.25	Based on the World Bank's 2009 Maize Marketing Study for Eastern Africa (Tables 25 and 34).
5b	Adjusted	Ksh/Tonne	ACa_{fg}		2,125.89	2,254.20	2,350.58	2,705.63	2,990.66	3,112.82	Government taxes and costs from roadblocks and weighbridges were removed from access costs.
6	Farm gate price	Ksh/Tonne	P_{dfg}		12,797.12	12,643.98	12,962.96	21,346.47	20,472.91	13,638.25	Calculated by subtracting access costs between the farm gate and wholesale from the wholesale price in each respective year.
7	Externalities associated with production	Ksh/Tonne	E		-	-	-	-	-	-	
8	Budget and other product related transfers	Ksh/Tonne	BOT		-	-	-	-	-	-	
	Quantity conversion factor (border – wholesale)	Fraction	QT_{wh}		1.00	1.00	1.00	1.00	1.00	1.00	
	Quality conversion factor (border – wholesale)	Fraction	QL_{wh}		1.00	1.00	1.00	1.00	1.00	1.00	
	Quantity conversion factor (wholesale – farm gate)	Fraction	QT_{fg}		1.00	1.00	1.00	1.00	1.00	1.00	
	Quality conversion factor (wholesale – farm gate)	Fraction	QL_{fg}		1.00	1.00	1.00	1.00	1.00	1.00	

	CALCULATED PRICES	Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
	Benchmark price in local currency									
9	Observed	Ksh/Tonne	$P_{b(loc)}$	17,310.99	15,084.63	15,837.10	18,935.51	23,806.79	18,491.60	[1]*[2]
10	Adjusted	Ksh/Tonne	$P_{b(loc)a}$	17,310.99	15,084.63	15,837.10	18,935.51	23,806.79	18,491.60	[1b]*[2b]
	Reference Price at wholesale									
11	Observed	Ksh/Tonne	RPo_{wh}	20,323.99	18,279.48	19,168.54	22,770.16	28,045.42	22,903.35	([9]*[QTwh]*[QLwh])+[3]
12	Adjusted	Ksh/Tonne	RPa_{wh}	20,057.78	17,997.21	18,874.20	22,431.36	27,670.93	22,513.56	([10]*[QTwh]*[QLwh])+[3b]
	Reference Price at Farm Gate									
13	Observed	Ksh/Tonne	RPo_{fg}	17,882.28	15,690.40	16,468.77	19,662.59	24,610.47	19,328.10	(([11]*[QLfg])*[QTfg])-[5]
14	Adjusted	Ksh/Tonne	RPa_{fg}	17,931.89	15,743.01	16,523.62	19,725.73	24,680.26	19,400.74	(([12]*[QLfg])*[QTfg])-[5b]

INDICATORS		Unit	Symbol		2005	2006	2007	2008	2009	2010	Formula
Price gap at wholesale											
15	Observed	Ksh/Tonne	PGo$_{wh}$		(5,085.16)	(3,046.42)	(3,505.80)	1,683.88	(4,137.56)	(5,689.85)	[4]-[11]
16	Adjusted	Ksh/Tonne	PGa$_{wh}$		(4,818.95)	(2,764.15)	(3,211.47)	2,022.68	(3,763.07)	(5,300.06)	[4]-[12]
Price gap at farm gate											
17	Observed	Ksh/Tonne	PGo$_{fg}$		(5,085.16)	(3,046.42)	(3,505.80)	1,683.88	(4,137.56)	(5,689.85)	[6]-[13]
18	Adjusted	Ksh/Tonne	PGa$_{fg}$		(5,134.77)	(3,099.03)	(3,560.66)	1,620.74	(4,207.35)	(5,762.49)	[6]-[14]
Nominal rate of protection at wholesale											
19	Observed	%	NRPo$_{wh}$		-25.02%	-16.67%	-18.29%	7.40%	-14.75%	-24.84%	[15]/[11]
20	Adjusted	%	NRPa$_{wh}$		-24.03%	-15.36%	-17.02%	9.02%	-13.60%	-23.54%	[16]/[12]
Nominal rate of protection at farm gate											
21	Observed	%	NRPo$_{fg}$		-28.44%	-19.42%	-21.29%	8.56%	-16.81%	-29.44%	[17]/[13]
22	Adjusted	%	NRPa$_{fg}$		-28.63%	-19.69%	-21.55%	8.22%	-17.05%	-29.70%	[18]/[14]
Nominal rate of assistance											
23	Observed	%	NRAo		-28.44%	-19.42%	-21.29%	8.56%	-16.81%	-29.44%	([17]+[8])/[13]
24	Adjusted	%	NRAa		-28.63%	-19.69%	-21.55%	8.22%	-17.05%	-29.70%	([18]+[8])/[14]

Decomposition of PWAfg		Unit	Symbol		2005	2006	2007	2008	2009	2010	Formula
25	International markets gap	Ksh/Tonne	IRG		-	-	-	-	-	-	([1]-[1b])*([2]+[2b]/2)*QTwh*QLwh
26	Exchange policy gap	Ksh/Tonne	ERPG		-	-	-	-	-	-	([2]-[2b])*(([1]+[1b])/2)*QTwh*QLwh
27	Access costs gap to wholesale	Ksh/Tonne	ACG$_{wh}$		266.20	282.27	294.34	338.80	374.49	389.79	([3]-[3b])*QLfg*QTfg
28	Access costs gap to farm gate	Ksh/Tonne	ACG$_{fg}$		(315.81)	(334.87)	(349.19)	(401.94)	(444.28)	(462.43)	[5b]-[5]
29	Externality gap	Ksh/Tonne	EG		-	-	-	-	-	-	-[7]
	Market Development Gap	Ksh/Tonne	MDG		(49.61)	(52.60)	(54.85)	(63.14)	(69.79)	(72.64)	[25]+[26]+[27]+[28]+[29]
	Market Development Gap	%	MDG		-0.28%	-0.33%	-0.33%	-0.32%	-0.28%	-0.37%	MDG/RPafg

ANNEX III: Food and agriculture policy decisions analysis (FAPDA) of recent policy initiatives

POLICY BEFORE 2006

Continuous availability of maize/ maize meal at stable, affordable prices is both a moral and political exigency in Kenya.

Before maize market liberalization in the 1990s, the GOK set producer and into-mill prices for maize grain and prices for maize meal sold by millers and by retailers to consumers. These prices were pan-territorial and pan-seasonal, adjusted once per year at the beginning of the marketing season.

The National Cereals and Produce Board (NCPB) monopolized internal and external trade. It purchased 2-3 million bags (over 20% of production) in this period, while only limited private trade was permitted. Traders were required to apply for movement permits to transport grain across district boundaries. NCPB losses were covered by transfers from the GOK budget.

The restrictions on private maize trading and licensing of imports together with the fact that Kenya was generally a maize exporter made the border protection redundant but tariffs were nevertheless also a feature of the policy set.

Over the period 1988-1995, the maize market was gradually liberalized through the elimination regulation of prices and private sector maize movement and the reduction of the role of the NCPB. This included the elimination of border protection in 1992 but tariffs were reintroduced in 1995 with the full implementation of other elements of market liberalization.

Since 2000 NCPB purchases have accounted for a bigger share of marketed maize purchases and sales, buying mostly from large scale farmers in the grain surplus regions of western Kenya and selling to millers.

Since market liberalization, tariffs have been a principle policy instrument with tariffs shifting between 0 and 50% in response to changes in domestic production levels. Imports from Uganda and Tanzania, however, have always been subject only to 2.75% inspection fee since 2005 according to conditions in the East African Community agreement.

THE JULY 2011 BUDGET

Government set the purchasing price of Ksh 3,000 for bag of maize (90 kg) for National Cereals and Produce Board to buy from the farmers. This price is revised every two month by the government. The current price is Ksh 3,000 for August and September. In January 2011 the purchasing price was Ksh 1,800. National Cereals and Produce Board is a government agency that helps farmers by buying their produce especially during harvests, especially when there is a high supply and the prices from the middlemen and unregistered brokers are always very low, the NCPB comes in to cushion the farmers. The prices offered by NCPB are usually well received by most farmers. But the prices offered across the borders for example South Sudan may seem higher. This intervention though is influencing the maize price offered by other private sector in maize market.

STRATEGIC FOOD RESERVE

The National Cereals and Produce Board (NCPB) has a grain storage capacity of 28 million bags of maize (1 bag = 90kg), but this remains largely under-utilized with the current use of about 13%.

In 2008 over the food security crisis Ministry of Finance has been asked to allocate more funds as to increase the Strategic Grain Reserve from the 4 million bags or one and half months of the national requirement to 8 million bags or three months of the national requirement. By 2009 government's declaration of national emergency on food security the grain reserves planned to be doubled as a buffer against any shortages forecasted for 2010. But still in 2011 government's strategic reserves continue to dwindle which is an obstacle for the government due to storage constraints as well as costs such as security, etc. As of October 2011 the reserve remains less than 3 million bags, although the capacity exists.

IRRIGATION

The 2008 budget provided general stimulus package that included new funding to improve and expand irrigation schemes. This initiative is on going with additional funding announced in the 2011 budget.

PRICE CONTROL

19 September 2011 Act of Parliament to provide regulation of the prices of essential commodities in order to secure their availability at reasonable prices and for connected purposes this act will be effective from 2012. Minister from time to time may determine the maximum prices of the commodities with consultation with the industry. The list of the prices for the essential commodities is yet to be announced.

IMPORTS

Import duty reduction is intended to increase supply and reduce consumer prices, but lack of uniform tariff among the neighboring countries encourages unofficial maize trade due to price differences.

Kenya has been relying on duty free imported maize mainly from South Africa. A duty waiver was put in place until 16th July 2009, but the President of Kenya directed the concerned ministries to extend the duty free period until end the year 2009.

In 2011 the Kenya Bureau of Standards (Kebs) rejected 5,000 tonnes of maize shipped from Malawi for not meeting the minimum standards (discoloured). Mr John Abongs, who is in charge of inspection and quality assurance at Kebs, said the maize had a moisture content of above 13.5 percent. The moisture content of the maize was 13.6 percent against the recommended 13.5 percent.

8 June 2011, the GOK announced a continuation of its tariff-abatement policy on imported maize. Under the new abatement, 18 Kenyan registered millers will be allowed to import duty free maize to the end of the year. Most of the maize imported is from EAC and COMESA region -under the EAC and COMESA trade regimes, maize attract around 50 percent import duty- since 2009 every year there is a duty waiver on maize import because of the shortfalls and food prices, in 2010 the rate was

reduced to 10 percent instead of 15 percent which was reduced to zero percent in June 2011. (The reduction on duty is not well received by the producers/farmers).

In 2011 Kenyan government allowed the import of genetically modified (GM) maize from South Africa to fight hunger and starvation, even though GM crops cannot yet be legally grown in the country. GM maize can be imported on condition that it is not used as seed, that products are clearly labelled, and that it is certified by the National Biosafety Authority.

(For the past three years the Government is subsidizing import of fertilizer.)

Export Ban

The 2008 export ban on maize which continued and will continue until January 2012.

ANNEX IV: Summary of market chain costs

Estimates of Margins in Major Portions of the Maize Supply Chains

| Source	Period	USD/T	Ksh/T	Ksh/bag
Ocean Freight and Insurance:				
Nyoro, Kiiru & Jayne	May 2001	25.00	1,750	158
Nyoro, Kirimi & Jayne	2003	15.00	1,125	101
Kirimi: Trends in …	Jul 2009	45.00	3,501	315
FAO study	Oct 2006	29.49	2,132	192
Port Charges:				
Agriculture import surges study	Apr 2000	39.93	2,991	269
Nyoro, Kiiru & Jayne	May 2001	27.86	1,950	176
Nyoro, Kirimi & Jayne	2003	35.63	2,672	241
Kirimi: Trends in …	Jul 2009	37.62	2,927	263
Kirimi Conventional: Trends in …	Jul 2009	34.12	2,654	239
Transport Mombasa to Nairobi:				
Agriculture import surges study	Apr 2000	32.50	2,434	219
Nyoro Kiiru & Jayne	May 2001	47.62	3,333	300
Nyoro, Kirimi & Jayne	2003	32.50	2,438	219
RATIN in Ke MOA	Feb 2009	33.00	2,625	236
Kirimi: Trends in …	Jul 2009	33.56	2,611	235
RATIN web site	Aug 2011	33.00	3,062	276
Transport- Surplus Area to Nairobi:				
Kitali: Nyoro, Kirimi & Jayne	2003	33.33	2,500	225
Kitali: Nyoro	2001	42.54	3,342	301
Eldoret: Nyoro	2001	36.03	2,831	255

ANNEX V: Analysis of NCPB effects on maize marketing chains

The NCPB is a parastatal marketing agency for grains and fertilizers. If it is able to market grain more efficiently because of its size it should reduce the gap between the farm price, PF, and the consumer price, PC in Figure 12.

More realistically it may be able to achieve this because of the subsidies it receives from government. In theory, the subsidies have three effects: increases prices to producers, reduces prices to consumers and increases output.

When the NCPB subsidizes imports, as was done in 2008 and 2009, it reduces prices to both producers and consumers.

Figure 12: Effect of marketing subsidies with a single national market
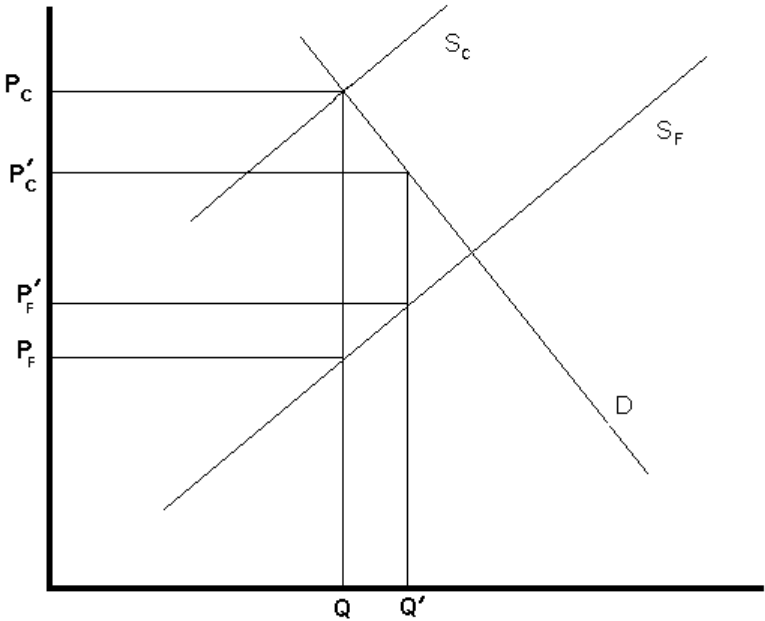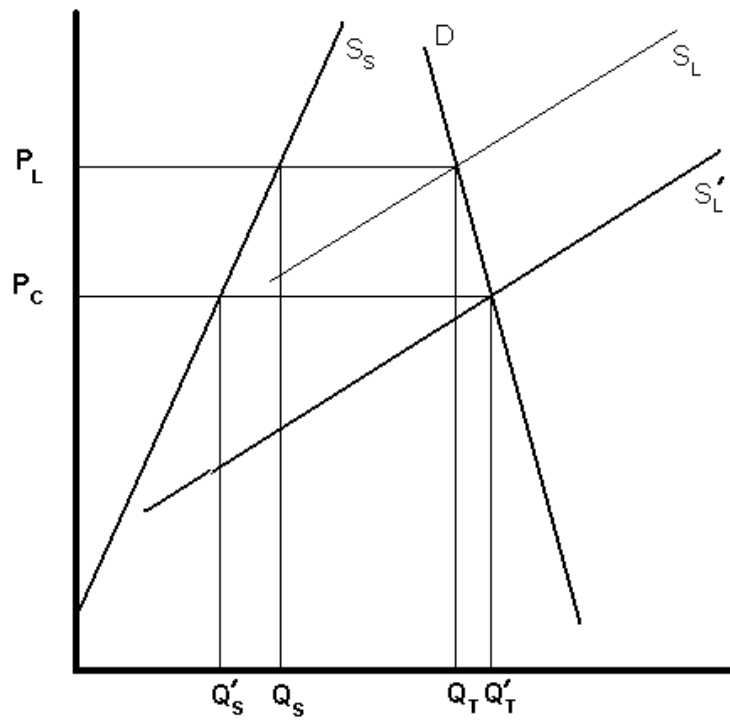

But the situation may work quite differently if the markets are not integrated. The supply function of the smallholder farms is given by S_S while that of the large scale farms is S_L. The same price P_L holds for large and smallholder farms and consumers. (All prices are including marketing margins in this figure.)

With a subsidy restricted to large-scale farms their supply function shifts down to S_L'. Their price increases a small amount. (It increases to the price on their original supply function above Q_T'. It is not shown in Figure 13.) They increase production from $(Q_T - Q_S)$ to $(Q_T' - Q_S')$ while smallholder producers and reduce production from Q_S to Q_S'.

This type of outcome seems likely for the large number of farmers who do not market their maize in Kenya and has likely been the case for all smallholder producers in recent years.

Figure 13: Effect of the NCPB with separation between large farm – miller market and the small farm - rural consumer market