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Analysis of price incentives for maize in Malawi 2005–2013

August 2014

Monitoring and Analysing Food and Agricultural Policies (MAFAP)

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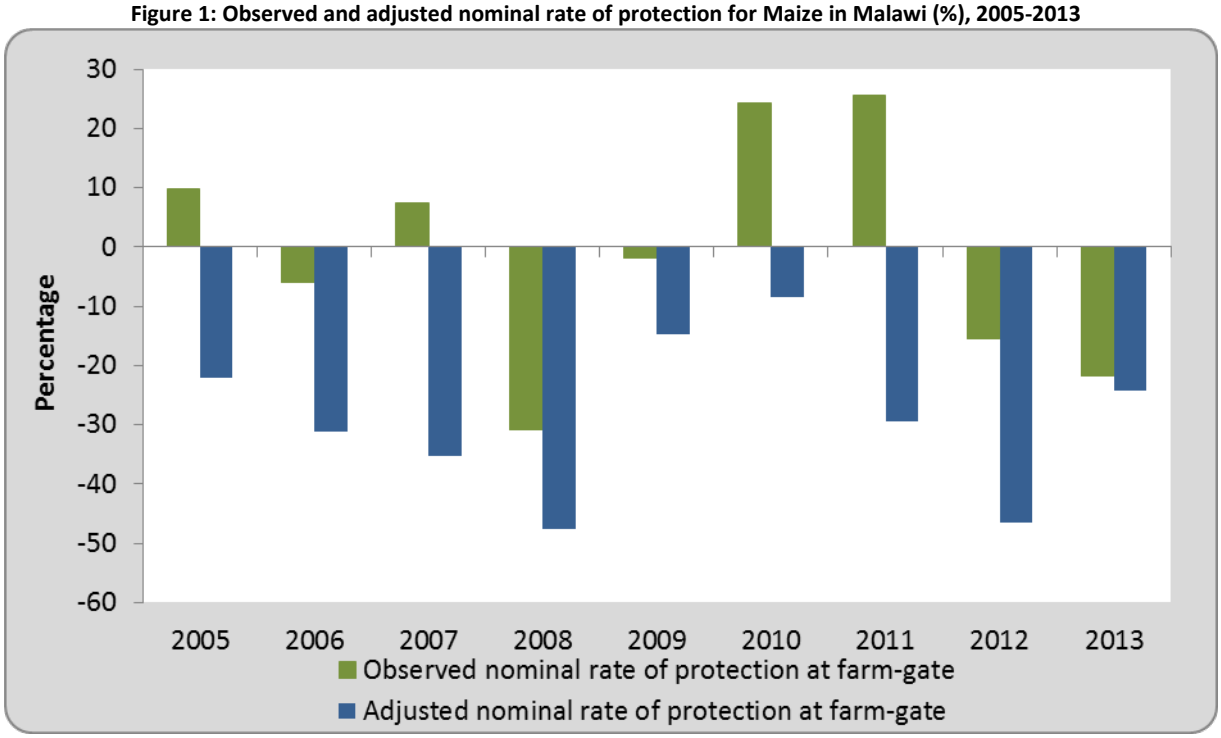
SUMMARY OF THE NOTE

Product: Maize
Period analyzed: 2005–2013
Trade status: Import in all years except 2011

COMMODITY CONTEXT

- Maize is Malawi's main staple food crop and is of great strategic importance; the country's food security status is generally defined in terms of adequate availability of and access to maize.
- Between 1984 and 2012, maize production more than tripled from 1.36 million to 3.9 million tonnes and from 1990 to 2013, yields have doubled from 1 to 2 tonnes per hectare.
- There are between 1.8 and 2 million smallholder farmers in Malawi, of which 97 percent grow maize every year. However, less than 15 percent of maize produced by smallholder farmers is marketed.
- Maize constitutes almost 90 percent of the total intake of cereals and 54 percent of the total caloric intake per capita.
- Malawi is self-sufficient in its production of maize and traded volumes are relatively limited in comparison to total production but informal cross-border trade takes place between Malawi and Mozambique and, to a lesser extent, Tanzania and Zambia.
- Export bans were in place in 2005/06, 2008/09 and 2012/13 and import restrictions are present throughout the entire period under review. The Ministry of Agriculture and Food Security operates a price band system for maize in order to protect consumers and support producers; however, this policy has not been sufficient for price stabilization, particularly during 2008/09 and 2012/13 due to the limited financial capital of ADMARC.
- Following the Malawi food crisis of 2005, a large-scale input subsidy programme was re-introduced during the 2005/06 crop season to tackle some of the key constraints faced by Malawian small farmers, including low yields and high costs of inputs. The main feature of the Farm Input Subsidy Programme (FISP) is the provision of vouchers for seeds and fertilizer for maize production, targeting approximately 50 percent of small-scale farmers.

Figure 1: Observed and adjusted nominal rate of protection for Maize in Malawi (%), 2005-2013



Source: MAFAP, 2014

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 chain, in particular excessive transport costs and exchange rate misalignment.

DRIVING FACTORS

- Disincentives at the farm gate over the 2005–2013 period were primarily driven by low prices at farm gate owing to the fact that the majority of farmers market maize from April to June when prices are lowest.
- Sharp price increases on the domestic and regional market and ad hoc government trade policies further exacerbated the already extreme seasonal price variations, leading to severe disincentives at farm gate in 2008, 2012 and 2013.
- Incentives can be generally considered a product of the high domestic maize prices in Malawi in relation to the region, particularly in years of limited domestic and international trade restrictions, namely, 2007, 2010 as well as 2011 when Malawi became a net exporter.
- Our results show that there are additional disincentives for producers that arise from high access costs between farm-gate and point of competition due to poor rural infrastructure, high margins of traders and an overvalued exchange rate in most years under consideration.
- Incentives at the point of competition in all years under consideration, aside from a neutral situation in 2007 and 2012, can be attributed to the ability of wholesalers and large-scale traders to store maize in anticipation of higher prices later in the season.
- Conversely, consumers received disincentives to purchase maize throughout the entire period under consideration except 2007 and 2012 since the NRP at wholesale can be taken as an inverse proxy indicator of disincentives for consumers.

RECOMMENDATIONS

Further policy analysis is required to address the identified constraints in the maize value chain in Malawi.

- In order to promote more timely and informed decisions by policy makers, expanding the market information system in use by Malawi's Agricultural Commodity Exchange for Africa (ACE) as well as increasing the scope of data collected under the auspices of AMIS to include wholesale and farm gate prices;
- Exploring the possibilities offered by an expansion of the current Warehouse Receipt System (WRS) to cover more rural communities as well as assessing the potential benefits of secure access to storage and credit, enabling farmers the option to sell when prices are higher later in the season.
- The implementation of both the first and second recommendation would increase the capability of farmers to negotiate prices and make informed decisions on the marketing of their produce.
- As maize is thinly traded in Malawi, stable prices are reliant on high volumes of domestic maize production, which in turn is heavily reliant on rainfall. Instead of focusing only on input subsidies, longer-term production solutions such as small-scale irrigation schemes and further efforts to promote crop diversification on smallholder plots would help to mitigate this production risk.
- Improving rural infrastructure such as feeder roads would cut transport costs between the farm-gate and central markets – the most costly leg of the value chain. This would also limit the number of intermediaries necessary to collect and assemble grain from remote villages to where it could be transported by truck.
- Reducing domestic and international trade restrictions could increase the level of maize marketed within the country and facilitate movement of grain from surplus areas to supply deficit areas.
- Continue to promote exchange rate policies that allow the currency to float freely to avoid further disincentives to grain marketers and farmers.

1. PURPOSE OF THE NOTE

This technical note is an attempt to measure, analyze and interpret price incentives for maize in Malawi over the period 2005-2013. However, the exceptional circumstances in Malawi regarding data availability have prompted a diversion from the official MAFAP methodology in an effort to present indicative results and the opportunities for in-depth analysis that MAFAP could contribute, were the required data made available.

According to MAFAP methodology, yearly averages of domestic farm gate and wholesale prices are compared with reference prices, calculated based on 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.

Due to the absence of domestic price data at farm gate and wholesale for maize, these prices have been constructed by the author based on quantitative and qualitative information found in secondary sources; namely, value chain analyses conducted in 2005 and 2008 (for details, please see Chapter 4). Recent access cost information is likewise unavailable, and similar to the prices just mentioned, were constructed based on observed prices in 2005 and 2008. The final challenge to an standard MAFAP analysis of maize in Malawi involves the nature of maize trade itself, primarily traded informally and if officially, as a government tender or negotiated export among governments; the former are unaccompanied by price data (border FOB/CIF price), and the latter are not determined by market forces. Thus, an unorthodox yet justifiable benchmark price was taken in the market hub of informal maize trade, located a few kilometers from the border between Mozambique Malawi (please see Chapter 4 for full explanation). Given such a severe data constraint, we are unable to conduct a standard MAFAP analysis capable of accurately measuring policy and market distortions. With the above in mind, it is nevertheless felt that the analysis presented in this note can reveal indicative and preliminary results, which would need to be supported by the collection of appropriate data whenever possible.

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 4). The indicators were then interpreted in light of existing policies and market characteristics (Chapter 5), and key policy recommendations were formulated on the basis of this interpretation (Chapter 6). Finally, the note concludes with a few main messages, limitations of the analysis and areas identified for further research to improve the analysis (Chapter 7).

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 serve as input for 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

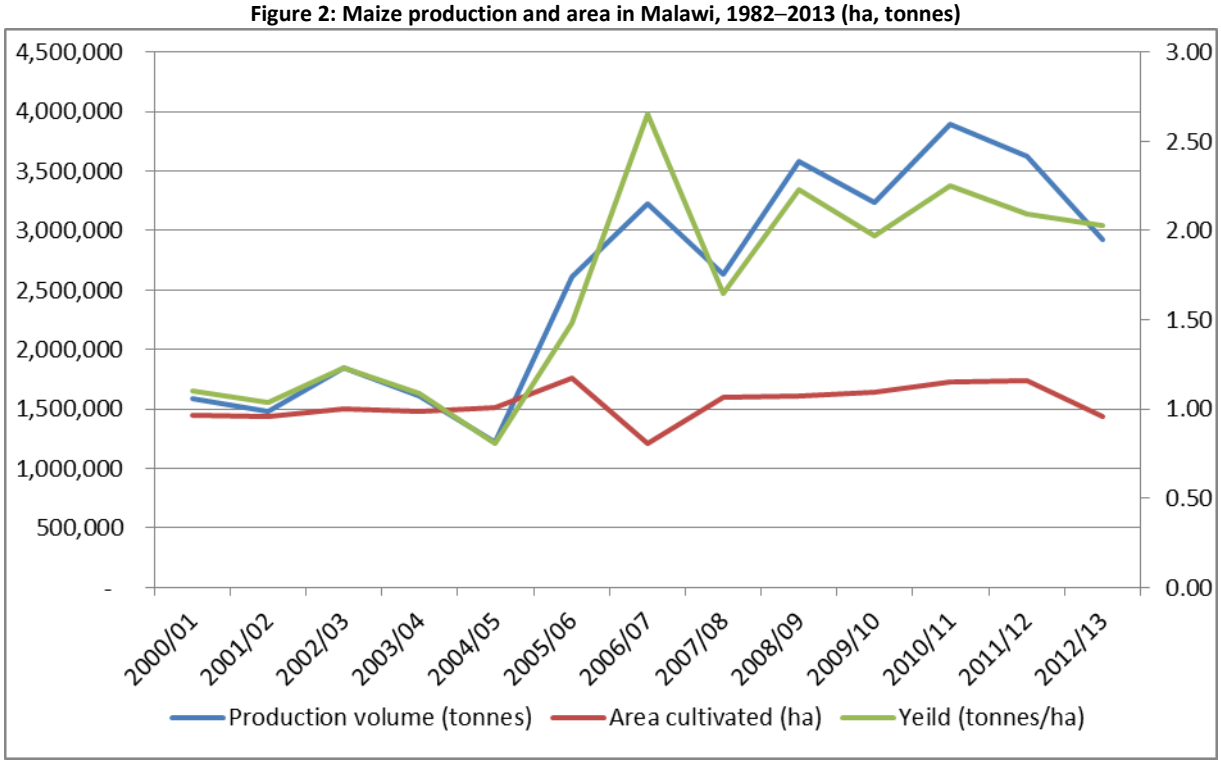
Maize is Malawi's main staple food crop and is of great strategic importance as the country's food security status is generally defined in terms of adequate availability of and access to maize. The crop is almost exclusively produced by smallholder farmers and makes up almost 60 percent of total food consumed (Mazunda & Droppleman, 2012). Thus, the need to ensure low maize prices for consumers while at the same time improving income for small farmers constitutes a continual food price dilemma for policy makers. A well-functioning maize market is a key condition for reducing food insecurity in Malawi. For these reasons, the maize market in Malawi has been the primary target of food and agricultural policy interventions.

PRODUCTION

Almost all maize production is rain-fed and produced by smallholder farmers, occupying 54 percent of smallholder producers' cultivated land. There are between 1.8 and 2 million smallholder farmers in Malawi of which 97 percent of these grow maize every year (NSO, 2008). Production has been increasing since the 1980s, although before 2005, was highly erratic and subject to severe deficits. Between 1984/85 and 2012/13 maize production more than tripled from 1.36 million to 3.9 million MT and from 1990 to 2013. Since the introduction of the Farm Input Subsidy Programme (FISP) in the 2005/06 cropping season, production almost doubled by 2011 before a sharp decline in 2012/13 due to poor rains in most parts of the country and reduced maize acreage by smallholder farmers. Figure 2 demonstrates how total harvest area for maize has slightly increased from 1.5 million hectares in 2000/01 to 1.7 million hectares in 2011/12 before a slight decline to 1.4 million in 2012/13. The slight decline in area under maize may also be due to reallocation of land to other crops under the Green Belt Initiative. This scheme aims to irrigate up to 1 million hectares of land within 20 km of the lake and 13 perennial rivers through private and public investments. Besides irrigation, the aim is to diversify crops for domestic consumption as well as export such as wheat, rice, millet, cotton, and beans.

Against the backdrop of increasing population growth putting pressure on the land, resulting in soil fertility deterioration, output increase can only be achieved by yield increase through use of improved technologies such as seed-fertiliser, and irrigation. Unlike in the 1970s, when the population was much lower, Malawi can no-longer be regarded as land-abundant. Thus, while in the 1970s output increase was achieved through expansion of cultivable area, this option is no longer viable (FAO, 2006).

Figure 2: Maize production and area in Malawi, 1982–2013 (ha, tonnes)

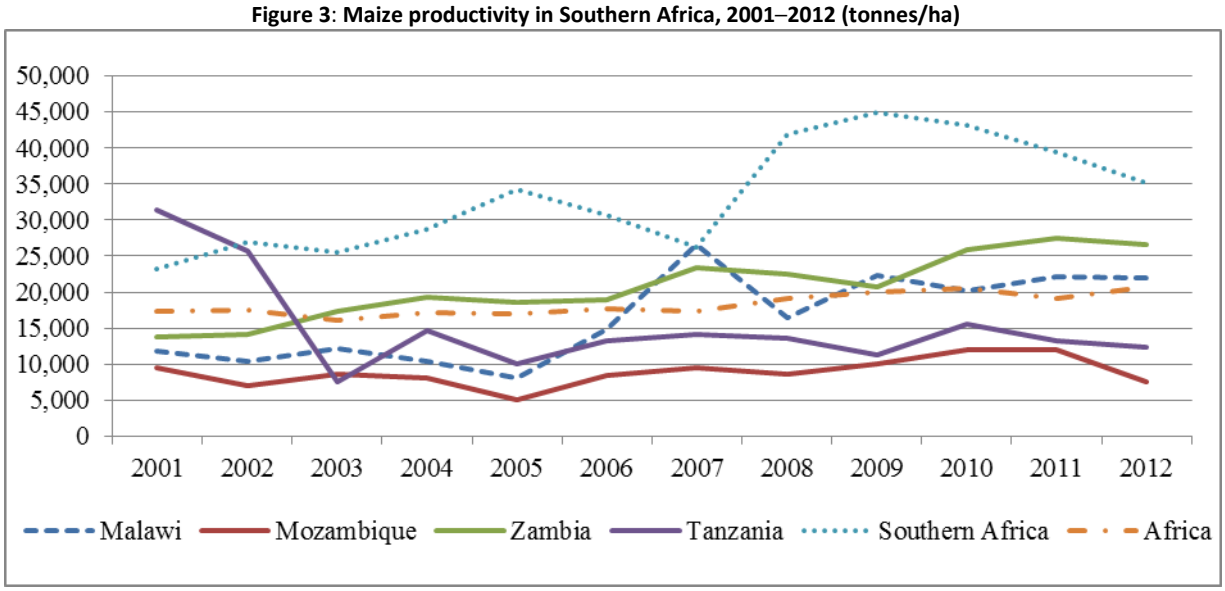


Source: Ministry of Agriculture and Food Security (MoAFS), 2014

In the period 1990 to 2013, yields increased from 1.10 to 2.03 tonnes/ha (Figure 2). Seed-fertiliser input is a major determinant of maize output variations in Malawi. For example, there has been a strong increase in production and yields since 2005/06 and this is generally considered to be related to the FISP. Current estimates on fertilizer show that in 2000/01 the average nitrogen intake for maize was 19 Kg/ha but this increased to an all-time high of 45Kg in 2008/09. Furthermore, only 33 percent of maize area was fertilized in 2000/01 compared to 78 percent in 2008/09 during FISP (Katengeza et. al., 2012). Estimates show that the government acquired a total of 150,000 tonnes of maize fertilizer in 2008/09 for distribution to smallholder farmers (Chibwana et al, 2010).

In comparison with the neighbouring countries and Africa as a whole, Malawi's maize productivity has on average been above that of Tanzania and Mozambique but below Zambia (Figure 3). The volume of production shows that Malawi, despite being a small country compared to neighbouring countries, contributes 5 percent of total African maize production. Only Tanzania has an average national production above Malawi (7 percent).

Figure 3: **Maize productivity in Southern Africa, 2001–2012 (tonnes/ha)**



Source: FAOSTAT, 2014

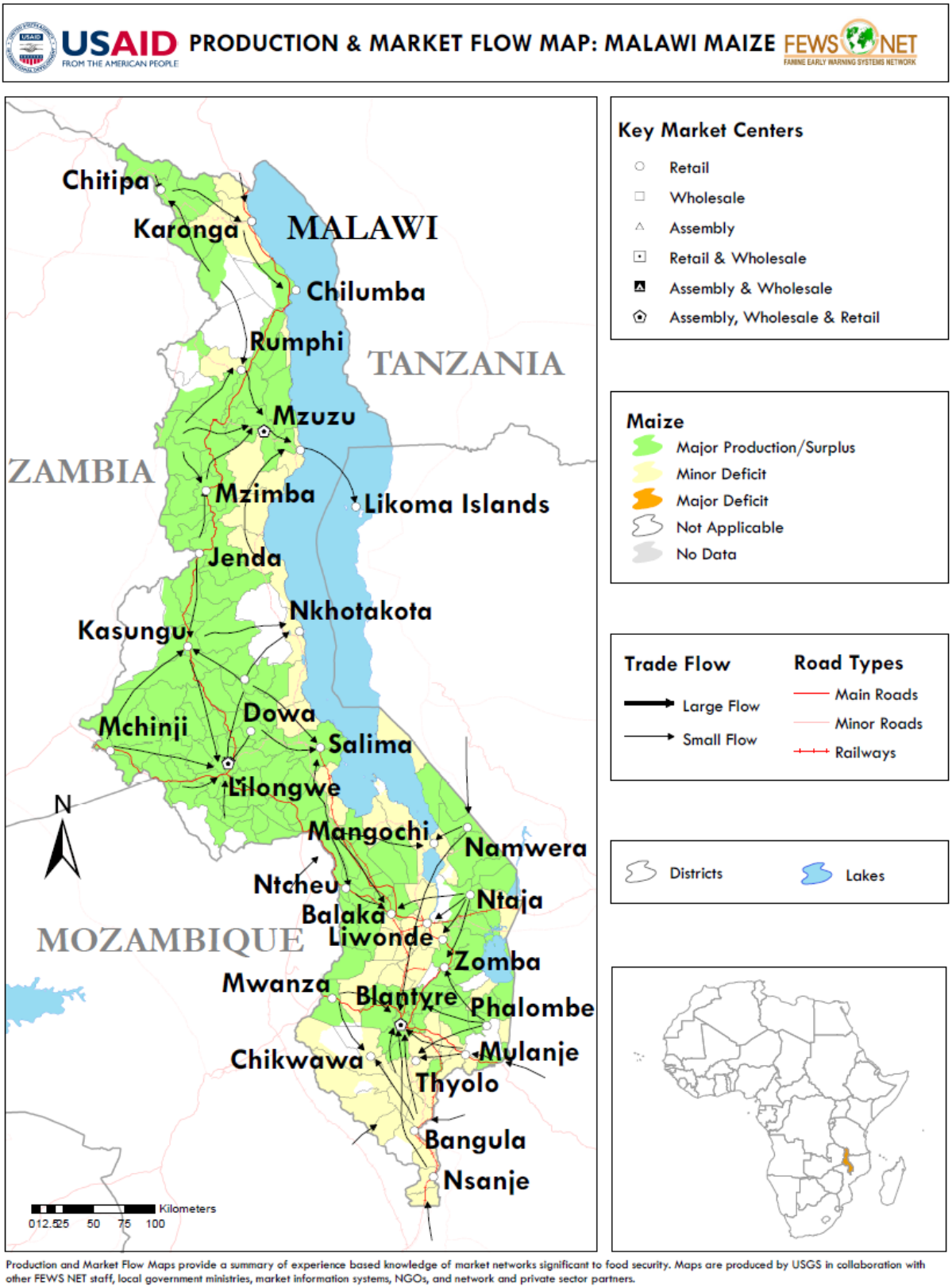
The central region of Malawi, which comprises Kasungu, Salima and Lilongwe Agriculture Development Division (ADDs) is the main production area (Table 1). During the period 2000/01 and 2010/11, the central region produced 58 percent of total national maize production. The Southern Region (Machinga, Blantyre and Shire Valley ADDs), which accounts for 45 percent of the country's population, contributed 30 percent of total maize production between 2000/01 and 2010/11. On average, 96 percent of maize land is under smallholder production producing 94 percent of total national output annually. The average farm size of smallholder producers in Malawi amounts to 0.5-0.8 hectares. At the regional level, the Central Region amounts to 1.13 ha/household, 0.92 ha/household in the North, and 0.72 in the South.

Table 1: Total maize production in Malawi by region, 2001–2011 (tonnes, % share)

ADD	Average Production	% of National
Karonga	82,430	2.85
Mzuzu	267,020	9.24
Kasungu	619,523	21.45
Lilongwe	707,532	24.49
Salima	340,462	11.79
Machinga	421,893	14.61
Blantyre	360,558	12.48
Shire Valley	89,076	3.08

Source: AMIS. MOAFS, 2014

Figure 4: Maize production and market flow map



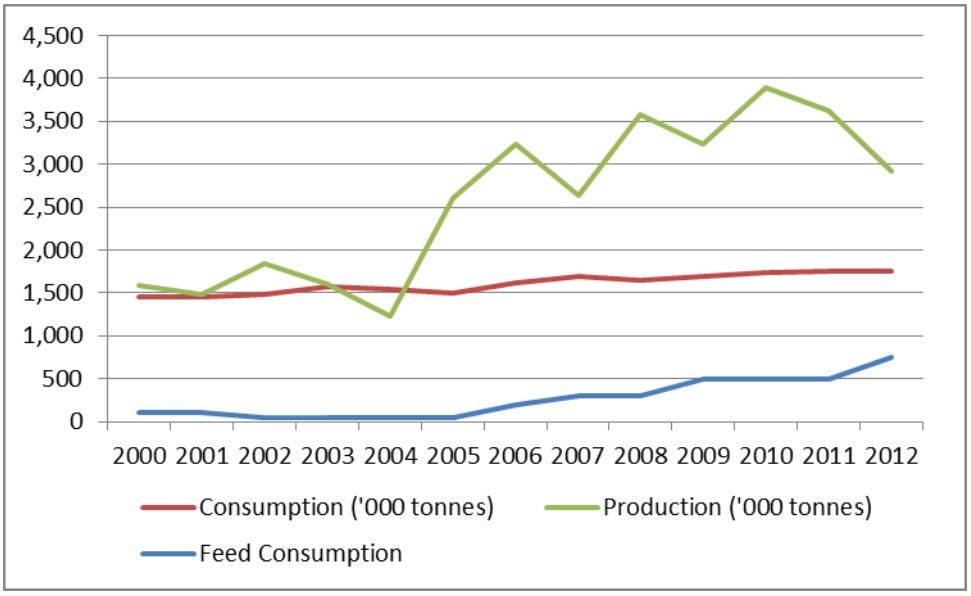
Production and Market Flow Maps provide a summary of experience based knowledge of market networks significant to food security. Maps are produced by USGS in collaboration with other FEWS NET staff, local government ministries, market information systems, NGOs, and network and private sector partners.

Source: FEWS NET, 2009

CONSUMPTION/UTILIZATION

Chimanga ndi moyo – maize is life – is a famous Malawian saying, and underlines the importance of maize as the main staple food for Malawians. Thus, the main objective of smallholder households is to produce enough maize to meet the annual food requirements of their families. Maize constitutes almost 90 percent of the total intake of cereals and 54 percent of the total caloric intake per capita. The Government of Malawi (GoM) in 2006 reported that adults of 10 years and above require 270kg of maize per year while children below the age of 10 require 135kg. These figures are an assessment of what is required to enjoy a healthy life in terms of meeting recommended calories (Jayne et al. 2010; GoM, 2012). In 2011 however, the average per capita intake was only 131.2 kg of maize per year (FAOSTAT, 2014). Maize is largely milled into maize meal flour known as 'Ufa', for cooking 'Nsima' and is often locally processed by the consuming households (Chirwa, 2010).

Figure 5: Annual maize production and consumption trends in Malawi, 2000–2012 ('000 tonnes)

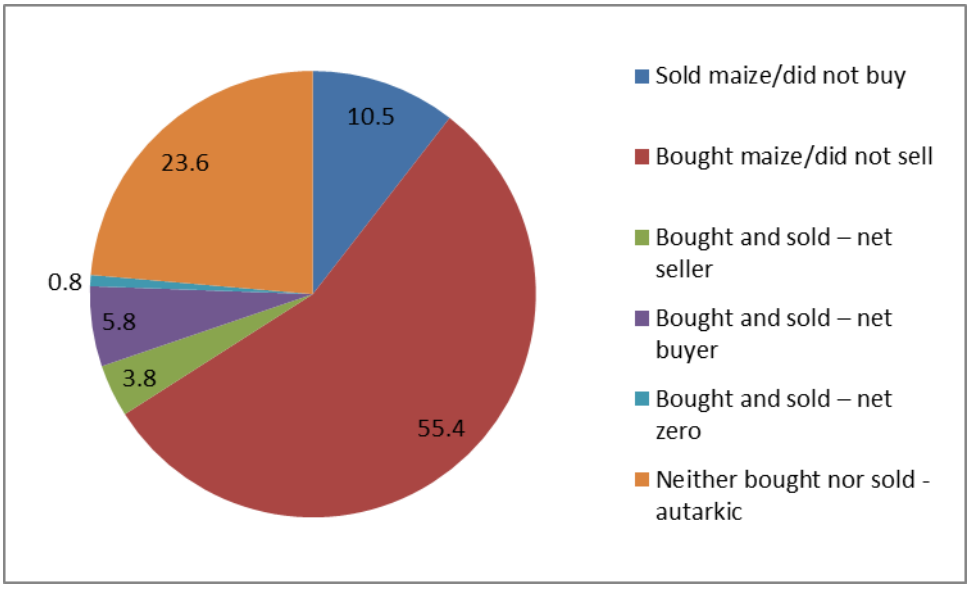


Source: 1. Production data – MoAFS, 2014 2. Consumption and Feed data – NSO, 2014

Total maize consumption has been growing steadily since 2000, a trend primarily driven by population growth (Figure 5). Furthermore, feed consumption has increased significantly since 2005.

Since maize is Malawi's main food crop, it should be noted that a large share of smallholder maize production is not traded but consumed by producer households. In the period 2003—2009, it is estimated that only 10-15 percent of maize produced by smallholder farms was marketed (Jayne et al, 2010). Over half of rural households do not sell maize at all and an additional roughly 10 percent of rural households buy and sell grain in the same year (Figure 6). These largely consist of relatively poor households that make distress sales of grain after harvest in order to meet immediate cash needs, only to buy back later in the season at higher prices.

Figure 6: Maize market positions of rural households in Malawi, 2008/09 (%)



Source: Jayne et al, 2010

MARKETING AND TRADE

Malawi is practically self-sufficient maize production and traded volumes are relatively limited in comparison to total production (Table 2). Apart from 2005, in all other years under review Malawi registered more production than what the nation consumed. However, as discussed in PRODUCTION, there are deficit areas in the North and most severely in the South, supplied by Tanzania and Mozambique surplus areas, respectively. In terms of trade volumes, data as provided by the Ministry of Trade and Industry (MoTI) shows that Malawi was a net importer of maize in most years (Table 2). Only in 2007 and 2010, was the country a net exporter of maize. These statistics are however somewhat confusing because one would expect Malawi to be a net exporter of maize from 2006 onward, when production was continually above national consumption.

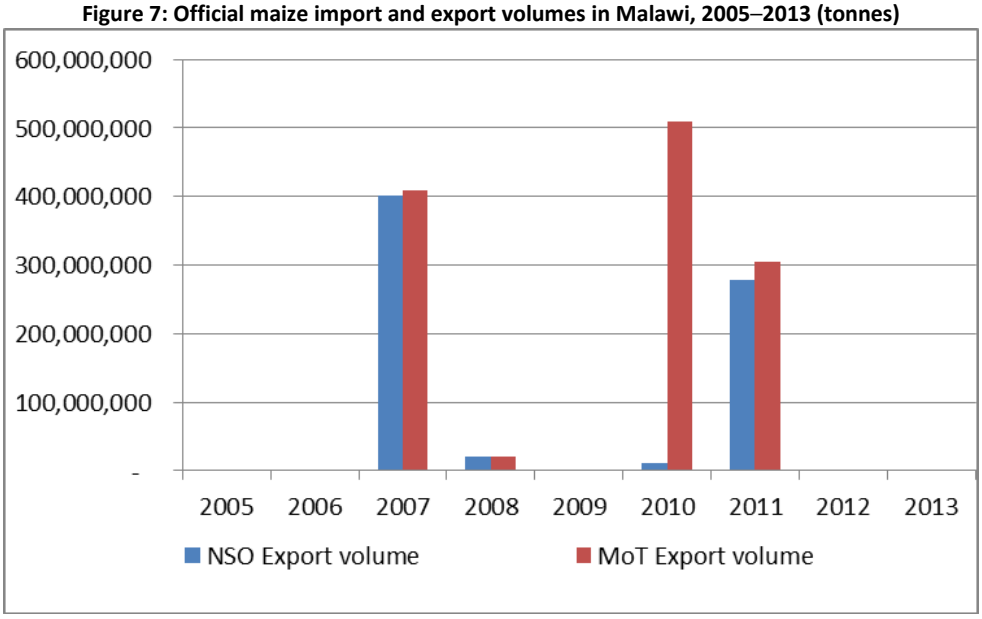
Table 2: Malawi maize production and trade volumes, 2005–2012 (tonnes)

Year	2005	2006	2007	2008	2009	2010	2011	2012
Production	1,225,234	2,611,486	3,444,655	2,777,438	3,767,247	3,433,511	3,193,344	2,909,939
Consumption	1,500,000	1,620,000	1,690,000	1,650,000	1,696,000	1,732,000	1,750,000	1,750,000
Feed	50,000	200,000	300,000	300,000	500,000	500,000	500,000	750,000
Export	467	1,160	391,550	21,380	3,665	511,396	13,000	14,000
Imports	113,300	55,810	20,180	28,176	54,146	15,395	12,652	25,000
Self-sufficiency ratio (%)	91.6	98.0	112.1	99.8	98.7	116.9	100.0	99.6

Source: MOAFS (2014) and Ministry of Trade and Industry (MoTI), 2014

Furthermore, as shown in Figure 7, data from the NSO and the MoTI report different figures: notably for 2010 and 2011 exports at 11,198 and 277,445 tonnes, respectively. This difference may be due to the type of export as well as the data collection and reporting system of each institute.

Figure 7: Official maize import and export volumes in Malawi, 2005–2013 (tonnes)



Source: NSO and MoT, 2014

It is possible that the MoTI reported 500,000 tonnes exported to Zimbabwe in 2010 when an agreement was signed, whereas the NSO, receiving actual customs records, reported the maize as it was leaving the country in 2011. It is also possible that these exports were lent or donated since, as shown in Table 3, 99 percent of this volume was sold at US$ 4.75 per tonne while the average domestic price of maize in Lilongwe, for example, that year was US$ 285 per tonne (MoTI, 2014).

Table 3: Export volume and value for maize in Malawi, 2010 (tonnes)

Period	Trade Flow	Reporter	Partner	Code	Trade Value (US$)	Net Weight (tonnes)	Unit Value
2010	Export	Malawi	World	1005	3,399,086	511,369	6.65
			Zimbabwe		2,409,996	507,875	4.75

Source: MoT, 2014

Formal exports of maize from Malawi are based on government-to-government agreements, carried out by the private Grain Traders Association of Malawi and monitored by the National Food Reserve Agency (NFRA). Both sources report large volumes of exports in 2007. After official estimates of a record harvest in 2007, the Malawi Government concluded an export agreement to supply food-deficit Zimbabwe with almost 400,000 tonnes of maize.

Besides these official trade figures, significant informal cross-border trade takes place between Malawi and Mozambique and, to a lesser extent, Tanzania and Zambia (Table 4). According to FEWSNET reports on informal cross-border trade, in 2005/2006 informal imports of maize into Malawi were estimated to amount to 156,499 tonnes. Though the 2007-2009 crop seasons have generally witnessed good harvests, FEWSNET reports indicate that informal imports significantly exceeded exports in most years under review. This could suggest that the price of Malawi maize is not competitive in neighbouring countries' markets. It also suggests that the official exports to Zimbabwe and Kenya mainly consisted of produce from the surplus region in Central Malawi, while at the same time maize was imported from Mozambique and Tanzania to supply structural maize deficit areas in Northern and Southern Malawi. The reason that informal exports did not surge in the

bumper harvest years could be due to the fact that Malawi's surplus regions are situated near high production areas in Zambia and Tanzania (USAID Staple Food Value Chain Analysis, 2009).

Table 4: Informal cross-border trade between Malawi, Tanzania, Mozambique, 2005-13 (tonnes)

Year	Exports to			Imports from		
	Mozambique	Tanzania	Zambia	Mozambique	Tanzania	Zambia
2005/06	133	944	81	71,218	84,862	419
2006/07	591	2,928	202	77,394	1,888	378
2007/08	3,755	1,581	1,779	56,078	1,073	2,500
2008/09	203	239	129	54,223	2,910	5,388
2009/10	6,124	6,031	315	60,399	89	546
2010/11	27,209	7,073	444	23,557	261	515
2011/12	59,388	17,252	990	30,356	27	0
2012/13	4,168	27,250	320	14,765	0	0
2013/2014	1,207	4,484	115	27,583	641	36,564
Cumulative	102,778	67,782	4,375	415,573	91,751	46,310

Source: MAFAP calculation based on FEWSNET data, 2014

Conversely, in 2010, there is a shift in informal trade directions. There are several reasons this may have occurred; generally trade flows are influenced by price variations, transportation costs and changes in the exchange rate. For example, infrastructure improvements in Mozambique such as the opening of the Zambezi bridge in 2009 may have diverted more maize to central and southern Mozambique and away from Malawi due to cut time and travel costs (Goodbody, S., 2010).

Table 5 shows aggregate imports and exports from official and informal trade as reported by the NSO and FEWS NET. NSO data indicates that Malawi was a net importer of maize in terms of volume in all years except 2007 and 2011. However, in 2011, informal exports exceed informal imports, making Malawi a net exporter in both domains in 2011.

Table 5: Aggregate official and informal export and import volumes (tonnes) for Malawi, 2005–2013

EXPORT Tonnes	2005	2006	2007	2008	2009	2010	2011	2012	2013
Formal	0	150	401806	21567	1943	11198	277445	0	84
Informal	1158	3721	7115	571	12470	34726	77630		
Total Exports	1158	3871	408921	22138	14413	45924	355075	0	84
IMPORT Tonnes									
Formal	70401	43889	10472	26434	51878	12132	5389	1776	60220
Informal	156499	79660	59651	62521	61034	24333	30383		
Total import	226900	123549	70123	88955	112912	36465	35772	1776	60220

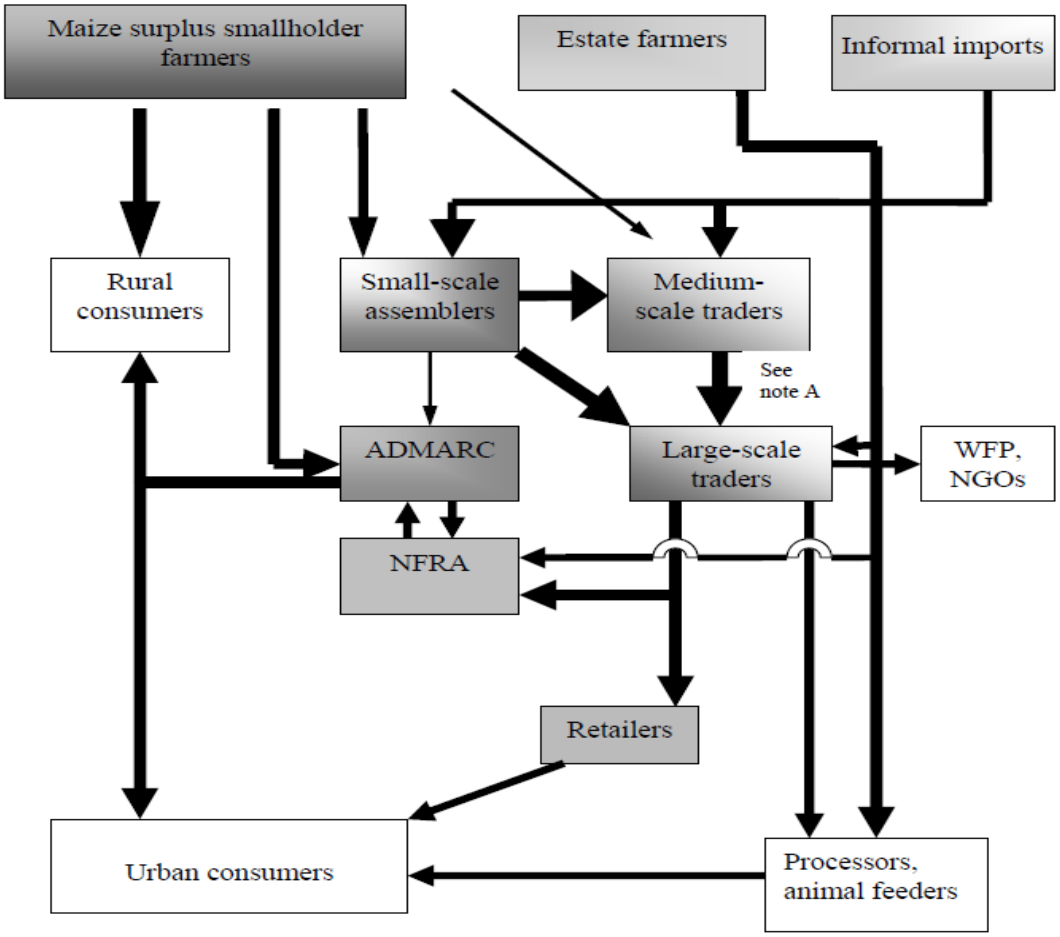
Source: NSO, FEWSNET, 2014

DESCRIPTION OF THE VALUE CHAIN

The 10-15 percent of total maize production that is traded is marketed through different channels. While before liberalization maize was exclusively marketed through the parastatal Agricultural Development and Marketing Corporation (ADMARC), farmers now also conduct direct sales to households, or sell their produce to small traders, or medium/large traders (Figure 8). In 2008, only about 8 percent of the maize sold by farmers was marketed through ADMARC, while roughly 75

percent was marketed through private traders (Jayne et al, 2010). The remainder is sold directly on the local market.

Figure 8: Domestic Value Chain for Maize in Malawi



Source: Jayne et al, 2010

Players in the maize market in Malawi can be grouped into five main categories which are producers, small-scale/rural traders, medium and large-scale traders, processors and grain reserves

Producers – Smallholders and Estates

Agriculture in Malawi is composed of estate and smallholder sub-sectors. The smallholder sub-sector is comprised of farmers with average cultivated land holding at 0.95 ha/household and dependent on favourable weather conditions for a good harvest. Most maize is produced for home consumption. These farmers generally obtain more cash from sales of cash crops than from maize sales although some sell some maize just after the harvest to buy other basic needs (Katengeza et. al., 2012). The estate sub-sector is also actively involved in production of maize but their main focus is on commercial sale, seed production and for employee meals.

Small-scale/rural traders and assemblers

Local market traders and assemblers are those trading in locations where there are very small-scale buyers and sellers of agricultural produce and inputs. In a local market, farmers come to sell just one or a few bags of maize; in most cases people buy in the same or smaller quantities. A high number of operators act at the primary assembly level and the market is characterized by a high degree of competition. Since these areas are difficult to access by truck, many use bicycles to transport small amounts of grain to assembly points that can be accessed by larger vehicles.

Medium/large-scale traders and ADMARC

Historically, maize marketing was dominated by ADMARC for regulatory purposes before liberalization and take-over of private traders. The shift was likely due to the following reasons: the lower purchasing price paid by ADMARC as opposed to those paid by private traders; ADMARC's late opening of its markets, whereas private traders often start buying maize before the official start of the season, and finally; ADMARC tends to run out of cash in the middle of the buying season and cannot purchase all surplus nor procure enough grain to stabilize prices (Jayne et al 2010).

Many rural households, even smallholder growers usually need to purchase some maize at the end of the season and ADMARC is an important source for this type of purchase. People rationally prefer to buy maize from ADMARC and not in the local market or from traders because the former tends to sell at a lower price than the latter during the lean season. Therefore, in areas where ADMARC is still operational and in years when they can purchase enough maize to avoid rationing, it functions as a price setter at the end of the season in such a way that private traders have to follow if they want to have a share of the market.

Medium and large-scale traders usually have access to transportation and storage facilities. This enables them to buy from producers when the price is low, immediately pre or post-harvest, and to sell stocks when prices are higher from December to March. Large scale traders often buy from small-scale traders and not directly from producers. This allows them to obtain larger volumes and reduce transaction costs (USAID Staple Foods Value Chain Analysis, 2009). These large traders, such as Mulli Brothers and members of the GTPA, also supply the National Food Reserve Agency and contract requirements with the World Food Program, Non-Governmental Organizations and institutions. Large traders and farms also supply maize to processing companies that produce maize flour and animal feeds (Figure 8).

Although storage and transportation enable private traders to take advantage of intra-temporal and spatial price differences, there is no real incentive to store maize for a long period of time, as the buying power of Malawians is limited, there is uncertainty about future prices and storage costs are very high as a result of high interest rates relative to the value of the crop.

ADMARC owned most of the storage capacity that was not available to the private sector until 2009 with the establishment of the Malawi Agricultural Warehousing and Trading Company – a public company to enhance agricultural marketing efficiency and provide storage serveices to traders and processors (Manda, 2010). Furthermore, Malawi's Agricultural Commodity Exchange for Africa (ACE)

is in the process of implementing a Warehouse Receipt System (WRS) to ensure contracts are honoured and to provide finance for traders and extend rural credit to farmers.[1]

Processors

Processing industries include; commercial milling companies, animal feed industry and beverage industry. Out of these three, commercial milling companies process most maize. Processors mill the maize into flour products such as 'Super Cream of Maize', 'Cream of Maize' or whole maize meal and in some cases may also add soya, sugar and other ingredients such as iron, zinc and calcium. Rab Processors sets up buying points in rural areas to reach producers directly and make vitamin and nutrient enhanced maize meal for sale in supermarkets as well as for NGOs. Since 2005, the animal feed and the beverage industry have used 15 percent of national production on average (Table 2). Maize makes up 60 percent of the ingredients for chicken feed processed by Central Poultry. Large milling companies usually purchase maize grain through traders or are traders themselves. Due to their storage capacity, they concentrate their purchases during the trading season of June-July to take advantage of the low prices.

In addition to the big players, numerous middle-sized millers are operating, often combined with other activities, including maize trading. These companies usually do not have their own transport facilities. However, their storage facilities are normally sufficient.

POLICY DECISIONS AND MEASURES

Overarching Government Objectives in Agriculture and Food Security

The Government of Malawi's Agriculture Sector Wide Approach (ASWAP) expresses the following key priorities for agriculture and food security in Long and Medium Term Goals: 1) to increase agricultural productivity; (2) to eliminate food shortages even in times of disasters; 3) boost exports of food staples; 4) expand the contribution of agro-processing to economic growth, encourage domestic value addition in key crops, increase export of processed products and finally; 5) open up linkages to the sea.

Farm Input Subsidy Programme (FISP)

Input subsidies have been an important feature of Malawi's agricultural policy for decades, until they were largely abolished in the 1990s. Following the Malawi food crisis of 2005 however, a large-scale input subsidy programme was re-introduced during the 2005/6 crop season to tackle some of the key constraints to increased maize production faced by Malawian small farmers, including low yields and high costs of inputs. The Agricultural Input Subsidy Programme was established with its main feature being the provision of vouchers to target approximately 50 percent of small farmers to receive fertilizers for maize production. Additional vouchers were provided for maize seeds and tobacco fertilizer.

Vouchers entitle the beneficiaries to purchase two bags of 50kg fertilizer at a subsidized price. This quantity is considered sufficient for 0.4 hectares of land. In the first two years, farmers were

[1] The Agricultural Commodity Exchange for Africa (ACE) was established in 2005 by NASFAM, facilitating trade and providing price information for farmers.

required to purchase subsidized maize seed; from the 2008/09 to 2012/13 seasons, these (mainly hybrid) seeds were provided free of charge.

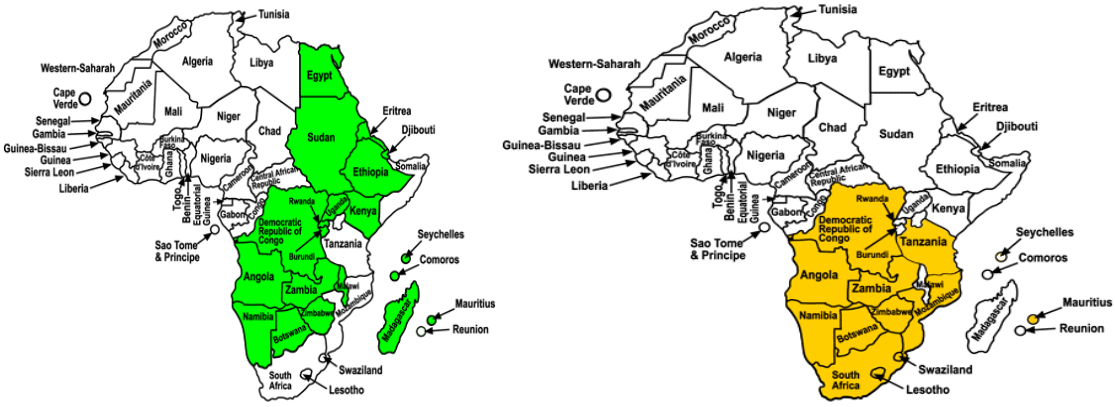
Annually, between 50 and 65 percent of farmers received vouchers through the Agricultural Input Subsidy Programme. The total volume of subsidized maize fertilizer varied between 108,986 tonnes in 2005/06 to 192,976 tonnes in 2007/2008. The percentage of subsidy on purchased inputs has risen from 64 percent of the value of inputs in 2005/06, to 88 percent in the 2009/10 season. After removing the effect of above-average rainfall, it is estimated that the impact of the programme on the national maize harvest amounts to 300,000-400,000 tonnes in 2006 to 60,000-70,000 tonnes in 2007 (Doward & Chirwa, 2011).

International trade agreements

Malawi was one of the founding members of the Common Market for Eastern and Southern Africa (COMESA), established in 1994 and followed by the establishment of the COMESA Free Trade Area in 2000 (Figure 9). Since 2009, a Customs Union has been in effect with one common external tariff, which consists of 0 percent for capital goods and raw materials, 10 percent for intermediate goods and 25 percent for finished products (WTO Malawi Trade Policy Review, 2010). Malawi is also a member of the South African Development Community (SADC), under which a Free Trade Area has been in effect since 2008. According to authorities, Malawi's dual participation in both free trade regimes has so far not caused any conflicts.

Though quantitative restrictions may be imposed, maize grain is tax-free in the tariff schedule. This is consistent with the 'maize without borders' policy of COMESA. Imports of maize (grain) from other origins are also duty-free. Maize meal is imported duty-free from COMESA member countries, but a 25 percent tariff is applied to imports from MFN and SADC origins (WTO, 2010). Exports of maize grain are restricted through a system of export licensing requirements and intermittent export bans.

Figure 9: Maps of COMESA (left) and SADC member countries



Maize trade and marketing policy measures

The marketing environment in Malawi has a high level of unpredictability due to the changing government role in the market. Some examples of this are; government procurement and sale of subsidized grain, operation of a price band, contracts only for selected traders, banning of external trade as well as import tariff rate changes.

Under the structural adjustment programmes that started in the 1980s, marketing and price policies were gradually liberalized. The maize market moved from a domain controlled by the state marketing agency ADMARC, with fixed pan-territorial and pan-seasonal pricing, to a market in which private traders operated within the limits of a government-set price band by the end of the 1990s.

Since the 2000s, agricultural markets have been further liberalized but maize, as the main pillar of the country's food security, has been consistently excluded from these measures. Furthermore, following the critical food crises in 2002 and 2005, several measures to liberalize the maize market implemented in the 1990s were either partially or wholly reversed.

Formal maize imports were only carried out through a government tender system that licensed the private sector to procure maize abroad. Though Malawi had generally maintained a liberal export policy for agricultural products, official maize exports only took place under specific government licenses monitored by the The National Food Reserve Agency (NFRA). The NFRA has a mandate to maintain adequate buffer stocks of grain to protect Malawians against fluctuations in food production, availability and prices. The NFRA was established as an independent trust in July 1999 and buys from ADMARC and/or private traders and imports maize whenever necessary. Their sourcing depends mostly on domestic availability of maize, and in times of emergencies, on availability of transport.

Apart from the establishment of an extensive input subsidy programme, primarily targeted at maize producers (see below), the government introduced both minimum producer prices as well as price ceilings at retail, which were to be enforced by ADMARC. This pricing policy has been pursued since 2006 even though ADMARC has failed to defend the price policy and private trade takes place outside of the price bands set by the government.

Table 6 outlines some of the major market and trade developments between 2005 and 2013.

Table 6: Trade and Market Policy developments for maize in Malawi, 2005–2013

2005	Mar	Projected maize production deficit: 300,000 tonnes
	Apr	Government announces import tender of 100,000 tonnes of maize to replenish depleted NFRA stocks and for sale to public
	Jul	Delayed tender for procurement finally issued (originating from SADC)
	Jul	Export Ban on maize and fertilizers, ADMARC rationing sales to consumers at 17MWK/kg
	Oct	Government declares national emergency
	Dec	Market price of maize reaches MWK 34 while ADMARC selling at MWK 17
2006	Jan	Ban on private domestic maize trade, ADMARC stocks dwindling
	Feb	Prices reach MWK 51, 218% higher than April 2005
	Mar	Late imports arriving at time of bumper harvest
2007	Feb	Ban lifted due to estimated surplus of 500,000 tonnes, government begins issuing export licenses for 80,000 tonnes
	May	Contract to supply 400,000 tonnes Zimbabwe and so NFRA signs purchase contracts with private traders for 240,000 tonnes
	Oct-Dec	Steep rise in prices suggest market shortage, ADMARC competing with private traders and increases purchase price to MWK 20
2008	Jan	Market price at MWK 34, ADMARC increases selling price to MWK 30
	Mar	Price peaks just before 2008 harvest at MWK 44, Export to Zimbabwe ceases at 300,000 tonnes MoAFS sets a maximum buying price for farmers of MWK 28/kg[2]
	Apr	Export ban on maize introduced in April to face the record high prices (except for the residual export quota to Zimbabwe). [3] Prices level out at MWK 33, ADMARC enters market with competitive purchase pricing – initiating price increase
	May	Maximum buying price of MWK 28 to private traders enforced and required all buyers to acquire a restrictive license from MoAFS under recommendation from GTPA, June–July ADMARC competes with traders for supplies
	June-Jul	Market prevails; ADMARC buys from traders at MWK 50-60, NFRA buying at MWK 65
	Aug	A ban imposed on private trade of maize, making ADMARC the sole trader in the country, buying maize at MK 45 per kg and selling at max MK 52 per kg. (However, maize prices remained generally above the maximum set prices). Unintended effect of curbing informal imports, further restricting supply
	Aug	The government institutes an inspection regime by which traders suspected of hoarding could be prosecuted.
	Sept	Clarification issued to allow small traders with low volumes, private trade allowed under restrictive licensing conditions and operation within price band
2009	Jan-Feb	Maize prices reach MWK 71, 395 % above those of May 2007
	Jun	The minimum buying price for maize has been set at MWK 40 (USD 0.28) per kilo, with ADMARC procurement price at MWK 50-60.
	Sep	The maximum retail price of maize set at MK 52 (USD 0.37) per Kilogram.
2010	Aug	The 2008 export ban is lifted; until then, only politically connected traders were exporting maize to Zimbabwe[4]
2011	Dec	Export ban on maize reinstated[5]
2013	Apr	Export ban on maize re-affirmed by government and border patrols increased

Sources: Author's composition based on information gathered from: ITC (2012), Chinsinga & Chirwa (2013), Ellis & Manda (2012) and FEWS NET (2014)

[2] According to Manda (2010), the publicized reason for this move on behalf of the MoAFS, was to encourage farmers to keep their maize. This indicates that the government may have already been aware of an upcoming shortage.

[3] Chinsinga and Chirwa (2013), Ellis and Manda (2012) and Doward and Chirwa, 2009 corroborate this date.

[4] Chinsinga and Chirwa (2013)

[5] FEWSNET (August 2012) and according to Agritrade (2012), Malawi had announced a bumper harvest with a surplus over 1 million tonnes and had intended to export around 600 000 tonnes. After allowing exports of 300 000 tonnes to S Sudan, Kenya and Zimbabwe, the policy was reconsidered and export ban implemented.

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[6] 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:

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

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

[6] 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.[7] Mathematically, the Nominal Rate of Assistance is defined by the following equation:

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

[7] 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 incentives or disincentives to production (Price Gaps and NRPs) as well as the Market Development Gaps (MDGs), several types of data are needed. This section presents the data that was obtained and methodological decisions that were taken in this analysis.

As discussed in Chapter 1, the most basic data requirements for MAFAP analysis could not be met in Malawi at this stage of MAFAP implementation owing to the fact that the national Agricultural Market Information System only collects data at retail level, while prices at farm gate and wholesale level are required to conduct a proper MAFAP analysis. However, the missing observed prices have been constructed on a sound basis and with appropriate justification. Therefore, although the methodology is unorthodox compared to the standard MAFAP methodology, it is the next best option to carry-out a preliminary analysis to estimate price incentives and disincentives in the maize value chain in Malawi.

TRADE STATUS OF THE PRODUCT

As mentioned above, Malawi's international trade in maize is limited in comparison to total national production. The high volume of official exports in 2007 and 2011 can be related directly to specific government-negotiated export agreements to supply markets in Zimbabwe and Kenya with surplus maize from Malawi's Central Region. Even in these years however, significant informal imports from neighbouring countries continued to flow into Malawi. Informal trade flows in 2010 begin shifting direction but the price of maize in Malawi remained higher than the benchmark price at the border and thus, in 2010, Malawi is still considered a net importer for the purpose of the analysis (see MARKETING AND TRADE). The exact quantities of grain traded are disputed not only between FEWS NET and Mozambican authorities but also within national institutions in Malawi (Goodbody, S. et al, 2010). FEWS NET claims that much of what is counted as 'informal' exports from Malawi to Mozambique in 2010 and 2011 are in fact part of the official exports destined for Zimbabwe, meaning that they are double counted.[8] There are no official maize exports by Malawi in 2012 or 2013 due to an export ban in place since December 2011.

Table 7: Official and informal trade volumes of maize in Malawi, 2005–2013 (tonnes)

EXPORT	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Formal	0	150	401806	21567	1943	11198	277445	0	84
Informal	1158	3721	7115	571	12470	34726	77630		
Total Exports	1158	3871	408921	22138	14413	45924	355075	0	84
IMPORT									
Formal	70401	43889	10472	26434	51878	12132	5389	1776	60220
Informal	156499	79660	59651	62521	61034	24333	30383		
Total import	226900	123549	70123	88955	112912	36465	35772	1776	60220
Net trade status retained for this analysis	m	m	m	m	m	m	x	m	m

Source: NSO and FEWS NET, 2014

Overall, Malawi is a net importer of maize with the exception of few government-negotiated export agreements and a slight informal trade shift in 2010/11. In 2011, both formal and informal exports

[8] It should also be acknowledged here that informal trade data is more subject to measurement error than official data.

surpass all imports. Therefore, Malawi is considered a net importer of maize for this analysis except in 2011.

MARKET PATHWAY ANALYSED

The majority of imported maize comes from the northern surplus producing areas of Mozambique through the Milange–Muloza border crossing to the Southern deficit areas of Malawi. Malawi provides the most accessible market for Mozambique, since trade within Mozambique from the northern surplus to the southern deficit areas is constrained by long distances and high transport costs (Goodbody, S. et al, 2010). This trade is primarily informal, involving several intermediaries who assemble and transport maize across the border from Milange, Mozambique into Malawi by bicycle, each carrying up to four 50 kg bags. In Muloza, the grain is re-assembled before transportation by truck to Blantyre, a commercial city of Malawi and centre for both agricultural and industrial trade.

Although Mzuzu in the Northern region of Malawi also experiences maize deficits and depends on imports from Tanzania and maize from the central region, it is the volume of trade in Blantyre (Southern Malawi) that has guided the choice of Lunzu market as the point of competition for the analysis. At Lunzu market in Blantyre, maize produced locally such as in the southern district of Mulange, competes with maize produced in central Malawi as well as imports from Mozambique.

Figure 10: **Overview of analysed maize flows from border (Milange) to point of competition (Blantyre) and from farm gate (Mulange district) to Blantyre**

Souce: Author's elaboration of United Nations, January 2004

Our market pathway for this analysis follows a path similar to that of a Sequential Marketing Margins Survey conducted in Mission Village (Milange) in 2008. Farmers sell maize to small scale

traders who often travel by bicycle, collecting small amounts that are then brought to assembly points. From these first assembly points, maize may be transported by small trucks to primary maize markets and may be purchased by other small scale or medium scale traders and brought to larger rural maize markets or to the major retail and wholesale markets in Blantyre. In this segment of the market pathway, there are many intermediaries and due to poor rural infrastructure, particularly rural feeder roads, transportation is limited and inefficient.

BENCHMARK PRICES

Observed

A benchmark price is established as a basis to calculate a reference parity price in order to determine whether maize farmers in Malawi receive market incentives or disincentives. Since Malawi is considered an importer of maize and since both official and informal import trade data indicate that the largest volumes of maize flow over the Milange (MOZ) – Muloza (MAL) border, this will be the border point considered.

An official CIF price is not taken because it would neither be representative nor comparable since the majority of maize trade, both import and export, is informal aside from a few government negotiated export agreements. Since the distance between the Malawi border and the market in Milange is less than 5 km and trade is well integrated, the wholesale price of maize in Milange is used as our benchmark price.

The great majority of this trade is informal and includes many intermediaries, yet the market system on both sides is quite sophisticated and efficient (Olanda Bata, et al. 2005). In 2005, all informal maize trade in Milange was conducted in Malawi kwacha, primarily by medium scale traders on the Malawi side who pay various agents to conduct purchases and arrange transport across the border. This has likely changed since then as there are indications that maize flows change in tandem with currencies in some years. Prices are available in US dollars in the GIEWS database[9] and correspond to the price of white maize at wholesale level in Milange. These prices are those collected by the Information System of Agricultural Markets (SIMA) of the Ministry of Agriculture in Mozambique.

Table 8: Annual wholesale price of maize in Milange, Mozambique (unit), 2005-2013

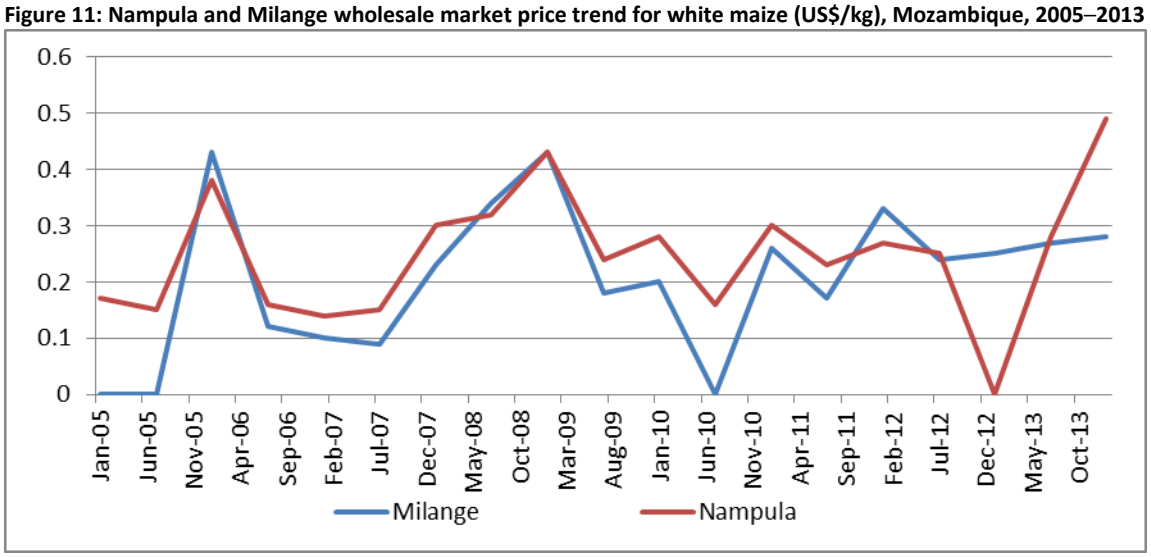
Year	2005*	2006	2007	2008	2009	2010	2011	2012	2013
US$/tonne	**168.92**	**161.67**	**115.83**	**283.33**	**232.50**	**192.22**	**220.00**	**217.50**	**259.17**

**Jan-Oct constructed from Nampula wholesale market. Source: GIEWS, 2014*

This benchmark price is based on the average annual wholesale prices in the Milange, Mozambique market. Wholesale price data from Milange is only available from November 2005 and so the previous months have been constructed using the Nampula market wholesale prices. As seen in Figure 11, the two markets follow very similar annual trends and seasonal fluctuations until 2011, when they begin to diverge quite significantly. For this reason, price data has been compared for the years 2006-2011 and only for the months January to October, which are the missing prices for 2005. Prices in Milange were lower by an average of 85 percent and so this share was applied to Nampula prices in order to arrive at an estimation of Milange wholesale prices from January to October 2005.

[9] FAO GIEWS Food Price Data and Analysis Tool; last accessed September, 2014

Figure 11: Nampula and Milange wholesale market price trend for white maize (US$/kg), Mozambique, 2005–2013



Source: MAFAP using GIEWS price data tool, 2014

Adjusted

No adjustments to the benchmark prices were made as the regional market for maize is competitive and without significantly distortive policies.

DOMESTIC PRICES

Observed prices at point of competition

In order to determine the domestic prices it is important to define the point of competition where imported produce will compete with maize of local farmers. In our analysed value chain, the main target for imported maize is the wholesale market in the city of Blantyre, located in Southern Malawi. In Blantyre, maize from local farmers as well as maize from the surplus region in the central highlands of Malawi competes with imports.

Wholesale price data is not available in Malawi. Nonetheless, the wholesale and retail markets are integrated in such a way that wholesale prices represent 97 percent of retail prices (Manda, 2010). Therefore, 97 percent of annual retail prices in these towns have been considered in this analysis as wholesale prices (Table 9).

Table 9: Annual retail and constructed wholesale prices of maize at Blantyre's Lunzu market in Malawi, 2005–2013

		2005	2006	2007	2008	2009	2010	2011	2012	2013*
Lunzu Retail		24.34	28.73	19.22	49.29	48.47	35.55	35.91	60.32	120.21
Wholesale	97%	23.61	27.86	18.64	47.81	47.01	34.48	34.83	58.51	116.61
MkWK/Tonne		23606	27864	18640	47807	47013	34481	34832	58506	116608

Source: AMIS, 2014

Observed prices at farm gate

Also producer prices are not collected and are thus not available. However, Manda (2010) reported that the producer price represents 61.5 percent of retail prices in Blantyre (value for end of May 2008). Since this survey was conducted during the harvest season at the end of May, retail prices are significantly lower than the annual average price would be. Furthermore, the average difference between prices in the harvest months (April–June) and the peak price months (Jan-Feb) over a 20

year period (1989–2009) was roughly 60 percent (Ellis & Manda, 2012). Therefore, we have taken the share represented in the survey and applied it to the average harvest season price (April–June) only (Table 10). This is necessary to reflect that in reality, the majority of farmers who sell maize will do so at harvest season while the prices are very low, whereas other actors in the value chain will trade and store grain throughout the year.

Table 10: Calculation of retail and seasonal farm gate price in Lunzu Market (Blantyre), Malawi, 2005–2013 (MWK/kg and MWK/tonne)

	April	May	Jun	Average Harvest Season Price	Farmer Price (61.5% of retail)	Farmer Price (MWK/tonne)
2005	16.13	17.82	21.93	18.63	**11.55**	**11,550**
2006	22.50	16.80	19.04	19.45	**12.06**	**12,057**
2007	13.52	9.50	10.00	11.01	**6.82**	**6,824**
2008	31.00	27.50	38.67	32.39	**20.08**	**20,081**
2009	31.84	32.25	36.38	33.49	**20.76**	**20,764**
2010	37.78	30.39	30.28	32.81	**20.34**	**20,344**
2011	30.24	27.80	27.63	28.55	**17.70**	**17,703**
2012	41.09	49.28	65.08	51.82	**32.13**	**32,127**
2013	106.20	81.98	90.40	92.86	**57.57**	**57,572**

Source: MAFAP calculations based on AMIS price data, 2014 and Manda, 2010

EXCHANGE RATES

In MAFAP analyses, the exchange rate is usually used to convert the reference price in local currency and thus to analyze the effect of the exchange rate at point of competition and farm gate.

Observed

The observed exchange rate from the International Monetary Fund (IMF) is used for this analysis (Table 12). The exchange rate from the Reserve Bank of Malawi (RBM) was not available for the whole period.

Table 11: Nominal exchange rate USD/Mk, 2005-2013

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Nominal exchange rate	118	136	140	141	141	150	157	249	364

Source: IMF, 2014

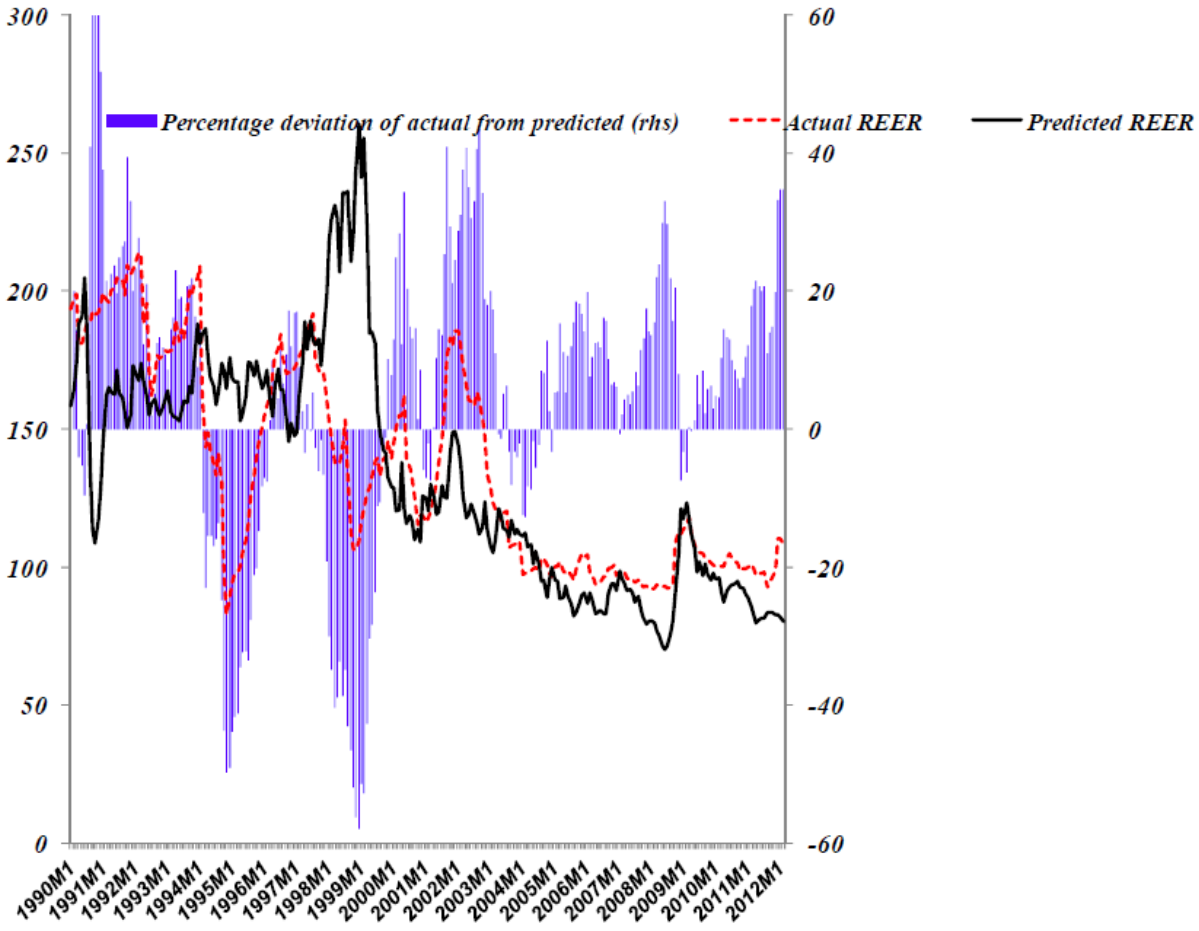
Adjusted

Prior to 2012, the government had implemented foreign exchange controls on the exchange rate through the RBM. In relation to the United States dollar, the Malawi kwacha has been significantly overvalued since 2005. This is reflected in a dynamic parallel market for foreign exchange until May

2012, when the government decided to modify the exchange rate policy and allow the currency to float freely against the US dollar. Therefore, an adjusted exchange rate has been applied from 2005 to 2012 to express the difference between the nominal exchange rate and the exchange rate in the parallel market.

The values used to express the misalignment are the percentage difference of actual Real Effective Exchange Rate (REER) and the prevised REER as estimated by IMF (Figure 12).

Figure 12: Estimation of the exchange misalignment based on the comparison between actual REER and predicted REER in Malawi, 1990 M1- 2012M2



Source: IMF, 2012

The adjusted exchange rate has been estimated based on the level of misalignment in relative value (Table 13). Data for 2012 are available only for the first two months and therefore represent the level of misalignment only for January and February. However, since the currency started to float in mid-2012 and most of the maize production is marketed by farmers during the first half of the year; those figures are used to estimate the level of incentives in 2012. Thereby, despite the fact that the analysis allows for the identification of the effect of the exchange rate misalignment at both wholesale and producer levels, it is likely that wholesalers were less affected than producers by the fixed exchange rate policy since they market maize all year. The exchange rate is not adjusted for 2013, no data are available but we consider that the misalignment has been minor due to the implementation of the floating exchange rate in 2012. The misalignment has also been confirmed

through the literature review by IFPRI (Pauw, 2013), estimating that by late 2010, the kwacha was overvalued by 10-20 percent.

Table 12: Adjusted exchange rate USD/Mk, 2005-2013

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Misalignment (%)	12%	11%	7%	19%	2%	9%	18%	34%	0%
Adjusted exchange rate	133	151	150	167	145	164	185	334	364

Source: IMF, 2012 and MAFAP, 2014

ACCESS COSTS

Observed

Access costs analysed include the costs of bringing the commodity both from farm-gate and from the border to the centre of the value chain at the point of competition.

Border to Point of Competition

Access costs are taken from Milange (Mozambique) wholesale market (border) to the point of competition at Lunzu wholesale market in Blantyre. Maize is often purchased by medium traders on the Malawi side through agents in Mozambique who will also arrange the transport across the border by bicycle. This trip takes about 20 minutes and each cyclist will carry around three or four 50 kg bags, a volume too small to require an export license from Mozambique and is only subject to a small fee from Mozambique customs of US$ 100 on trucks more than 3.5 tonnes (Goodbody, S. et al., 2010). There are no import taxes on maize coming into Malawi.

Data was collected through a survey undertaken in 2005 on informal trade between Mozambique and Malawi (Bata, M. et al., 2005). Costs for the following years were calculated using the Consumer Price Index of Malawi as reported by the IMF.

Table 13: Access costs from Milange, Mozambique (border) to Blantyre, Malawi (point of competition), 2005–2013 (MWK/tonne)

MK/Tonne	2005	2006	2007	2008	2009	2010	2011	2012	2013
Transport- cyclist	400	456	492	535	580	623	670	813	1024
Transport (Brokers)	100	114	123	134	145	156	168	203	256
Customs Mozambique	160	182	197	214	232	249	268	325	410
Storage (Muloza)	80	91	98	107	116	125	134	163	205
Transport Muloza - Blantyre	1300	1481	1599	1738	1884	2024	2178	2642	3327
Total	**2040**								
ratio	1	1.14	1.23	1.34	1.45	1.56	1.68	2.03	2.56
CPI	198.50	226.10	244.10	265.40	287.70	309.00	332.60	403.36	508.04

Source: Author's calculations based on survey data (Bata, M. et al. 2005)

The largest cost incurred in this segment is the transport by truck from Muloza to Blantyre.

Point of Competition to Farm gate

Access costs are taken from a survey conducted in May 2008 (Manda, 2010) which was also used to estimate the prices paid to producers. The CPI of Malawi was used to estimate the prices for the remaining years. The transport cost is high because vehicles are limited by the poor conditions of

rural feeder roads. Storage costs are very low due to frequent rotation in rural markets where grain is generally bought and sold in the same day or perhaps stored over 2 days.

Table 14: Access costs from farm gate in Muloza to point of competition in Blantyre, 2005–2013

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Transport cost (total farm-ws)	2238.81	2552.24	2753.73	3000.00	3246.27	3492.54	3761.19	4544.78	5798.51
Margin small trader/transporter	1119.40	1276.12	1376.87	1500.00	1623.13	1746.27	1880.60	2272.39	2899.25
Margin 1st assembler	2985.07	3402.99	3671.64	4000.00	4328.36	4656.72	5014.93	6059.70	7731.34
Storage cost (rural market)	298.51	340.30	367.16	400.00	432.84	465.67	501.49	605.97	773.13
Margin storage	1194.03	1361.19	1468.66	1600.00	1731.34	1862.69	2005.97	2423.88	3092.54
Margin agent	746.27	850.75	917.91	1000.00	1082.09	1164.18	1253.73	1514.93	1932.84
Wholesale Margin	1492.54	1701.49	1835.82	2000.00	2164.18	2328.36	2507.46	3029.85	3865.67
CPI ratio	0.75	0.85	0.92	1.00	1.08	1.16	1.25	1.51	1.93

Source: MAFAP calculations based on survey data collected in 2008 (Manda, 2010)

Adjusted

Access costs on both segments of the value chain have been adjusted. From the border to point of competition, access costs have been adjusted only from the Malawi border to point of competition segment (not from Milange, Mozambique to the border) since we want to consider only inefficiencies of the market and policy environment in Malawi. Transport cost adjustments are based on the 2012 Logistic Performance Index (LPI) scoring of Malawi (2.81) and South Africa (3.67).[10] Since South Africa is the most efficient market in the region, it is a good benchmark for comparison. According to this index, Malawi is 76 percent less efficient so transport costs have been adjusted downward based on this.

Table 15: Adjusted access costs: border to point of competition, Malawi, 2005–2013 (MWK/tonne)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Transport Muloza - Blantyre	1300	1481	1599	1738	1884	2024	2178	2642	3327
Adjusted transport Muloza - Blantyre	**988**	**1125**	**1215**	**1321**	**1432**	**1538**	**1655**	**2008**	**2529**

Informal trade costs have not been adjusted. Although not reaching maximum economy of scale by using larger transport, bicycle trade avoids fees such as the US$ 100 truck levy and the necessity of trade licenses.

Transport costs and excessive margins have been adjusted from the farm gate to the point of competition. Due to lack of good feeder roads in rural areas, transportation is limited by the type of vehicle that can pass. Many of the remote village transactions and transport utilize bicycles and small trucks, limiting the load each time and increasing costs per kg/km.

The value chain study outlining the various margins and costs at each point in the value chain showed a price gap of 4 MWK/Kg between the first and second market but did not specify the service or actor associated with the fee. It is thus considered to be a margin exacted by a small trader or first assembler that could be due to a lack of market information, allowing them to raise the price quite significantly at this middle level. At the time the survey was conducted, this margin

[10] The LPI includes 6 dimensions: (1) efficiency of the clearance process by border control agencies, including customs; (2) quality of trade and transport related infrastructure; (3) ease of arranging competitively price shipment; (4) competence and quality logistic services; (5) ability to track and trace consignments; (6) timeliness of shipments in reaching destination within schedules or expected time delivery.

represents over 10 percent of the wholesale price, which is considered excessive. This 'margin 1st assembler' has thus been adjusted downward to reflect only 5 percent of the wholesale price.

Table 16: Adjusted access costs: farm-gate to point of competition, Malawi, 2005–2013 (MWK/tonne)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
total transport (MK/Tonne)	2239	2552	2754	3000	3246	3493	3761	4545	5799
adjusted (76 percent)	1701	1940	2093	2280	2467	2654	2859	3454	4407
Transport Adjustment	**537**	**613**	**661**	**720**	**779**	**838**	**903**	**1091**	**1392**
Margin 1st assembler (+10%)	2985	3403	3672	4000	4328	4657	5015	6060	7731
Lunzu Wholesale	23606	27864	18640	47807	47013	34481	34832	58506	116608
Adjusted Margin 5%	1180	1393	932	2390	2351	1724	1742	2925	5830
Margin Adjustment	**1805**	**2010**	**2740**	**1610**	**1978**	**2933**	**3273**	**3134**	**1901**
Total downward adjustment	**2342**	**2622**	**3401**	**2330**	**2757**	**3771**	**4176**	**4225**	**3293**

BUDGET AND OTHER TRANSFERS

The Malawi Farm Input Subsidy Programme (FISP) has been a source of budgetary transfers to smallholder maize farmers in Malawi during the period of analysis. A separate study, MAFAP public expenditure analysis, permits the identification of annual budget allocated to maize and allows the possibility to calculate the Nominal Rate of Assistance in this analysis.

Table 17: Total expenditure allocated to maize per year in Malawi, 2006–2013

	2006	2007	2008	2009	2010	2011	2012	2013
Total expenditure allocated to maize (MWK millions)	15,923	8,863	11,883	19,549	25,145	11,404	22,132	47,808
Total expenditure allocated to maize per tonne (MWK)	6,097	2,747	4,510	5,457	7,777	2,928	6,107	16,374

Source: MAFAP Public Expenditure Analysis, 2014

QUALITY AND QUANTITY ADJUSTMENTS

No quantity or quality adjustments were used since, although the quality of maize may be inconsistent, there is no formal grading system (especially for informally traded maize). Thus, there would be a very minor price differential for variations in quality.

DATA OVERVIEW

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

Table 18: Sources of data used in the calculations of indicators

		Description	
Concept		***Observed***	***Adjusted***
Benchmark price		Wholesale prices in Milange Mozambique. Price data taken from GIEWS.	Non relevant
Domestic price at point of competition		Computed as 97% of annual average retail prices at point of competition at Lunzu market in Blantyre, based on price data from Ministry of Agriculture and Food Security (MOAFS).	Non relevant
Domestic price at farm gate		Computed as 61.5% of average harvest season (Apr–Jun) retail prices in Blantyre as reported by AMIS; Ministry of Agriculture and Food Security (MOAFS)	Non relevant
Exchange rate		Annual average exchange rate as reported by IMF.	Average annual adjusted market rate as estimated by the IMF
Access cost from border to point of competition		Transport costs, broker fees, and storage costs taken from Maria Olanda Bata et al (2005) from Milange (MOZ) to Blantyre (MAL) and adjusted by CPI for remaining years.	Access costs adjusted for transportation by means of LPI
Access cost from farm-gate to PoC		Transport, margins and storage taken from Manda (2010) from Mission Village in Muloza area to Lunzu wholesale market in Blantyre and adjusted by CPI for remaining years.	Access costs were adjusted for transportation using the LPI and for excessive margins (over 10%) due to remoteness and lack of market information adjusted downward to 5 percent of wholesale price
QT adjustment	Bor-Wh	-	-
	Wh-FG	-	-
QL adjustment	Bor-Wh	-	-
	Wh-FG	-	-

Data Summary Table

Year		**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
trade status		m	m	m	m	m	m	x	m	m
DATA	Unit									
Benchmark price										
Observed	USD/TON	157	162	116	283	233	192	220	218	259
Adjusted	USD/TON									
Exchange rate										
Observed	MWK/USD	118	136	139	141	141	150	157	249	364
Adjusted	MWK/USD	133	151	150	167	145	164	185	334	364
Access costs border - point of competition										
Observed	MWK/TON	2,040	2,324	2,509	2,727	2,957	3,176	3,418	4,145	5,221
Adjusted	MWK/TON	1,728	1,968	2,125	2,310	2,505	2,690	2,895	3,511	4,423
Domestic price at point of competition	MWK/TON	23,606	27,864	18,640	47,807	47,013	34,481	34,832	58,506	116,608
Access costs point of competition - farm gate	MWK/TON									
Observed	MWK/TON	10,075	11,484	12,393	13,500	14,607	15,717	16,925	20,452	26,094
Adjusted	MWK/TON	7,732	8,862	8,992	11,170	11,851	11,945	12,750	16,226	22,801
Domestic price at farm gate	MWK/TON	11,550	12,057	6,824	20,081	20,764	20,344	17,703	32,127	57,572

SUMMARY OF INDICATORS

Table 19: Price Gap for Maize in Malawi, 2005–2013

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Trade status		*m*	*m*	*m*	*m*	*m*	*m*	*x*	*m*	*m*
Observed price gap at point of competition	MWK/tonne of maize	3,024	3,551	-104	5,311	11,235	2,411	3,817	55	17,005
Adjusted price gap at point of competition	MWK/tonne of maize	1,053	1,484	-885	-1,765	10,796	302	-2,973	-17,818	17,803
Observed price gap at farm gate	MWK/tonne of maize	1,043	-772	473	-8,915	-407	3,991	3,613	-5,872	-15,937
Adjusted price gap at farm gate	MWK/tonne of maize	-3,271	-5,461	-3,709	-18,321	-3,603	-1,890	-7,352	-27,971	-18,432

Source: MAFAP, 2014

Table 20: Nominal Rate of Protection and Nominal Rate of Assistance for Maize in Malawi, 2005–2013

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Trade status		*m*	*m*	*m*	*m*	*m*	*m*	*x*	*m*	*m*
Observed nominal rate of protection at point of competition	%	15	15	-1	12	31	8	12	0	17
Adjusted nominal rate of protection at point of competition	%	5	6	-5	-4	30	1	-8	-23	18
Observed nominal rate of protection at farm gate	%	10	-6	7	-31	-2	24	26	-15	-22
Adjusted nominal rate of protection at farm gate	%	-22	-31	-35	-48	-15	-9	-29	-47	-24

Source: MAFAP, 2014

Table 21: Market Development Gap for Maize in Malawi, 2005–2013

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Exchange policy gap	MWK/tonne of maize	-2,283	-2,423	-1,165	-7,493	-891	-2,595	-6,267	-18,507	0
Access costs gap to point of competition	MWK/tonne of maize	312	356	384	417	452	486	-523	634	798
Access costs gap to farm gate	MWK/tonne of maize	-2,343	-2,622	-3,401	-2,330	-2,756	-3,772	-4,175	-4,226	-3,293
Total market development gap	MWK/tonne of maize	-4,314	-4,689	-4,182	-9,406	-3,195	-5,881	-10,965	-22,099	-2,495
Market development gap as share of farm gate price	%	-37	-39	-61	-47	-15	-29	-62	-69	-4

Source: MAFAP, 2014

5. RESULTS AND INTERPRETATION

As the most important food security crop in Malawi, maize tends to be the focus of both producer and consumer oriented national programmes and policies. Between 2006 and 2013, 81 percent of food and agricultural specific public expenditure[11] exclusively targeted maize production, mainly through input subsidies in the framework of the FISP. Besides increasing domestic supply through increased productivity, trade and market policy measures were also implemented to contain domestic prices for consumers, namely, private domestic trade and export bans as well as maximum retail prices. This analysis, an adaptation of the orthodox MAFAP analysis, aims to identify and measure the effects of such policies on wholesalers, consumers and producers. In this way, it may be possible to determine whether the policy environment supports or counteracts policy objectives.

Price incentives for wholesalers

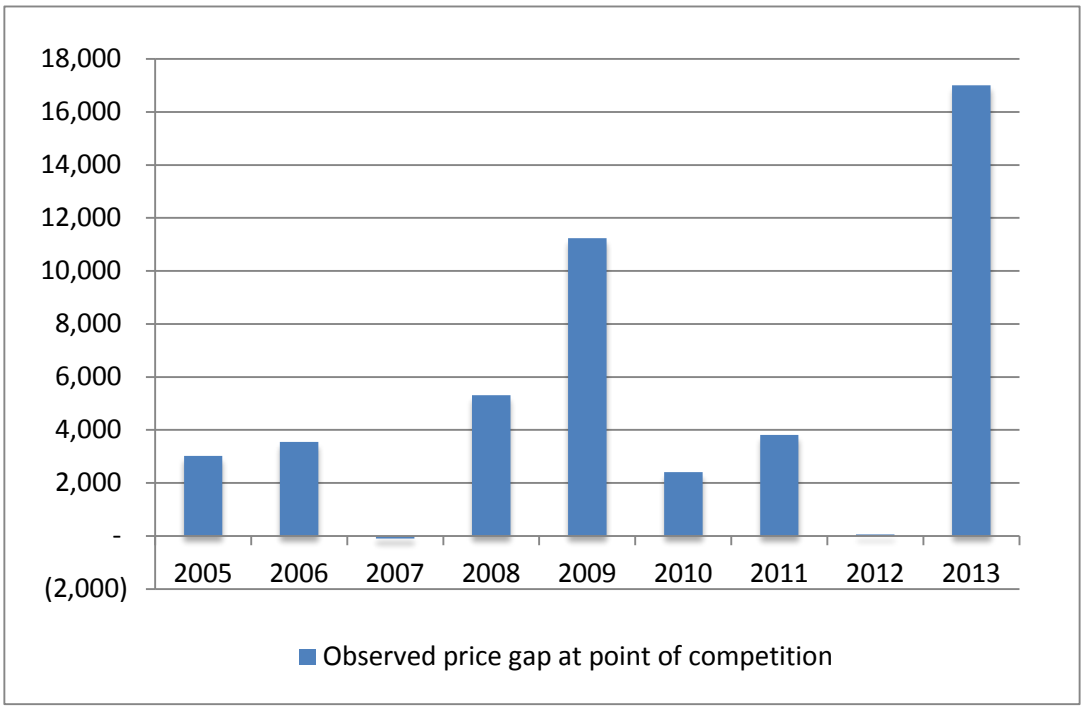
Observed domain

Medium and large-scale traders and wholesalers operating at the point of competition are given overall incentives to market maize during the period under review. Due to the warehousing and market information capabilities, they are able to take advantage of higher prices later in the season.

The observed price gap measures the effect (in absolute terms) of domestic policy environment and overall market performance on the prices received by different agents in the value chain. The price gaps at wholesale level show the difference between the reference price at wholesale, calculated based on the benchmark price plus the access costs between the border and the wholesale market and the actual price received by the wholesalers. From 2005 to 2013, observed price gaps at the point of competition were all positive except in 2007 and 2012 when the situation was neutral. The price gaps range from minus 104 MWK/tonne in 2007 to 17,005 MWK/tonne in 2013 (Figure 13). On average, medium to large-scale traders and wholesalers received 5,145 MWK more than they would have received in the absence of certain domestic policy and market factors.

[11] Food and Agricultural public expenditure refers to expenditure specific to agriculture and does not include expenditure supporting rural development (indirect support). It includes national expenditure and on-budget support from donors.

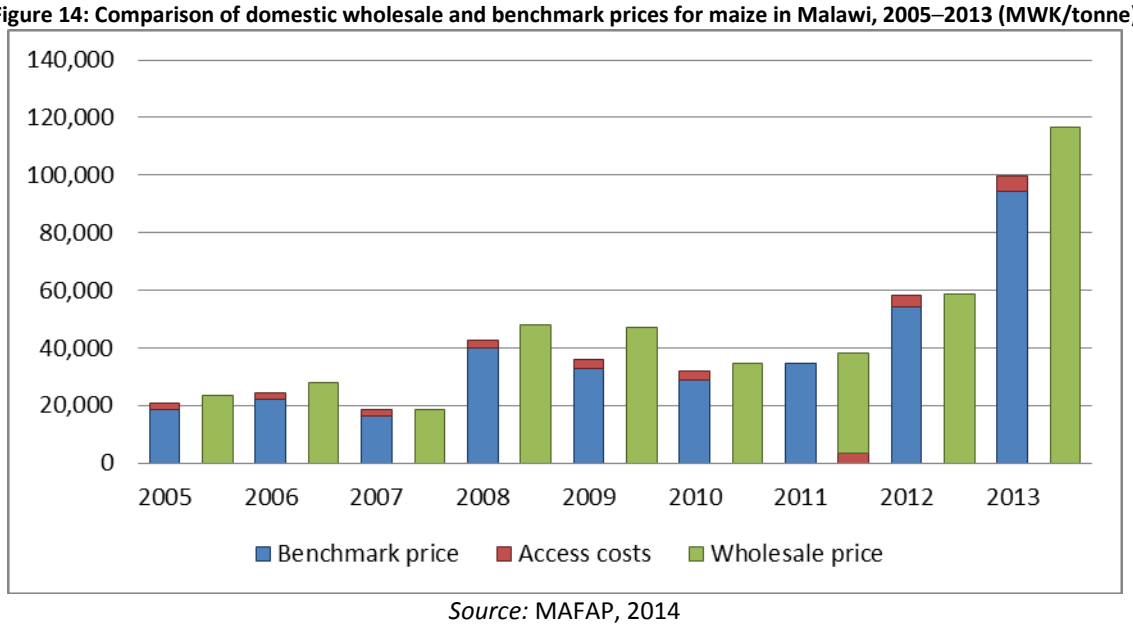
Figure 13: Observed Price Gaps at Point of Competition for maize in Malawi, 2005–2013, (%)



Source: MAFAP, 2014

Positive price gaps in the observed domain result when the actual domestic price at wholesale is higher than the reference price at wholesale. Access costs for bringing maize from the border to wholesale are generally not high enough to be prohibitive since transportation along the major international routes is relatively efficient. We can see from Figure 14 that the wholesale price in Blantyre is higher than the price of imported maize plus the access costs in all years.[12]

Figure 14: Comparison of domestic wholesale and benchmark prices for maize in Malawi, 2005–2013 (MWK/tonne)



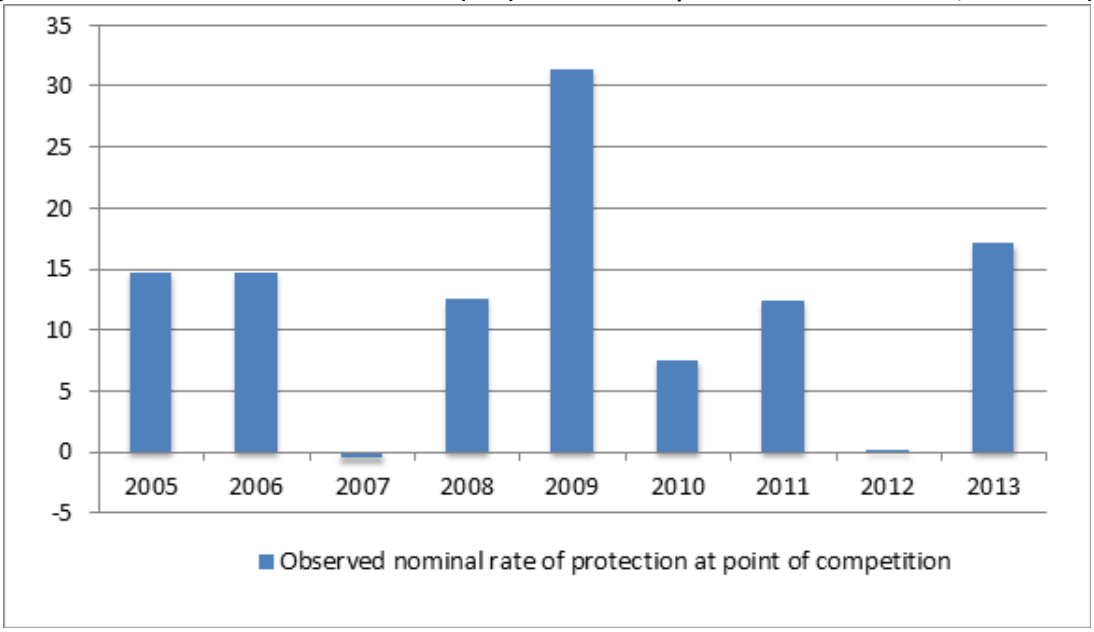
Source: MAFAP, 2014

[12] In 2011, maize was exported, explaining the fact that access costs are added to wholesale price and not to the benchmark price. Access costs have likely been underestimated due to lack of data.

Since the domestic price increased significantly from 2005 to 2013, the price gaps cannot be compared across years. For instance, a price gap of 15,000 MWK/tonne would affect a wholesaler more if the selling price were 23,606 MWK as in 2005 than if this price were 116,606 MWK as in 2013. For that reason, the Nominal Rate of Protection (Figure 15) is used to express the Price Gap in relative value.

Incentives at the point of competition in 2005 and 2006 can be attributed to high domestic prices after the drought of 2004/05. The high prices remained in the domestic market until 2006 due to the reluctance of the GoM to allow private traders to import maize without time-consuming licensing procedures and government issued tenders. Therefore, wholesalers received incentives to market maize reaching 15 percent in 2005 and 2006, representing 3,287 MKW on average.

Figure 15: Observed Nominal Rate of Protection (NRP) at Point of Competition for maize in Malawi, 2005–2013 (%)



Source: MAFAP, 2014

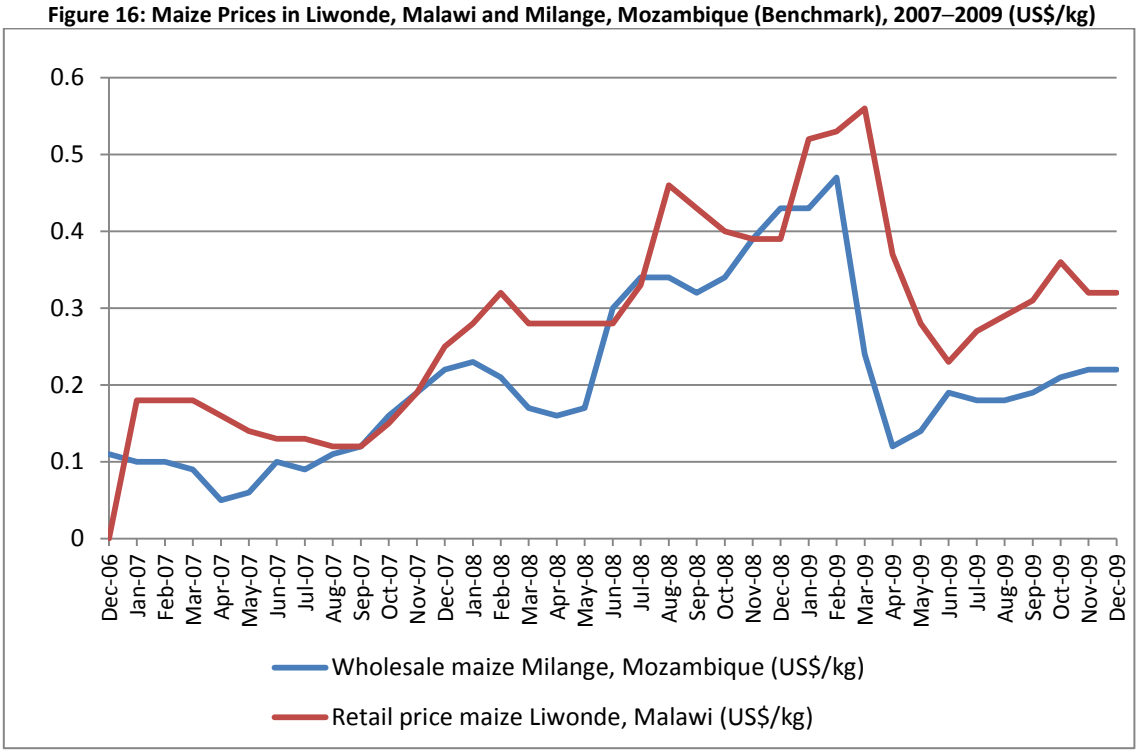
By 2007, the export and domestic trade bans for private traders had been lifted owing to the surplus of maize production the previous year. Wholesalers received a -1 percent NRP, which is not considered a disincentive but a neutral situation. Prices declined by -37 percent between 2006 and 2007 due to the increasing supply as production volume increased by 24 percent with a strong augmentation of yields which can be attributed to the FISP. However, this price decline has not resulted in disincentives for wholesalers since the import price declined as well.

A positive forecast for the 2006/07 growing season led the government to an agreement to export 400,000 tonnes of maize to Zimbabwe. Traders had difficulty procuring the requested volume by the end of 2007, indicating that the forecast may have been inaccurate and that the already slight supply was being procured and exported, creating a shortage and contributing to the price increase at the close of 2007 and start of 2008 (Mapila, 2013).

In 2008, wholesalers received price incentives of 15 percent due to the increase in domestic prices by 156 percent in the context of the global food price crisis. In an attempt to keep the lid on domestic prices, an export ban on maize was introduced in April 2008 (Figure 16). However, the trade policy could not contain prices and, on the contrary, may have contributed to higher prices

due to widespread panic regarding domestic maize supplies by encouraging actors to retain their production and increase stock (Manda, 2010).

Figure 16: Maize Prices in Liwonde, Malawi and Milange, Mozambique (Benchmark), 2007–2009 (US$/kg)

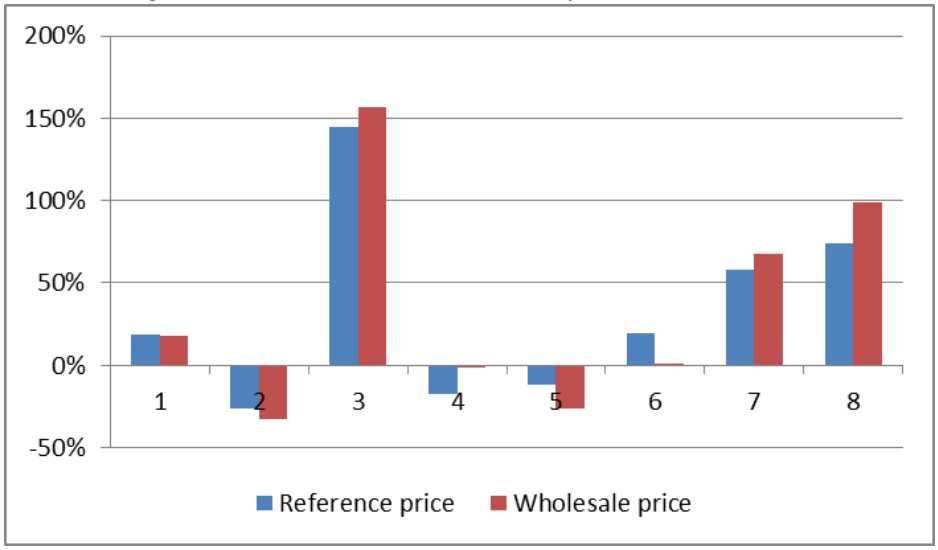


Source: GIEWS Price Data Tool, 2014

Formal imports only take place under government tenders. Studies have indicated that the decision to issue an import tender by the government had been more based on low domestic availability (crop forecast and food stocks data) as opposed to high price trends, which many would agree are the most accurate indicator of availability (Malipa & Kankwamba, 2013). Therefore, when domestic prices were increasing in the context of an apparent surplus, the government did not take steps to import maize, as they had done during the 2004/05 drought induced crisis. Furthermore, due to restrictions on trade licenses, many private traders were not able to formally import maize from South Africa (origin of majority of imports) even though by August 2008, the South Africa Futures Exchange (SAFEX) price was falling dramatically and became on par with Malawi import parity.

Price incentives at the point of competition were the highest in 2009. The global food price crisis of 2007/08 hit Malawi late (2008/09); prices in Mozambique had begun climbing months before but reached Malawi at the end of 2007. In 2008, prices increased by over 150 percent and at a faster pace than the import price, but in 2009, declined much more slowly (Figure 17), creating high incentives of 31 percent (Figure 15). Trade restrictions were not sufficient to contain prices and they could have even contributed to aggravating the soaring domestic price trend as in 2009, when international prices fell at 17 percent and domestic prices fell at a rate of only 3 percent (Figure 17).

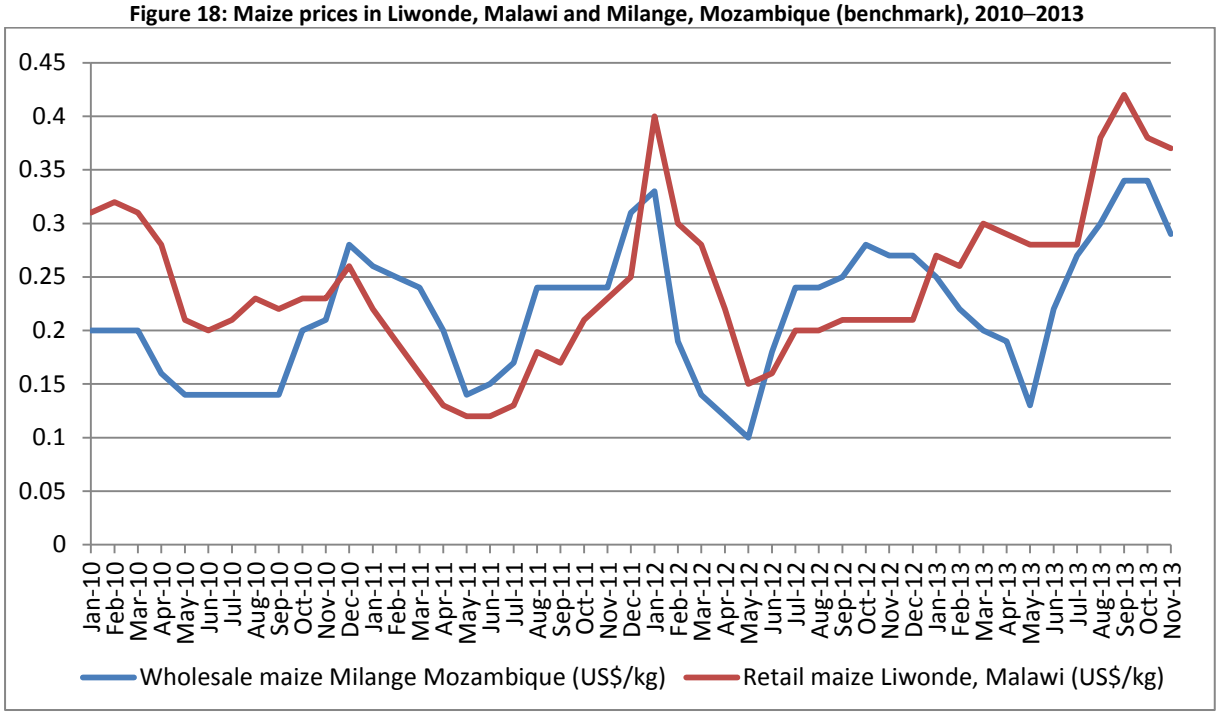
Figure 17: Annual growth rate of benchmark and wholesale price of maize in Malawi, 2005–2013 (%)



Source: MAFAP, 2014

Subsequently, prices declined in 2010 but did not reach the level prior to the crisis (Figure 18). Import prices declined as well but to a lesser extent, resulting in small incentives to wholesalers of 8 percent (Figure 15).

Figure 18: Maize prices in Liwonde, Malawi and Milange, Mozambique (benchmark), 2010–2013



Source: GIEWS Price Data Tool, 2014

In 2011, the maize market at international level witnessed a strong price increase that was reflected in the import prices. As in 2008, the Malawian markets were affected later, thereby wholesale prices remained stable, resulting in higher price incentives compared with the previous year. Finally, an export ban was imposed 29 December 2011, when the retail price reached 40,140 MWK/tonne. Despite the export ban, wholesale prices increased by 68 percent in 2012 owing to poor harvests in the southern structurally deficit regions and inflation of the currency after the change of the

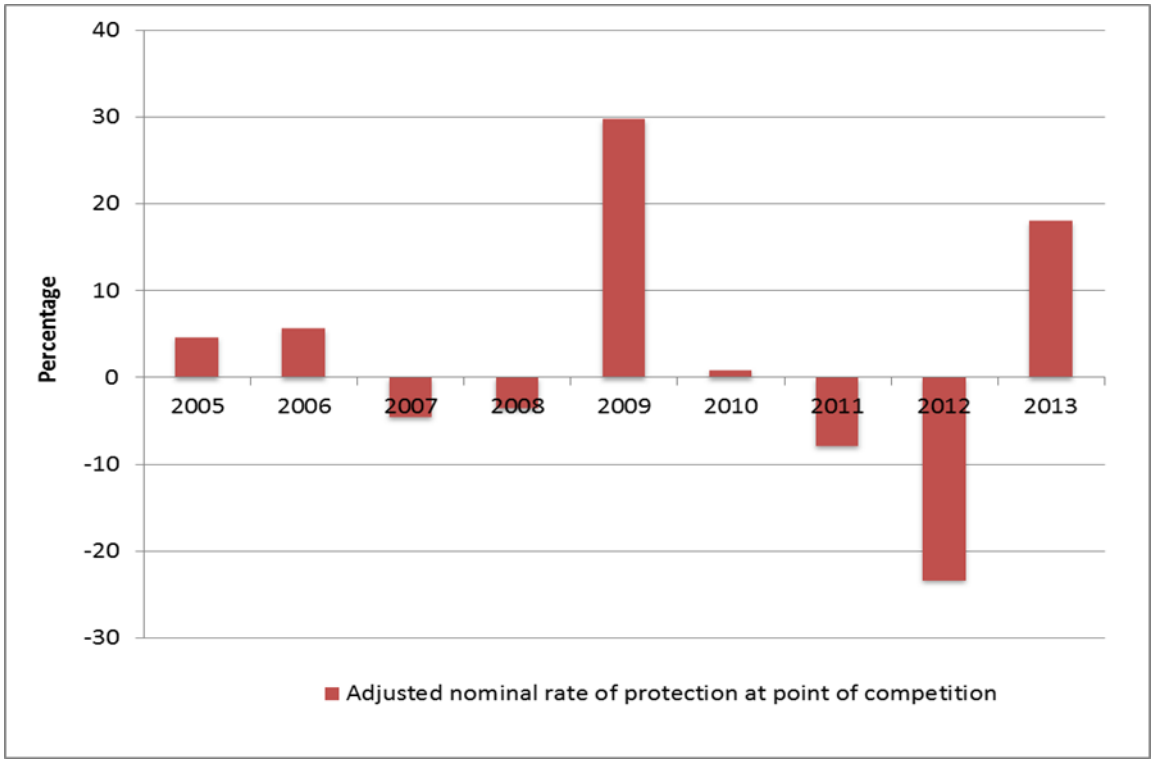
exchange rate regime and the subsequent devaluation of the kwacha in May 2012 (RBM, 2013). However, since import prices increased by 58 percent, no prices distortion was observed.

Incentives of 17 percent in 2013, representing a price gap of 17,000 MWK per tonne, are attributable to another domestic market spike, following a poor harvest in the 2012/2013 cropping season and further aggravated by inflation that reached a record high of 37 percent in February.

Adjusted domain

The adjusted price gaps represent in absolute terms, the price that traders would have received in the absence of exchange rate misalignments and with more efficient markets, in addition to domestic factors already accounted for in the observed domain. Since price gaps at the point of competition were relatively shallow in most years except in 2009, 2012 and 2013, we can say that with more efficient markets and a freely floating exchange rate, the situation at wholesale would be more neutral and thus closer to the ideal (Figure 19).

Figure 19: Adjusted NRP at Point of Competition for Maize in Malawi, 2005–2013 (%)



Source: MAFAP, 2014

A mentioned previously (See: Data Requirements), the exchange rate misalignment in 2012 would have only affected the point of competition in the first four months of the year, yet actors in this segment of the value chain market maize throughout the year. This means that the level of disincentive represented by the extreme negative price gap in 2012 is overestimated in this analysis.

Since access costs taken into account from border to point of competition are minimal, the market development gaps (Figure 23) are mainly composed of exchange rate policy misalignments. The exchange rate was overvalued in all years under consideration except 2013, reaching the most extreme misalignment of 34 percent in 2012.

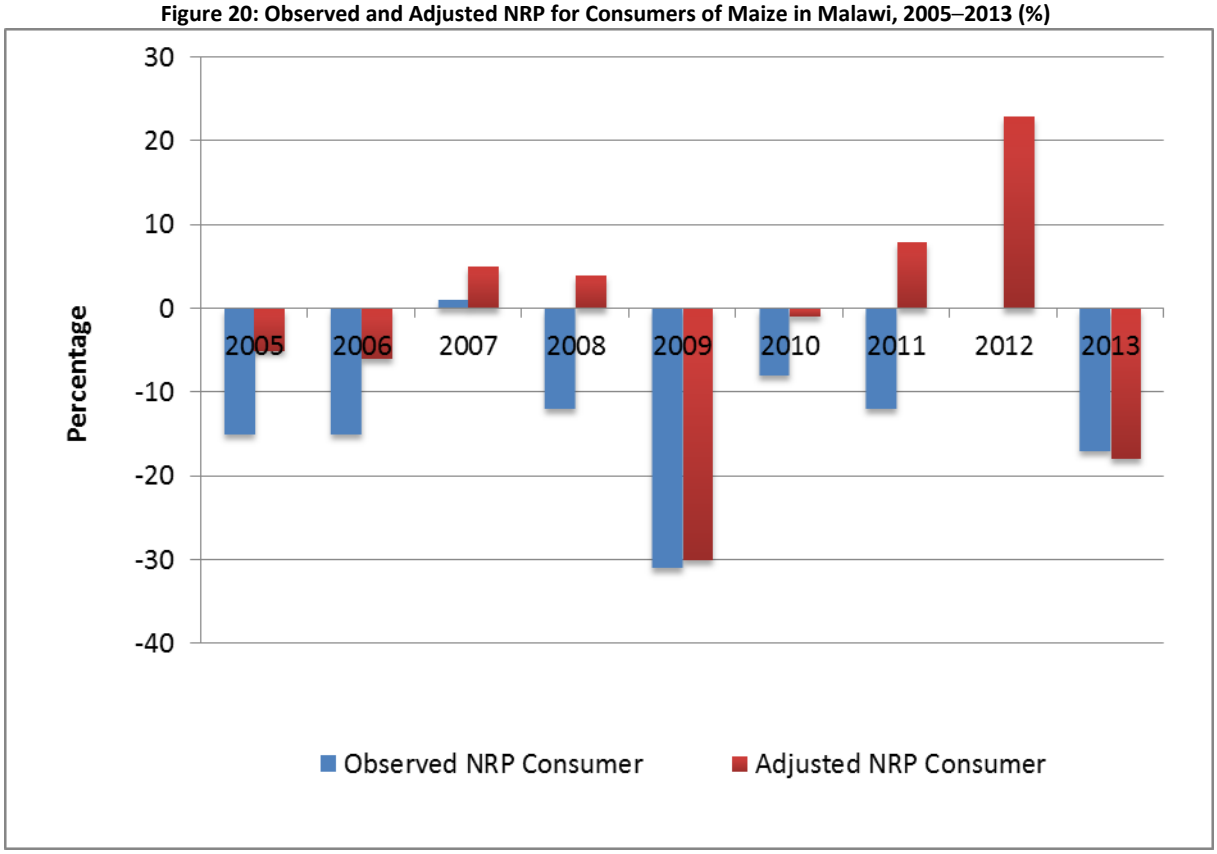
Maize trade is unpredictable and therefore not without risk for traders, and, although continually accused of hoarding, traders maintain that it is not realistic for them to pay for mass amounts of grain storage for long periods. Traders in fact tend to sell at prices that reflect an actual scarcity in the market and that compensate for the cost of storage but no higher, due to the limited purchasing power of Malawians (Manda, 2010). Having said this, more access cost information on storage would enrich the analysis further in order to more accurately assess the incentives to wholesalers.

Price Incentives to Consumers

Since the results for price incentives at wholesale level serve as an inverse proxy for the effects of policy and market factors on consumers, the high incentives at wholesale indicate equally strong disincentives for consumers throughout the period under review, but particularly in the years of price crises, namely 2005/06, 2008/09 and 2013 (Figure 20). On average, consumers paid 5,145 MWK/tonne more than the international equivalent price.

During the food crisis of 2005/2006, consumers received -15 percent disincentives, paying much higher prices for maize than they could have in the absence of import restrictions and were reliable public stocks in place. Despite the implementation of an export ban in July 2005, prices continued to rise, peaking in February 2006. Likewise, the export ban of April 2008 did not have the desired impact of reducing maize prices for consumers as prices continued to escalate after the harvest season, peaking in March 2009 and creating disincentives of -31 percent for consumers.

Figure 20: Observed and Adjusted NRP for Consumers of Maize in Malawi, 2005–2013 (%)



Source: Author's Calculations

The December 2011 export ban was effective in immediately suppressing retail prices for consumers but once again was trumped by climatic and macroeconomic factors that caused retail prices to increase. However, since prices also increased in the region, disincentives are not observed in 2012.

Despite efforts of ADMARC to stabilize domestic prices for consumers by setting maximum retail prices, financial constraints limit the amount of maize ADMARC can purchase and sell throughout the years. Consumers thus have no other option in the lean season than to purchase from private traders at higher prices. As discussed above for the point of competition, the adjusted domain demonstrates how the market could be more beneficial for consumers through efficiency improvements and by maintaining a floating exchange rate.

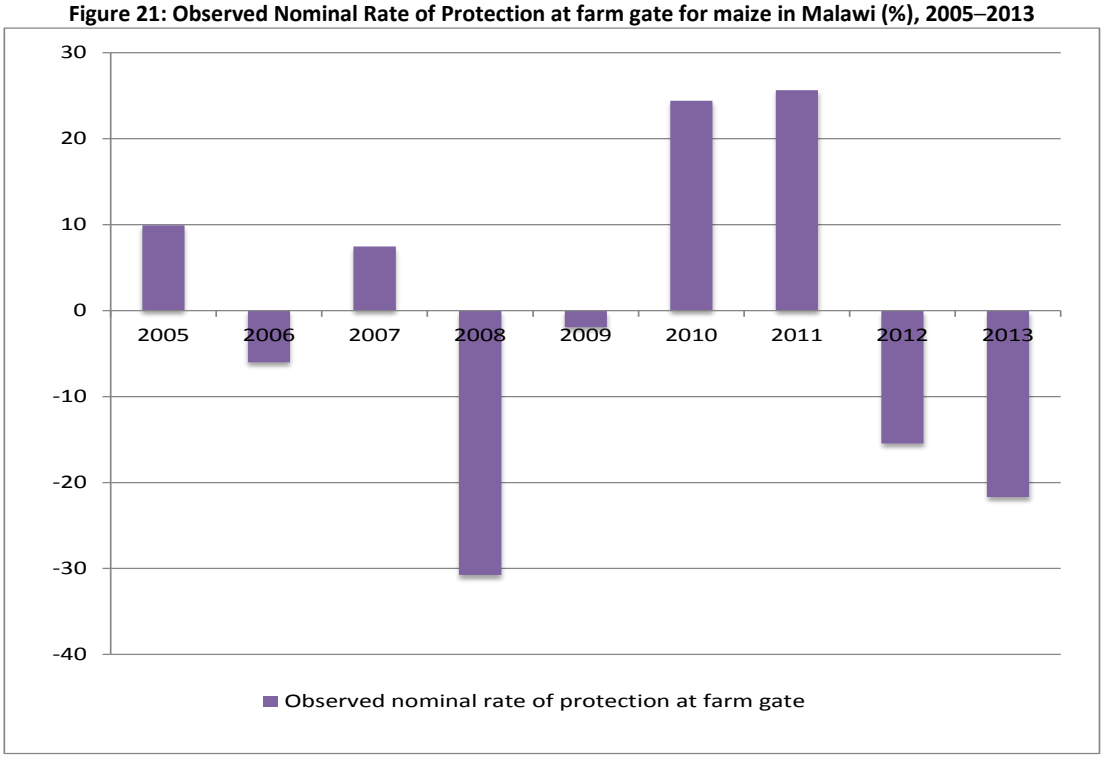
Price incentives at farm gate

Observed domain

Prices at farm gate follow a similar trend to those at point of competition as they are both based on the retail price in the same market. However, since the prices at farm gate are taken only from the months of April to June, we are able to see how the seasonal price variations affect the majority of farmers who sell their maize immediately after harvest.

In the observed domain, between 2005 and 2013, the average price gap at farm gate was -2,532 MWK, a simple average driven by the negative gaps of 2008, 2012 and 2013 (Figure 21). Overall, farmers could have received higher prices in the absence of trade restrictions and other domestic market factors. The biggest price gaps in favour of farmers are during 2010 and 2011.

Figure 21: Observed Nominal Rate of Protection at farm gate for maize in Malawi (%), 2005–2013



Source: MAFAP, 2014

In 2005, producers received price incentives reaching 10 percent. Between 2005 and 2006, production increased by 113 percent, attributable to good weather and FISP implementation. The increase in supply, coupled with the export ban, could have prevented the increase of producer prices, leading to disincentives in 2006. Also, the majority of the government import tender of 100,000 tonnes of maize began to arrive around the beginning of 2006 (Ellis & Manda, 2012), flooding the market.

Seasonality plays a major role in the incentives and disincentives at farm gate in this analysis since the producer prices are based on prices in months when maize is marketed by the majority of farmers (April-June) and prices are at their lowest. In 2007, farmers received higher incentives than wholesalers since the export ban was lifted in February, making domestic prices higher during the harvest season than throughout the year in comparison to the benchmark (Figure 16).

Farmers received severe disincentives in 2008 due to policy and market factors. Increasing prices from the end of 2007 were stabilized in April- June 2008 (farm gate price) following the arrival of the harvest season coupled with the imposition of a maximum buying price of 28 MWK per kilo by ADMARC.[13] Combined with an export ban implemented in April, these factors led to a scenario where farmers could not benefit from the global price increase (Manda, 2010). These measures managed to curb price increases for only a few months, after which, domestic prices increased until the end of the year, in line with benchmark prices (Figure 16). This later increase however, did not benefit farmers who market their maize immediately after harvest.

Maize prices remained high for the 2009 harvest while import prices decreased, leading to an almost neutral situation at the farm gate. In 2010 also, domestic prices during the harvest season were higher than the benchmark price throughout the year, leading to incentives of almost 25 percent. In 2011, despite a decline in producer prices in relation to international prices, Malawi became a net exporter of maize following the lifting of the export ban in August 2010.

Although the annual average domestic price is higher in 2013 than the benchmark price, the average harvest season price is lower, representing a disincentive at farm gate. The 2012/13 cropping season faced meagre rains, especially in the southern regions. Localized production deficits allowed prices to increase dramatically, but only after the end of the harvest when most farmers had already marketed their maize, meaning that high annual domestic prices were not transmitted to the farm gate. In 2013, inflation reached almost 40 percent, driving up the cost of transportation and services and thus driving up the access costs between the farm-gate and wholesale market. This increases the reference price at farm gate, contributing to the strong disincentives of 2013.

Price transmission to the farm gate is impeded by market distortions, such as poor rural infrastructure, presence of several intermediaries and lack of price information. This means that producers do not benefit from high prices and actually receive the greatest disincentives in years when the reference price at the border is high. One reason is that maize is thinly traded, making domestic supply and demand the driving factors in price formation. Domestic supply is still highly

[13] It was unusual for ADMARC to set a maximum buying price at the farm gate since it is usually their objective to set a minimum to ensure high prices for farmers. A maximum price is usually applied at retail to protect consumers. According to one source, the main reason was to encourage farmers to store maize for their own consumption later in the season (Manda. 2010).

dependent on favorable rains and yet as the primary staple food, local demand for maize is highly inelastic, particularly in the Southern deficit areas. In the north, Malawians are more apt to switch to cassava during the season of high maize prices but cassava is not typically grown in the south and other staples, such as potatoes are considered famine food. Despite the success of becoming self-sufficient in maize production since the introduction of the FISP in 2005/06, Malawi does not have a competitive advantage in maize production (Keyser & Tchale, 2010).

Farmers receive the highest incentives in years when domestic prices are higher during the harvest season than the annual average border price (benchmark), namely 2007, 2010 and 2011. The disincentives in the remaining years are due to several factors that limit producers' ability to take advantage of higher prices later in the season such as lack of access to credit and storage facilities. Furthermore, the lack of a market information system further sets them as price takers and limits the transmission of higher annual or regional prices to the farm gate. Indeed, they received the greatest disincentives in years when regional prices spiked while domestic prices during harvest remained relatively low. Domestic and international trade restrictions were insufficient to contain high price trends for an extended period in 2008, keeping prices low only during harvest. Farmers were also penalized by a maximum buying price set at 28 MWK/kg, while the prevailing market price was much higher (between 38 and 50 MWK/kg).

Adjusted domain

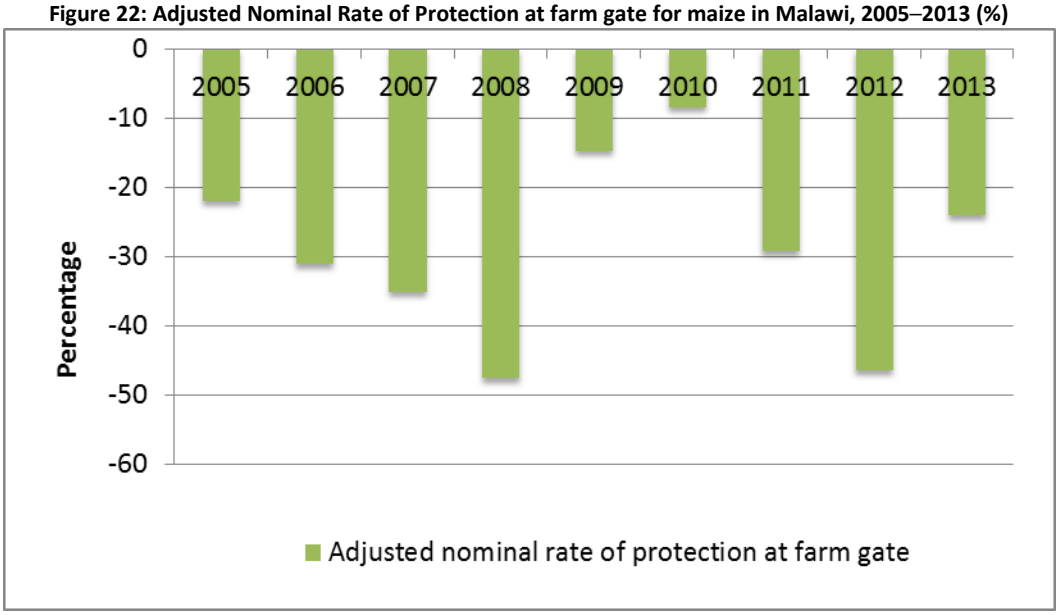
Unlike the observed price gaps, the adjusted price gaps show disincentive to producers in all years. The adjustments reflect that farmers are actually receiving prices that are lower than what they would receive in a more efficient market and in the absence of distortive exchange rate policies. In the adjusted domain, farmers received an average 10,000 MWK[14] less than they could have received in the absence of exchange rate misalignment and inefficiencies along the value chain (Figure 22).

The exchange rate policy resulted in an average misalignment of 12 percent during the period under review. The greatest negative gaps in 2008, 2011 and 2012 are due to extreme exchange rate misalignments of approximately 18, 19 and 34 percent, respectively. In 2008, this disincentive is even stronger than the already extreme disincentive in the observed domain. When misalignment is low, differences between the domestic and adjusted reference price at farm gate decrease as in 2009, when there was only a 2 percent misalignment. In 2009, farmers received a price closer to what they should have received.

The adjusted NRP measures inefficiencies in the market structure and value chain as well as excessive access costs and exchange rate policy distortions. Exchange rate misalignments from 2005 to 2012 further penalized producers by 26 percent of the farm gate price on average, with the greatest negative NRP reached in 2012 (58 percent).

[14] Simple average not taking into account levels of production.

Figure 22: Adjusted Nominal Rate of Protection at farm gate for maize in Malawi, 2005–2013 (%)



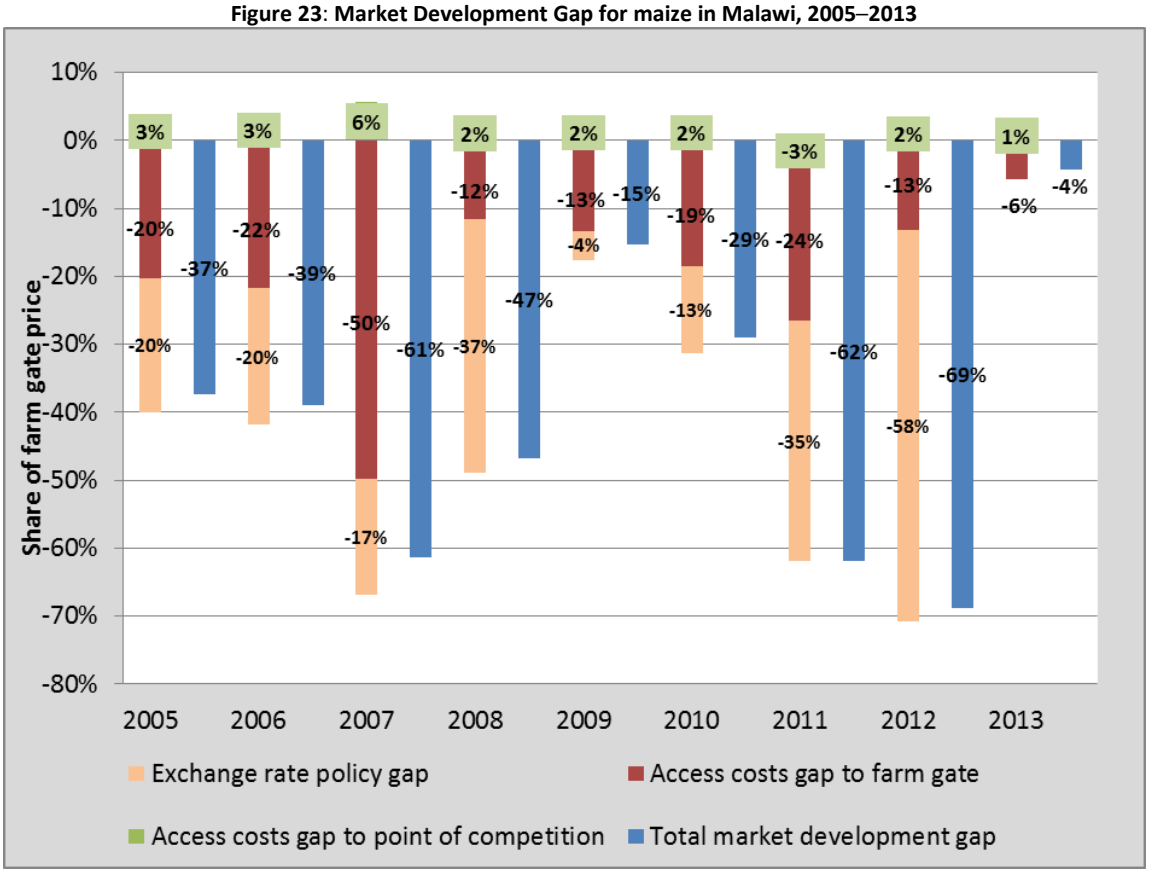
Source: MAFAP, 2014

In the adjusted domain, producers received disincentives throughout the entire period. These are driven primarily by an overvalued exchange rate and inefficiencies in the value chain between the farm gate and point of competition. An improvement in rural infrastructure such as feeder roads would improve not only transportation costs but also eliminate excess intermediaries. Currently, many traders and assemblers are involved in collecting grain by bicycle or by foot, assembling and storing for short periods and transporting by trucks to be re-assembled again before arriving in the central markets. Each agent exacts a fee and market prices can increase even during this time of transit, adding even more distance between producer and wholesale price.

Market Development Gap

The Market Development Gap measures the difference between the observed and adjusted access costs and exchange rate misalignments. The MDG allows for the disaggregation at each segment of the value chain. As reflected in Figure 23, the main component of MDG lies in the farm gate – point of competition segment of the value chain.

Figure 23: Market Development Gap for maize in Malawi, 2005–2013



Source: MAFAP, 2014

Farm-gate to point of competition

The access costs gap from wholesale to farm gate shows that farmers were penalized an average 40 percent of the farm-gate price due to inefficiencies in this segment of the value chain. In 2007, the 50 percent access costs gap at farm gate is in fact not due to higher than usual access costs, but rather reflects the very low price of maize at farm gate that year in relation to these costs. The rural feeder road network is highly underdeveloped and is difficult to travel for many larger vehicles. This severely limits the capacity of traders in terms of economy of scale. Because of this, many small-scale traders and assemblers are required to meet the volume demanded by medium and large-scale traders. The reported margins of traders have not been adjusted since they are not considered excessive; however, the fact that there are many, pushes up the total margins. Furthermore, an implicit margin recorded in the 2008 value chain survey was over 10 percent and so was adjusted downward to 5 percent. Improving rural infrastructure could lower cost of transportation and allow for larger volumes of maize to be transported, eliminating the need to reassemble grain, loading and unloading various sized vehicles at each point.

Border to point of competition

The value chain between the border and wholesale is relatively efficient. Malawi has no import tax on maize and transportation costs on major routes are considered relatively competitive. This segment could be more efficient if economy of scale were achieved through the use of larger trucks in crossing the border and passing directly from Milange to Blantyre. However, trucks are subject to

a US$ 100 levy from Mozambican customs and higher volumes of maize would require a formal export license. Maize grain imports to Malawi on the other hand are duty free. There is of course the issue of import license restrictions on the Malawian side but this is not a financial matter but a political one; in other words, it is not easily quantifiable and thus does not factor into our analysis. The positive nature of this gap analytically reflects an incentive for producers, although inefficiencies are still present.

Exchange Rate Policy Gap

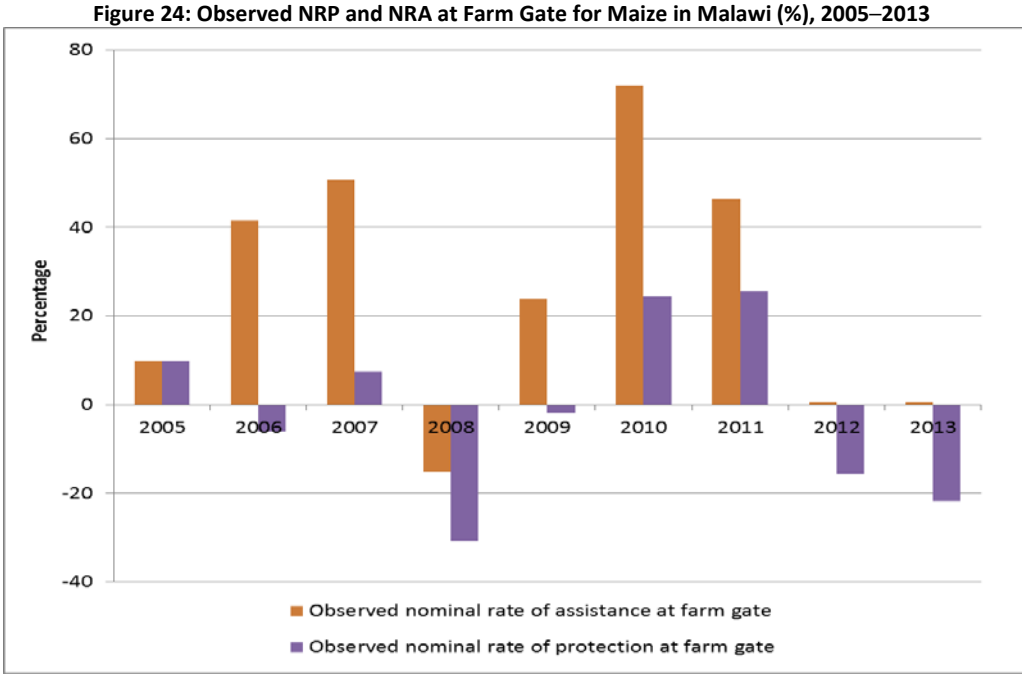
Exchange rate misalignments from 2005 to 2012 further penalized producers by -26 percent of the farm gate price on average, with minus 58 percent as maximum taxation value in 2012.

Nominal Rate of Assistance (NRA)

The NRA, like the NRP, measures the effect of domestic market and trade policies and overall market performance, but in addition, considers direct support to the value chain, namely commodity specific public expenditure allocations. Public expenditure allocated to maize has been added to the price gap at farm gate, reflecting additional incentives farmers receive due to budgetary support. Farmers received an average 6,500 MWK per tonne of maize between FY 2005/06 and FY 2012/13 owing to input subsidies under the FISP for fertilizer (NPK and urea) and seed (OPV and hybrid).

The average observed NRA over the 2005–2013 period was 26 percent in contrast to the Observed NRP at an average -1 percent. The NRA and NRP are the same in 2005, before the start of the FISP. As shown in Figure 24, the observed NRAs in 2006, 2007, and 2010 demonstrate substantial, additional (roughly 50 percent) incentives at farm gate. In 2008 and 2011-2013, the additional incentives received were between 16 and 23 percent: less than half the incentives of other years.

Figure 24: Observed NRP and NRA at Farm Gate for Maize in Malawi (%), 2005–2013



Source: MAFAP, 2014

In absolute terms, higher budgetary allocations do not necessarily create higher incentives. For example, as shown in Table 22, 2007 and 2011 have very small allocations of similar amounts, yet relative to the farm gate price in 2007, has a much greater impact compared to 2011. Likewise, in 2006 and 2012, there are high, almost equal allocations to maize in absolute terms but in comparison to the reference price, we see much greater effects in 2006.

Table 22: Total expenditure allocated to maize per year in Malawi, 2006–2013

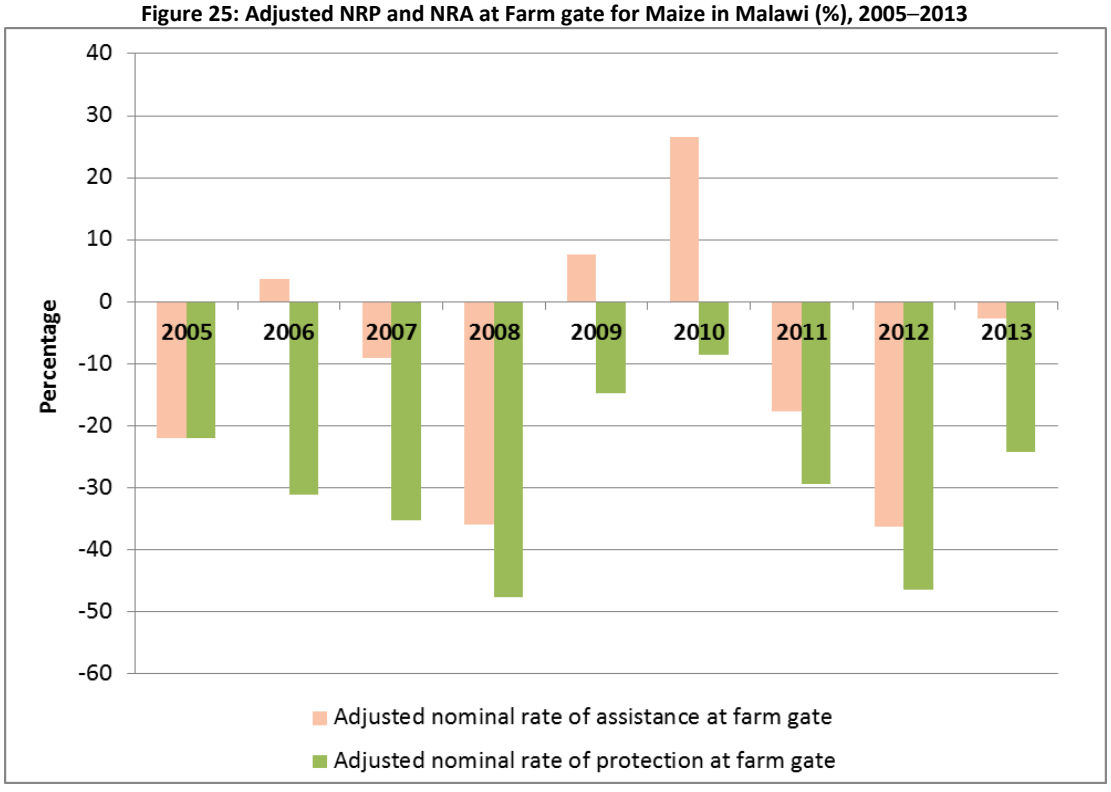
	2006	2007	2008	2009	2010	2011	2012	2013
Total expenditure allocated to maize (MWK millions)	15,923	8,863	11,883	19,549	25,145	11,404	22,132	47,808
Total expenditure allocated to maize per tonne (MWK)	6,097	2,747	4,510	5,457	7,777	2,928	6,107	16,374
Reference price at farm gate (MWK)	12,829	6,351	28,996	21,171	16,353	14,090	37,999	73,509

Source: MAFAP Public Expenditure Analysis, 2014

In summary, the effects of budgetary transfers on incentives at farm gate are greater in years when the reference price is closer to the domestic price, i.e. in years when price transmission is higher owing to minimal domestic and international trade restrictions.

The adjusted NRA is negative in all but three years (Figure 25). Recall that the adjusted domain reflects inefficiencies in the maize value chain, particularly in the farm-gate wholesale segment, as well as the overvalued exchange rate between 2005 and 2012.

Figure 25: Adjusted NRP and NRA at Farm gate for Maize in Malawi (%), 2005–2013



Source: MAFAP, 2014

The adjusted NRA demonstrates that despite high budgetary support, maize farmers only received incentives to produce in 3 of the 8 years under consideration, indicating that such support was not

sufficient to out-weigh other factors, including trade restrictions and exchange rate policy as well as the inefficiencies, that are negatively affecting the maize value chain. Removing domestic and international trade restrictions and improving value chain efficiency would be more effective in creating incentives for maize producers

6. RECOMMENDATIONS

High seasonal price variations and market unpredictability, partially due to unstable policy environment, have the strongest negative impact at both wholesale and farm-gate. Farmers receive low prices because they sell during the harvest season, when supply is high and prices are low, in order to meet immediate cash needs and due to lack of adequate storage. Since maize is a thinly traded commodity and infrastructure between farm gate and wholesale is poor, price transmission in this segment is low. Maize travels from the villages to larger towns and cities where storage facilities are available, accumulating access costs along the way as well as storage over time. Higher maize prices later in the season reflect not only these storage costs, but also the cost of redistribution to rural areas. These inefficiencies, along with the exchange rate, drive the immense MDG for maize in Malawi.

During the 2005–2013 period, the implementation of ad hoc international and domestic trade restrictions surely played a role in insulating Malawi from external market forces but also isolated internal markets from each other. In certain cases, as opposed to mitigating the impact of high price trends, these reactionary polices tended to aggravate high prices instead.

Some policy options to be considered in order to address some of the constrains identified in the analysis are:

1. In order to promote more timely and informed decisions by policy makers, expanding the market information system in use by Malawi's Agricultural Commodity Exchange for Africa (ACE) as well as increasing the scope of data collected under the auspices of AMIS to include wholesale and farm gate prices;
2. Exploring the possibilities offered by an expansion of the current Warehouse Receipt System (WRS) to cover more rural communities as well as assessing the potential benefits of secure access to storage and credit, enabling farmers the option to sell when prices are higher later in the season. This initiative has the potential to directly increase the income of farmers but also decrease access costs by eliminating the need to transport large amounts of grain out of rural communities.
3. The implementation of both the first and second recommendation would increase the capability of farmers to negotiate prices and make informed decisions on the marketing of their produce.
4. As the maize market in Malawi is thin, stable prices are reliant on high volumes of domestic maize production, which in turn is heavily reliant on rainfall. Instead of focusing only on input subsidies, longer-term production solutions such as small-scale irrigation schemes and further efforts to promote crop diversification on smallholder plots would help to mitigate this production risk.
5. Improving rural infrastructure such as feeder roads would cut transport costs between the farm-gate and central markets – the most costly leg of the value chain. This would also limit the number of intermediaries necessary to collect and assemble grain from remote villages to where it could be transported by truck.
6. Reducing domestic and international trade restrictions could increase the level of maize marketed within the country and facilitate movement of grain from surplus areas to supply deficit areas.

7. Continue to promote exchange rate policies that allow the currency to float freely to avoid further disincentives to grain marketers and farmers.

7. CONCLUSION

MAIN MESSAGE

As the most important food security crop in Malawi, maize tends to be the focus of both producer and consumer oriented national programmes and policies. Between 2006 and 2013, 81 percent of agricultural specific public expenditure[15] exclusively targeted maize production, mainly through input subsidies in the framework of the FISP. However, all other variables considered, the adjusted NRA indicates that this support has only created an incentive environment in 3 of the 8 years considered. Besides increasing domestic supply through increased productivity, trade and market policy measures were also implemented to contain domestic prices for consumers, namely, export bans and maximum retail prices. Although this analysis mainly focuses on incentives to producers of maize, implicitly there are implications on maize consumers too. Since a very limited amount of maize produced by smallholders is marketed, and the majority of households barely produce enough to last the year, minor shocks to domestic supply can create high price variations. Remunerative and stable domestic and regional maize prices would not only provide incentives to producers, but are also essential for food security in Malawi.

Trade policies implemented over the period have had a destabilizing effect on the domestic market. Trade bans and restrictions on licenses have aggravated the already wide price variations due to poor infrastructure and lack of international port access.

Farmers could benefit from higher prices later in the season if they had access to the required credit to meet immediate needs and the possibility to store the grain in a secure location. So far, the warehouse receipt system implemented by ACE is not able to serve smallholders since the minimum lot is too large and there is still limited storage in remote areas. However, actions are underway regarding the development of a national system that my better serve smallholder needs and in the long-run and create more stability and greater incentives at the farm-gate.

The results of this analysis show that wholesalers are penalized less because inefficiencies between the border and point of competition appear to be lower than inefficiencies between farm-gate and wholesale. However, were more data available on specific access costs incurred by actors in this segment of the value chain such as storage fees, we would surely see reduced incentives. Although it appears as though wholesalers are reaping all the benefit in the maize market, in fact they are faced with serious risk due to extreme price volatility and an unstable policy environment. Stable prices would also have positive impact on traders and wholesalers by increasing long-term investments in the sector such as storage facilities and transportation.

LIMITATIONS

Further information on the following elements would ensure a more representative analysis:

[15] Agricultural public expenditure refers to expenditure specific to agriculture and does not include expenditure supporting rural development. It includes national expenditure and on-budget support from donors: MAFAP Public Expenditure analysis and classification.

- Actual prices at farm gate collected at regular intervals as well as access costs between farm gate and wholesale;
- Data on prices at the point of competition along with access costs between wholesale and border.
- Information regarding volumes traded at the wholesale level would allow the possibility to calculate the weighted NRP at wholesale and thus give a clearer indication of incentives at this level.

FURTHER INVESTIGATION AND RESEARCH

Additional investigation is recommended in several key areas:

- How various agricultural initiatives could better serve the smallholder maize sector since they represent over 90 percent of maize production; For example, the WRS implemented by ACE so far is structured for large deposits of grain, which will nevertheless have a positive impact overall on the sector but will do little to benefit small-scale producers directly. The Green Belt Initiative aims to encourage investment in large-scale commercial farming as well as contract farming to smallholders but this initiative is very recent and controversial. It will be essential to monitor these initiatives closely to see the impact on smallholder farmers and on food security in Malawi.
- Further investigation into the inputs market would shed much needed light on the FISP and Agro-dealership programmes currently in place.
- How to improve trade and market policy coherence and transparency, for example through ex-ante analysis on potential impacts of specific policies on both producers and consumers;

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ANNEX I: Data and calculations used in the analysis

Name of product	**Maize**
International currency	**USD**

Country	**Malawi**
Local currency	**MWK**

DATA		Unit	Symbol	Year food security trade status	2005 y m	2006 y m	2007 y m	2008 y m	2009 y m	2010 y m	2011 y x	2012 y m	2013 y m
Benchmark price													
	Observed	USD/tonne	$P_{b(int\$)}$		157	162	116	283	233	192	220	218	259
	Adjusted	USD/tonne	P_{ba}										
Exchange rate													
	Observed	MWK/USD	ER_o		118	136	140	141	141	150	157	249	364
	Adjusted	MWK/USD	ER_a		133	151	150	167	145	164	185	334	364
Access costs border - point of competition													
	Observed	MWK/tonne	ACo_{wh}		2,040	2,324	2,509	2,728	2,957	3,177	3,418	4,146	5,222
	Adjusted	MWK/tonne	ACa_{wh}		1,728	1,968	2,125	2,311	2,505	2,691	2,895	3,512	4,424
Domestic price at point of competition		MWK/tonne	P_{dwh}		23,606	27,864	18,640	47,807	47,013	34,481	34,832	58,506	116,608
Access costs point of competition - farm gate													
	Observed	MWK/tonne	ACo_{fg}		10,075	11,484	12,393	13,500	14,607	15,717	16,925	20,452	26,094
	Adjusted	MWK/tonne	ACa_{fg}		7,732	8,862	8,992	11,170	11,851	11,945	12,750	16,226	22,801
Domestic price at farm gate		MWK/tonne	P_{dfg}		11,550	12,057	6,824	20,081	20,764	20,344	17,703	32,127	57,572
Externalities associated with production		MWK/tonne	E		-	-	-	-	-	-	-	-	-
Budget and other product related transfers		MWK/tonne	BOT		-	-	-	-	-	-	-	-	-
Quantity conversion factor (border - point of competition)		Fraction	QT_{wh}		1.00	1.00	1.00	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	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	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	1.00	1.00	1.00

CALCULATED PRICES		Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012	2013
Benchmark price in local currency												
	Observed	MWK/tonne	$P_{b(loc\$)}$	18,542	21,989	16,235	39,768	32,821	28,893	34,433	54,305	94,381
	Adjusted	MWK/tonne	$P_{b(loc\$)a}$	20,825	24,412	17,400	47,261	33,713	31,488	40,700	72,812	94,381
Reference price at point of competition												
	Observed	MWK/tonne	RPo_{wh}	20,582	24,313	18,744	42,496	35,778	32,070	31,015	58,451	99,603
	Adjusted	MWK/tonne	RPa_{wh}	22,553	26,380	19,525	49,572	36,218	34,179	37,805	76,324	98,805
Reference price at farm gate												
	Observed	MWK/tonne	RPo_{fg}	10,507	12,829	6,351	28,996	21,171	16,353	14,090	37,999	73,509
	Adjusted	MWK/tonne	RPa_{fg}	14,821	17,518	10,533	38,402	24,367	22,234	25,055	60,098	76,004

INDICATORS		Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012	2013
Price gap at point of competition												
	Observed	MWK/tonne	PGo_{wh}	3,024	3,551	-104	5,311	11,235	2,411	3,817	55	17,005
	Adjusted	MWK/tonne	PGa_{wh}	1,053	1,484	-885	-1,765	10,796	302	-2,973	-17,818	17,803
Price gap at farm gate												
	Observed	MWK/tonne	PGo_{fg}	1,043	-772	473	-8,915	-407	3,991	3,613	-5,872	-15,937
	Adjusted	MWK/tonne	PGa_{fg}	-3,271	-5,461	-3,709	-18,321	-3,603	-1,890	-7,352	-27,971	-18,432
Nominal rate of protection at point of competition												
	Observed	%	$NRPo_{wh}$	15%	15%	-1%	12%	31%	8%	12%	0%	17%
	Adjusted	%	$NRPa_{wh}$	5%	6%	-5%	-4%	30%	1%	-8%	-23%	18%
Nominal rate of protection at farm gate												
	Observed	%	$NRPo_{fg}$	10%	-6%	7%	-31%	-2%	24%	26%	-15%	-22%
	Adjusted	%	$NRPa_{fg}$	-22%	-31%	-35%	-48%	-15%	-9%	-29%	-47%	-24%
Nominal rate of assistance												
	Observed	%	NRAo	10%	-6%	7%	-31%	-2%	24%	26%	-15%	-22%
	Adjusted	%	NRAa	-22%	-31%	-35%	-48%	-15%	-9%	-29%	-47%	-24%

				0.00%	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
				(2,282.98)	(2,422.86)	(1,164.95)	(7,493.08)	(891.19)	(2,594.56)	(6,266.60)	(18,506.90)	-
DECOMPOSITION OF MDG		*Unit*	*Symbol*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
International markets gap		MWK/tonne	IRG	0	0	0	0	0	0	0	0	0
Exchange policy gap		MWK/tonne	ERPG	-2,283	-2,423	-1,165	-7,493	-891	-2,595	-6,267	-18,507	0
Access costs gap to point of competition		MWK/tonne	ACG_{wh}	312	356	384	417	452	486	-523	634	798
Access costs gap to farm gate		MWK/tonne	ACG_{fg}	-2,343	-2,622	-3,401	-2,330	-2,756	-3,772	-4,175	-4,226	-3,293
Externality gap		MWK/tonne	EG	0	0	0	0	0	0	0	0	0
Total market development gap		MWK/tonne	MDG	-4,314	-4,689	-4,182	-9,406	-3,195	-5,881	-10,965	-22,099	-2,495
Market development gap as share of farm gate price		%	MDG	-37%	-39%	-61%	-47%	-15%	-29%	-62%	-69%	-4%
Market development gap as share of adjusted reference price a		%	MDG	-29%	-27%	-40%	-24%	-13%	-26%	-44%	-37%	-3%

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