MAFAP
SPAAA

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

ANALYSIS OF INCENTIVES AND DISINCENTIVES FOR TOBACCO IN MALAWI

OCTOBER 2012

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

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1. PURPOSE OF THE NOTE

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

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

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

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

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

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

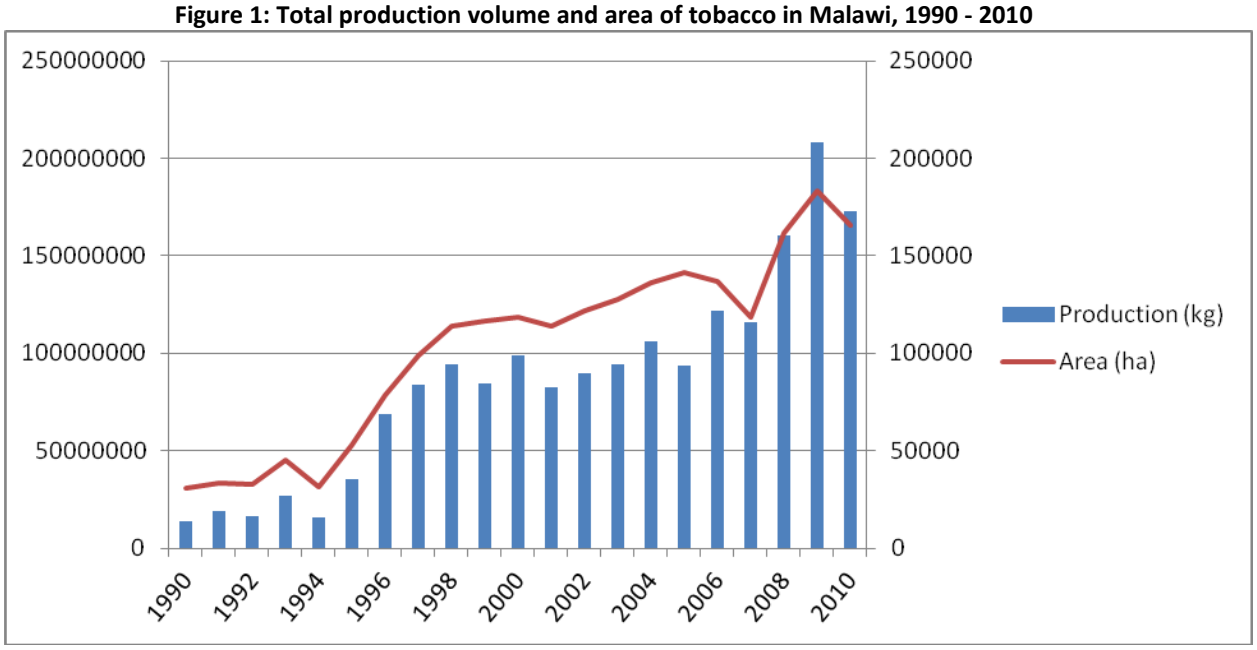
2. COMMODITY CONTEXT

Tobacco cultivation is one of Malawi's traditional economic activities and tobacco is still the most important cash crop in the country. Tobacco production accounts for over 13 percent of Malawi's Gross Domestic Product and provided 62 percent of total domestic export earnings in 2010 (National Statistical Office, 2010). Burley tobacco is the main variety with a share of over 80 percent of total production throughout the period under review. Though traditionally produced by large estates, a series of reforms in the early 1990s increased opportunities for smallholder farmers to participate in the sector, as will be described later in this note. Currently, over 95 percent of tobacco is produced by small farmers. As a result, the crop is not only Malawi's main export earner but also of key importance for rural households' incomes and food security.

PRODUCTION

As shown in Figure 1, total production of tobacco leaf in Malawi has steadily increased over the last two decades, from 14 million kilograms in 1990 to over 173 million in 2010. In the same period, the total area under production also increased from 30 thousand to 165 thousand hectares. However, as Figure 2 shows, the increase in production was not only the result of expansion of the total production area, but yields also more than doubled from 450 kg/ha in 1990 to 1044 kg/ha in 2010.

Figure 1: Total production volume and area of tobacco in Malawi, 1990 - 2010



Source: Ministry of Agriculture and Food Security

Malawi is sub divided into eight agro-ecological zones, which form the Agricultural Development Divisions (ADDs). Tobacco is grown in all ADDs but is concentrated in the central part of the country. As shown in Figure 3, the central regions of Salima, Lilongwe and Kasungu together accounted for more than half of total production.

Figure 2: Average tobacco yield, 1990 – 2010

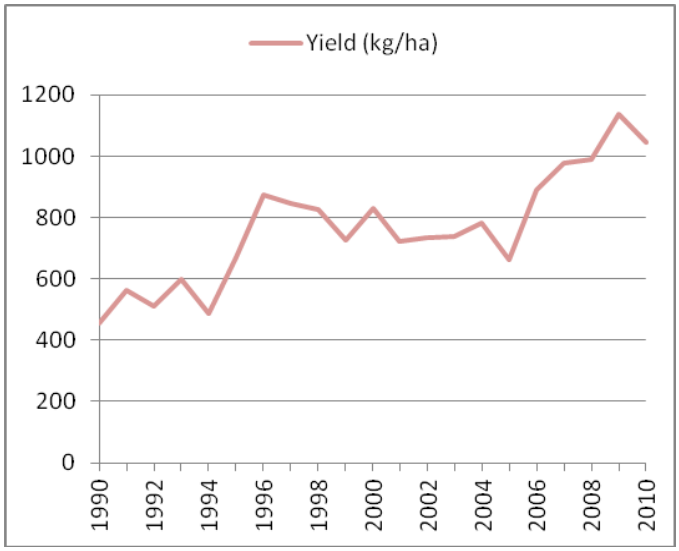
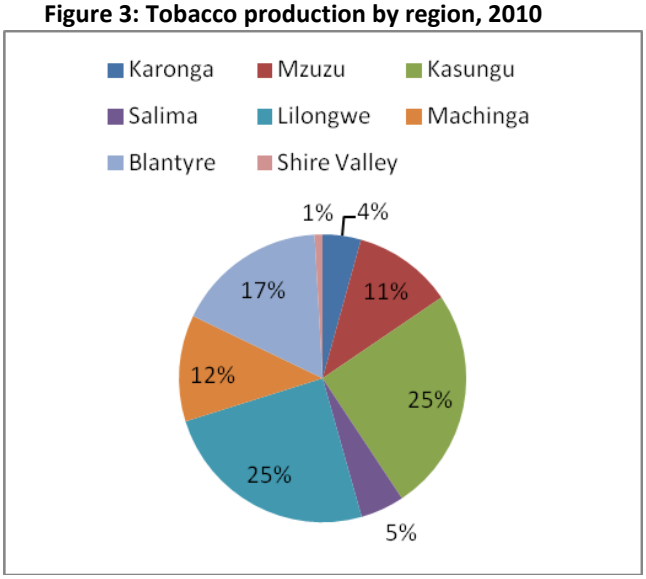


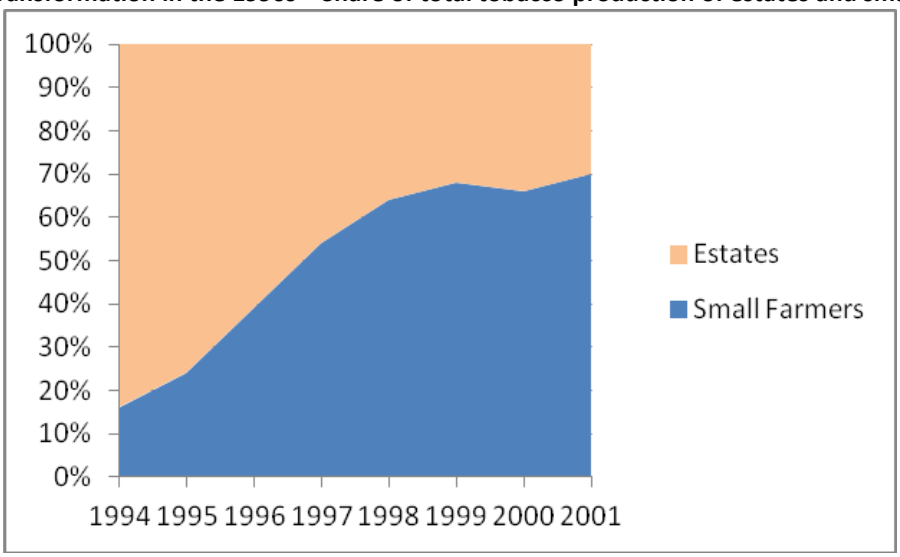
Figure 3: Tobacco production by region, 2010



Source: Ministry of Agriculture and Food Security

National output of tobacco was tightly controlled by the Government of Malawi before 1990 under the Special Crops Act. All tobacco producers had to obtain a license from the Government regulatory body, the Tobacco Control Commission (TCC). The TCC granted licenses only to estates and landowners. In 1990 the Act was repealed and after further reforms in 1996 all production restrictions were removed. From that moment on, smallholder farmers could grow tobacco freely (Minot et al., 2000). These reforms of structural adjustment and privatization had a strong impact on total output and resulted in a structural change of the Malawian tobacco sector. As demonstrated by Figure 4, the tobacco sector changed in one decade from an estate-dominated sector to an important commodity for smallholder farmers. In 1990, only 15 percent of production was realized by smallholders. In 2001, this figure had already increased to 70 percent and to 95 percent in 2009. The average farm size of tobacco producers was 1.8-2 ha in 2006 (Harashima, 2008). Several estates reduced their production or exited the tobacco sub-sector altogether as a result of declining yields and profitability (UNDP, 2004).

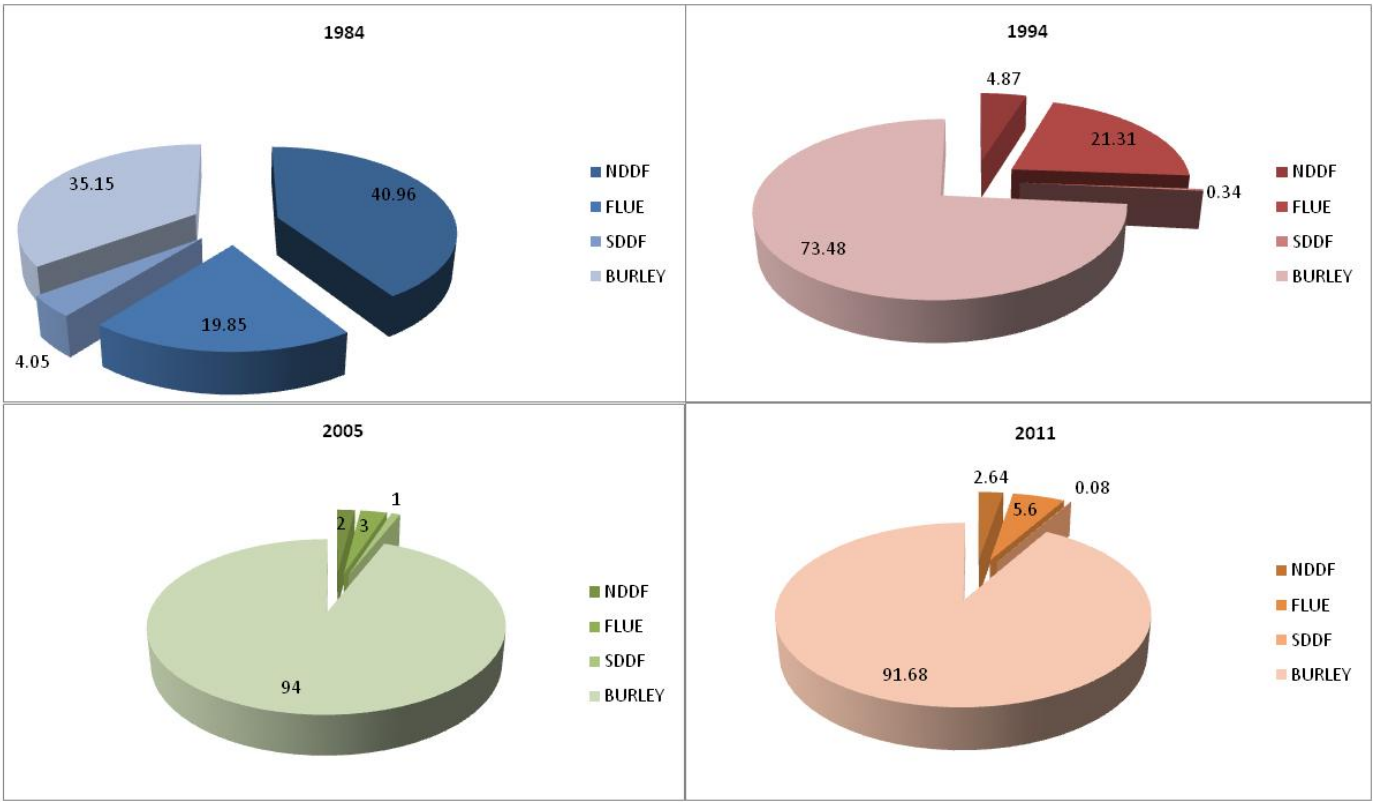
Figure 4: Transformation in the 1990s – Share of total tobacco production of estates and small farmers



Source: Jaffee, 2003

The five most common varieties of tobacco that are grown in Malawi include burley, flue cured, northern division dark fire cured (NDDF), southern division fire cured (SDDF) and sun air dried. Currently, burley tobacco is by far the most widely produced variety and accounted for more than 90 percent of total production in 2011 (see Figure 5). Burley tobacco is almost exclusively produced by smallholders as in 2009, 98 percent of total volume was produced by small growers. On the other hand, the production of flue cured tobacco, which requires a more complex curing process, is dominated by estates (Chirwa, 2009). The curing of burley tobacco consists of drying leafs in a well-ventilated barn for approximately six to eight weeks, while flue curing involves exposing the leafs to heat. Both varieties are used for the manufacturing of cigarettes. The production of NDDFS, SDDF and sun air dried varieties has become almost negligible in recent years.

Figure 5: Composition of tobacco production by variety



Source: Based on MOA crop estimates – 1983 - 2011

CONSUMPTION/UTILIZATION

After the sale of tobacco leaf on the auction floors, the leafs are dried, stemmed and packed for export to buyers, mainly in Europe and the United States. These buyers consist of cigarette manufacturers which process the unmanufactured leaf to cigarettes for the world market, such as Philip Morris and British American Tobacco. Despite the fact that tobacco is Malawi's main export crop, no cigarette manufacturing is carried out in the country. Therefore, all tobacco is exported.

MARKETING AND TRADE

Since 2000, all tobacco produced both by estates and smallholder farmers must be marketed through the tobacco auction operated by Auction Holdings Limited (AHL). Though unofficial intermediate

buying still exists, the vast majority of total production is marketed through the three main auction floors in Lilongwe, Mzuzu and Limbe. The prices at the auction are pegged in US dollars.

Box 1: Auction Holdings Limited (AHL)

Auction Holdings Limited was created in 1962 by tobacco growers on a "co-operative" basis. Its primary objective was not to optimize dividend payments or share value but to provide a service to tobacco growers on a cost-effective basis, and intended to ensure competition amongst buyers and fair sale prices to replace a situation of exploitation of growers under "contract buying" and 'private treaty buying' that perceived prior to the establishment of AHL in 1962.

AHL is the only licensed company to offer tobacco auction markets in Malawi. For many years, the company enjoyed a commission of 3.95 percent on all tobacco sold through the floors. However, after 2003 the commission was reduced to 3.25 percent, and further reduced to 2.5 percent in 2005.

The auctioning system is based on the American tobacco auction system in which a start price is determined on the basis of the quality of the leaf. Consequently, buyers can raise their bids to purchase the bale of tobacco. If the final price is not satisfactory, the farmer has the option to reject it and re-offer it (Chirwa, 2011).

At the auction the tobacco leaf is bought by processing and trading companies that have contract arrangements with foreign cigarette manufacturers. Most of the large buyers are subsidiaries of international leaf merchants that have their own processing plants and export tobacco in semi-processed form. These companies also import tobacco leaf from neighboring countries, in particular Zambia and Mozambique. The leaf is processed in Malawi and then re-exported. Tobacco exporters and importers require special permits from the Tobacco Control Commission (TCC).

Figure 6 shows the average prices per kilogram realized at the tobacco auction floors between 2005 and 2010. During this time period, prices of burley varied from just under USD 1 000 per tonne in 2006, to USD 2 400 USD per tonne in 2008. In general, a premium is paid for flue cured tobacco, which is subject to a more complex curing process and which contains higher sugar and nicotine levels.

In most of the years under review, export prices and auction prices follow the same trend, as can be seen from Figure 7. In absolute terms, the prices cannot be compared as the export price refers to unmanufactured but processed tobacco, while the auction prices are based on the sales of tobacco leaf that is cured but not yet processed. However, it follows from Figure 6 that since 2008, prices at the auction have decreased more than at export level. This suggests that the relatively high price that prevailed in the world market, did not translate in the same level of auction prices. In other words, the gap between the auction price and the border price widened.

This means that the total access costs to take the product from the auction to the border (including transport, processing and trader margins) in 2009 and 2010 have been above the levels registered in 2005-2008. With no specific policy measures or cost considerations explaining this difference, it is likely that trader margins in 2009 and 2010 rose to levels far above those registered in the period before.

Figure 6: Average auction prices of different tobacco varieties, 2005 – 2010, in USD per tonn

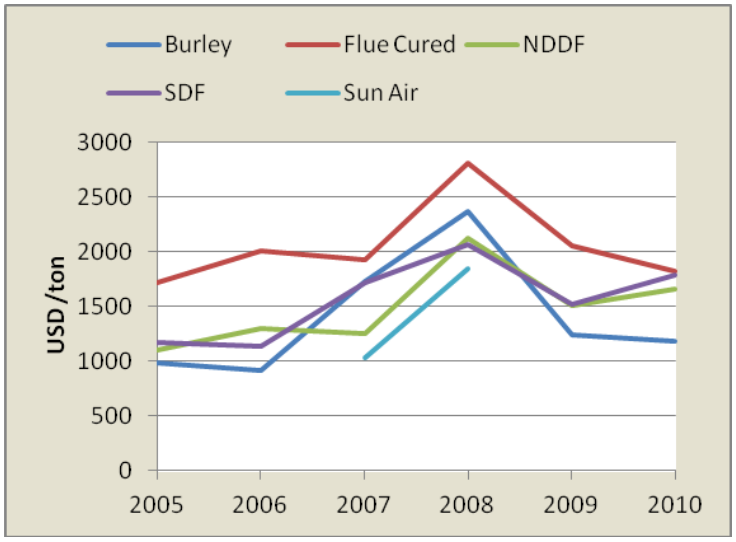
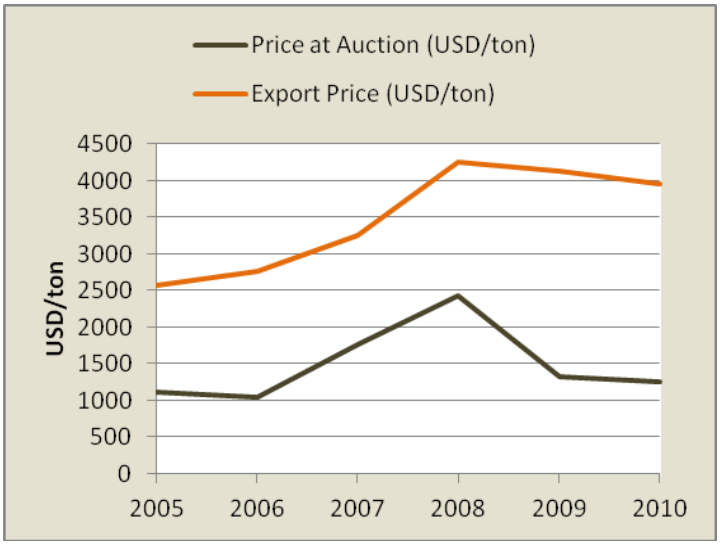


Figure 7: Average auction price and average export price, 2005 – 2010, in USD per tonne



Source: National Statistics Office

An overview of total tobacco exports and imports for the period 2000-2010 is provided in Figure 8. As shown, while we note an upward trend overall, exports have varied significantly between years both in value and in volume. In 2009, tobacco exports reached their highest volume when over 190 000 tonnes were exported at a total value of USD 750 million.

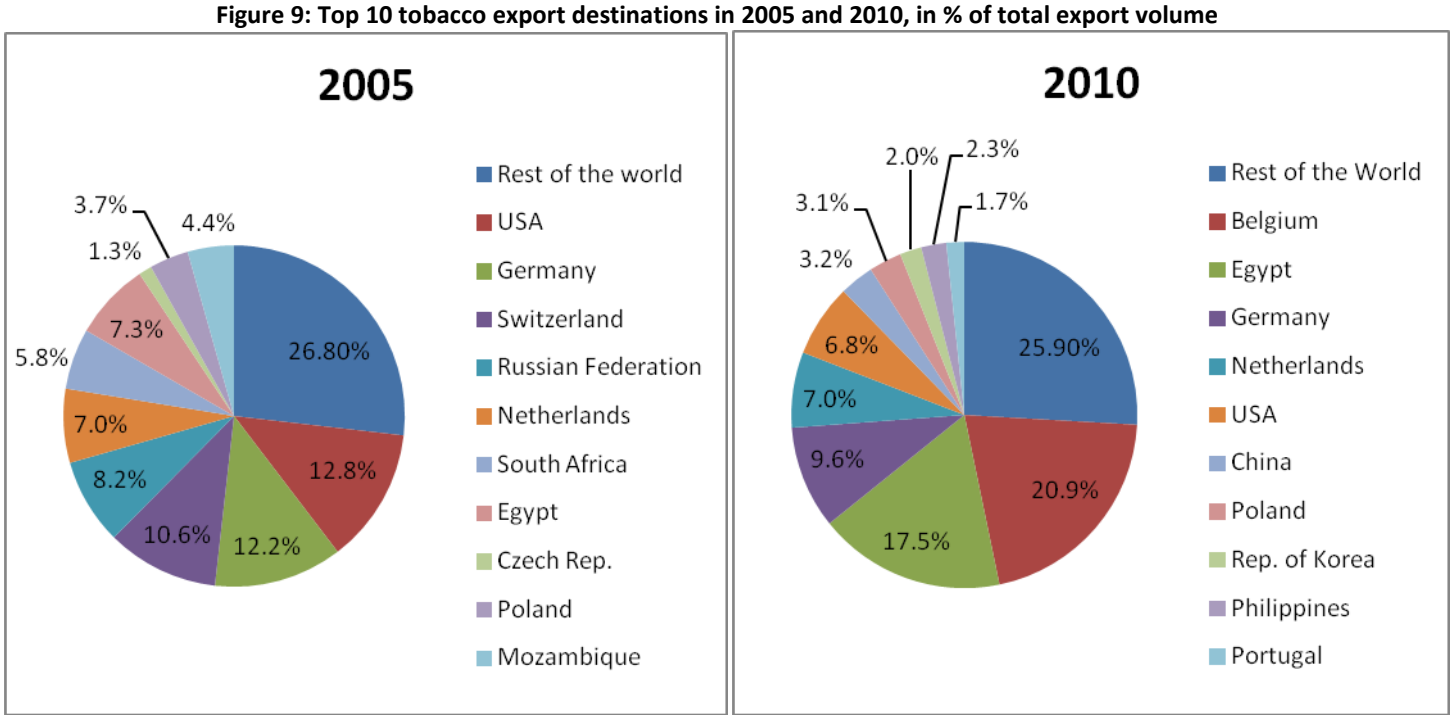
Malawi's main tobacco buyers also buy leaf in neighboring countries. Registered tobacco imports mainly come from Mozambique and Zambia and consist of dried leaf that is being processed in Malawi before being re-exported to Europe or the United States.. However, insufficient processing capacity exists in Mozambique and Zambia. Therefore, leaf is transported to Malawi for processing and re-exported.

Figure 8: Total tobacco imports and exports by volume and value, 2000 - 2010

Source: UN COMTRADE, National Statistics Office

As demonstrated in Figure 9, Malawian tobacco is exported to different countries and regions and shares of export destinations vary significantly between years. In 2005, main destinations included the United States (12.8 percent), Germany (12.2 percent) and Switzerland (10.2 percent). In 2010, the highest volumes were exported to Belgium (20.9 percent), Egypt (17.5 percent) and Germany (9.6 percent).

Figure 9: Top 10 tobacco export destinations in 2005 and 2010, in % of total export volume

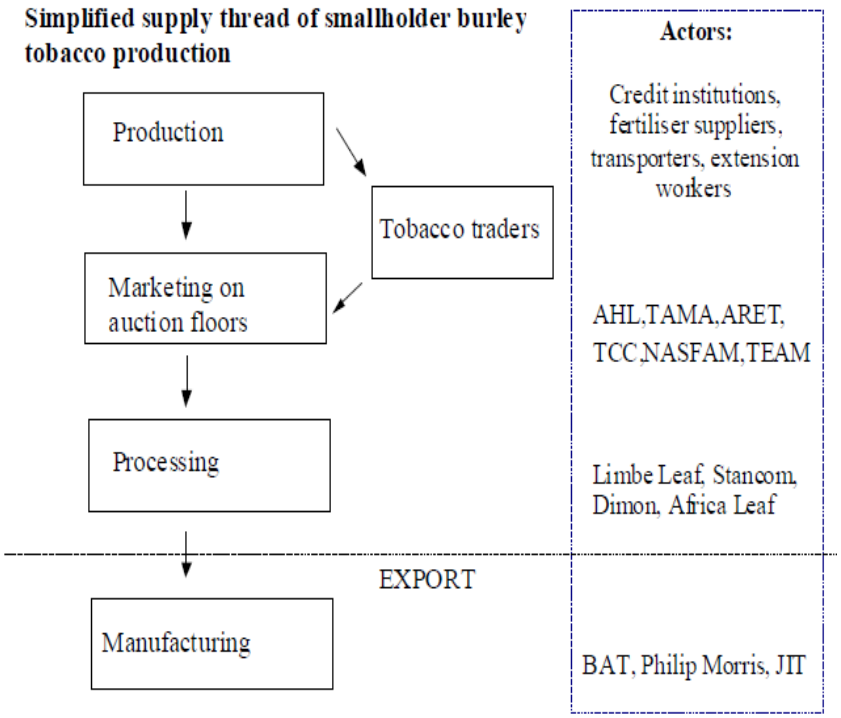


Source: COMTRADE

DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

The growing season of tobacco lasts from August to January, when tobacco leafs are harvested, dried and cured. After grading, the cured leafs are tied into hessian bales of approximately 90 kg. These bales are marketed on the auction floors.

Figure 10: Supply thread for tobacco in Malawi



Source: Prowse, 2011

In order to get access to the auction floors, smallholders are required to register as a "club" with the Tobacco Control Commission. These clubs usually consist of 12-20 producers and are affiliated with one of the two main marketing channels, the Tobacco Association of Malawi (TAMA) or a farmers' organization, for example the National Smallholder Farmers' Association of Malawi (NASFAM). These associations also provide credit, extension services and transportation to one of the three auction locations.

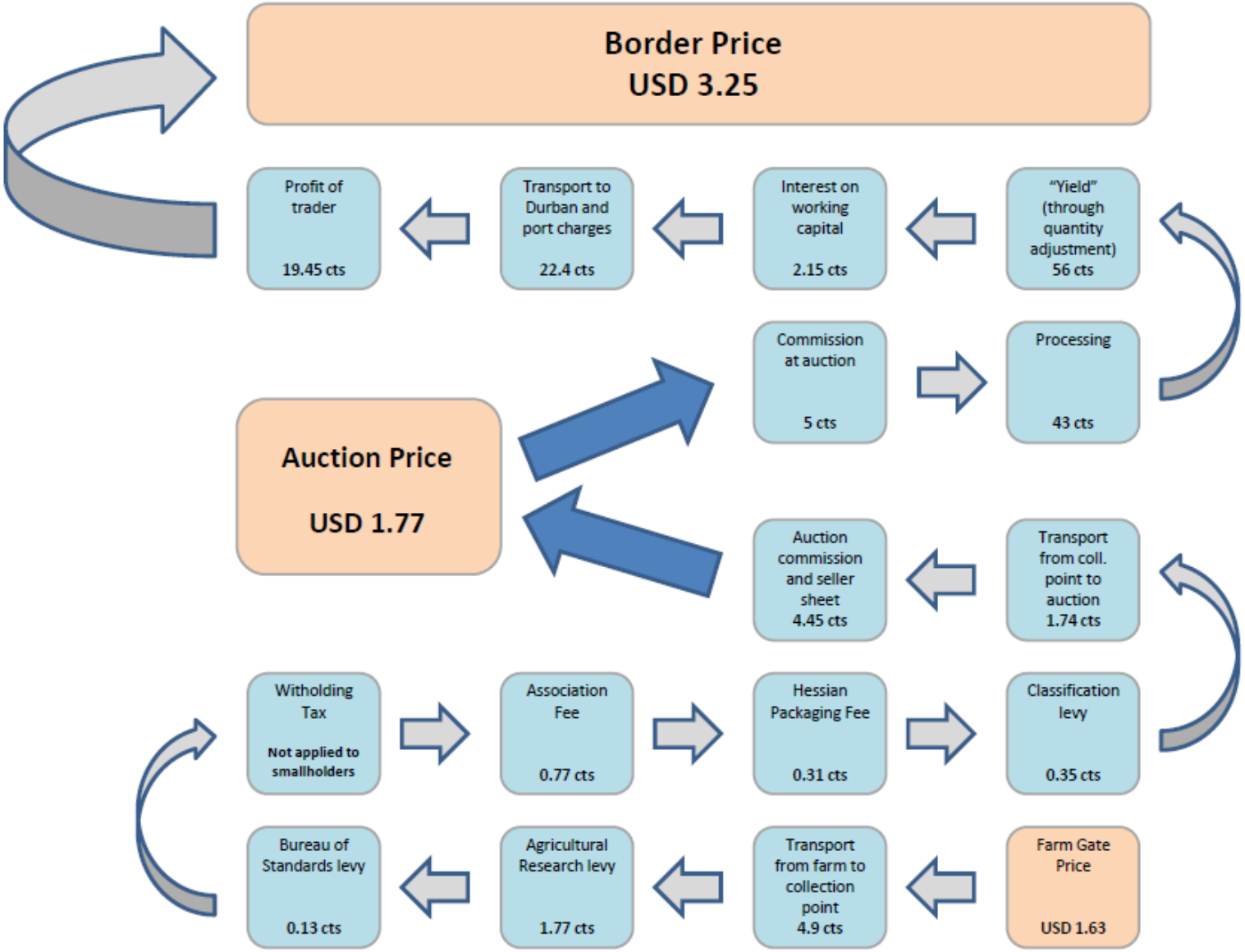
At the auction, bales are purchased by leaf merchants. Currently, seven buyers are active on the Malawian auction. Most of these buyers are subsidiaries or joint ventures of international tobacco leaf merchants. The two main buyers, Alliance One (a subsidiary of the US-based Alliance One International Corporation) and Limbe Leaf (a joint venture between the also US-based Universal Leaf Company and the Malawian Press Company) together accounted for 59 percent of total auction sales in 2009 (Prowse, 2011).

After sale, the leafs are stored and processed by the merchant in one of the tobacco factories to remove the stalks. This process results in a weight reduction of approximately 25 percent (Koester, 2004)). Once processed, the tobacco is packed into 180 kg cartons for transport to Durban (South Africa), where tobacco is shipped in containers to Asia, Egypt, Europe and the United States for cigarette manufacturing.

Since tobacco growers (estates or smallholder clubs) directly sell at the auction, price determination takes place at the auction floors. Farmers receive payment for their produced leaf only after auction sales have been realized. All duties, levies, taxes, fees and costs are deducted from the auction price. The residual is the price received at the farm gate. In other words, the farm gate price consists of the

auction price minus all costs, duties and levies. The flow-chart in Figure 11 provides an overview of the prices and costs for one kilogram of tobacco along the value chain in the year 2007.

Figure 11: Prices, costs and margins along the tobacco value chain in 2007, in USD per kg



Source: Prowse (2011), Koester (2004) and own calculations

POLICY DECISIONS AND MEASURES

Liberalization of the tobacco market

Tobacco cultivation in Malawi goes back to the end of the 19th century and, as the main source of export earnings, has played a major role in the political economy of the country since its independence in 1964. However, until the 1990s, under the Special Crops Act tobacco enjoyed a special status which limited production of the cash crop to estates and restricted small farmers with customary land or tenants from having access to the production and marketing mechanisms. Under the structural reform and adjustment packages promoted by the Bretton Woods Institutions, the Government of Malawi in the 1990s agreed on policy reforms that allowed smallholder farmers to engage in the production and marketing of tobacco. These reforms encompassed the following changes:

- before 1992, burley tobacco produced by smallholders needed to be sold to the parastatal Agricultural Development and Marketing Corporation (ADMARC). After 1992, this restriction was abolished and clubs of smallholders (as described above) could get direct access to the auction system;
- in 1996, the allowance system that provided limited production quotas to smallholders was removed. Tobacco could be produced freely;
- finally, an intermediate buyer system was installed which allowed licensed traders to buy tobacco from producers and sell it at the auction floors. However, because of the strong increase of intermediate buyers and complaints from estate growers and competitors in the marketing chain, the system was abolished in 2000 (Harashima, 2008).

Regulation and licensing through the Tobacco Control Commission

Despite the liberalization, the tobacco market in Malawi is still a regulated environment in which practically all agents (smallholder clubs, buyers and auction operators) require licenses to operate. The Tobacco Control Commission (TCC) is the market regulator.

The TCC operates as a semi-autonomous organ of the Ministry of Agriculture and its main activities include the regulation of tobacco producers, auctions, buyers, commercial traders and auction floor operators; the promotion and expansion of production and sale of tobacco; and the realization of market studies and statistical reports such as crop estimates.

The TCC is funded through a cess levy of 0.1 USD cents on every kilogram of tobacco sold, a classification levy of 0.35 USD cents, and revenue from licensing and registration.

Fiscal Policy

On behalf of the Government, Auction Holdings Limited deducts a withholding tax of 3 percent of gross proceeds of all tobacco sales, both from estates and smallholder clubs, since 2010. Before 2010, the withholding tax amounted to 7 percent but smallholder clubs were exempt. As mentioned by Chirwa (2011), this exemption for clubs resulted in medium size farmers or estate growers also registering under clubs in order to evade the tax payment.

The Government therefore removed the exemption but lowered the rate, in an effort to reduce evasion and increase tax revenues. In 2010, withholding tax on tobacco amounted to USD 10.8 million, about 8 percent of total domestic revenues budgeted. Since smallholders are the main source of tobacco production, our analysis does not take into account the withholding tax for the years 2005-2009.

Farm Input Subsidy Programme (FISP)

Input subsidies have been an important feature of Malawi's agricultural sector 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 2005/06 crop season to tackle some of the key constraints to increased production faced by Malawian small farmers, including low yields and high costs of inputs. The FISP 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. At the same time however, additional vouchers were provided for tobacco fertilizer in order to improve small farmers' incomes through increased production of burley tobacco.

According to Dorward et al (2010), the FISP has benefited approximately 100 000 small tobacco farmers in the period 2005/06 until 2009. Each cropping season, around 20 000 metric tonnes of subsidized fertilizer was provided through a voucher scheme. The beneficiaries that had been identified by the Village Development Committees received two vouchers that allowed them to buy a 50 kg bag of fertilizer for each coupon at a reduced price of MWK 1450 (further reduced to MWK 950 from the 2006/07 season onwards). This represented a discount of 75 percent on the market value of the fertilizer.

It is important to note that vouchers were not marked for specific types of fertilizer and therefore it is assumed that vouchers for tobacco fertilizer were in fact used to buy fertilizer for production of maize. A further analysis of the available data and literature is needed to allocate a share of the public expenditure on the subsidy programme to tobacco production as budgetary transfer in our incentive/disincentive calculation, in order to calculate the Nominal Rate of Assistance. More in particular, an estimate of the total budget spent on tobacco fertilizer for each year is required. These transfers will be incorporated in a revised version of this technical note.

Support services

Extension and other support services to tobacco farmers are provided by the Ministry of Agriculture and the Agricultural Research and Extension Trust (ARET). One of ARET's main roles is the production and distribution of high-quality tobacco seed, of which it is the only producer in the country. It also provides agronomic advice to smallholder farmers. ARET is funded by a 1 percent levy on gross proceeds at the auction.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

To calculate the indicators needed to estimate incentives or disincentives to production (NRP, NRA) as well as the Market Development Gaps (MDGs), several types of data are needed. They were collected and are presented and explained hereafter.

TRADE STATUS OF THE PRODUCTS

Tobacco is an export commodity for all years of the period under review.

BENCHMARK PRICES

Observed

The basis for calculating a reference parity price to determine whether Malawian tobacco farmers receive market incentives or disincentives is to establish a benchmark border price. Since Malawi is considered an exporter of tobacco, the FOB price is taken from the trade data of the National Statistical Office. This FOB price is the average price per tonne of all varieties of unmanufactured tobacco exported from Malawi.

Table 1: FOB prices of unmanufactured tobacco, 2005 – 2010

	2005	2006	2007	2008	2009	2010
Quantity (tonne)	124 900	156 684	130 183	138 896	183 552	146 800
Value (1000 USD)	319 989	431 713	422 685	589 988	758 969	581 409
Unit Value (USD/tonne)	2561.96	2755.31	3246.85	4247.70	4134.90	3960.55

Source: National Statistics Office

Adjusted

No adjustments to the benchmark price have been made.

DOMESTIC PRICES

Since sale of tobacco outside of the auctioning system is restricted and not permitted for smallholder farmers, the tobacco auction is taken as the wholesale market for tobacco in Malawi. Average auction prices have been obtained from Malawi's National Statistics Office. Because official auction prices are stated in US dollars, for our analysis the official prices have been converted in Malawi Kwacha using the average official exchange rate for each year.

Table 2: Average auction prices, 2005-2010 (in MWK/tonne)

	2005	2006	2007	2008	2009	2010
Auction Price in USD	1116	1045	1767	2421	1323	1257
Official nominal exchange rate	118.42	136.01	139.96	140.52	141.17	150.48
Auction Price in MWK	**132 115**	**142 071**	**247 303**	**340 260**	**186 694**	**189 175**

Domestic prices for tobacco leaf at the farm gate are derived from the auction prices. Farm gate prices are not collected as farmers receive the residual of the auction price after deduction of all

costs (such as transport costs, fees, levies, duties). As a result, the average farm gate price can be derived directly from the average price realized at the auction and is calculated in the table below.

Table 3: Calculation of farm gate price and overview of all costs from farm gate to auction, 2005 – 2010, in MWK/tonne

Calculation of Farm Gate Price Auction Price minus all costs, duties, levies									
		USDcts/kg	USD/ton	2005	2006	2007	2008	2009	2010
Exchange Rate				118.42	136.01	139.96	140.52	141.17	150.48
Average Auction Price in MWK/ton				132,115.39	142,071.11	247,303.24	340,260.32	186,694.47	189,175.37
Levies	TCC Cess	0.13	1.3	153.95	176.82	181.94	182.68	183.52	195.62
	Classification Levy	0.35	3.5	414.47	476.05	489.85	491.83	494.08	526.68
	Research (ARET) Levy	1%		1,321.15	1,420.71	2,473.03	3,402.60	1,866.94	1,891.75
Marketing	Auction Commission	2.5%		3,302.88	3,551.78	6,182.58	8,506.51	4,667.36	4,729.38
	Auction Seller Sheet	0.05	0.5	59.21	68.01	69.98	70.26	70.58	75.24
Transport	Farm to satellite depot	4.9	49	5,802.57	6,664.66	6,857.91	6,885.61	6,917.18	7,373.52
	Satellite to auction	1.74	17.4	2,060.50	2,366.64	2,435.26	2,445.09	2,456.30	2,618.35
Tax	Witholding Tax	3%		N/A	N/A	N/A	N/A	N/A	5,675.26
Association	Association Fee	0.7	7	828.94	952.09	979.70	983.66	988.17	1,053.36
Packaging	Hessian Scheme	0.31	3.1	367.10	421.64	433.87	435.62	437.62	466.49
Total in MWK/ton				14,310.77	16,098.40	20,104.12	23,403.87	18,081.76	24,605.66
Farm Gate Price				**117,804.62**	**125,972.71**	**227,199.12**	**316,856.45**	**168,612.71**	**164,569.71**

EXCHANGE RATES

Observed

The exchange rate between the Malawi Kwacha and the US dollar has been taken from the IMF database on exchange rates. The average of the exchange rate for each year has been calculated from the monthly data reported in that database.

Adjusted

As indicated by the MAFAP national team, media sources and IMF reports, the Malawi Kwacha has been significantly overvalued since 2007. This is reflected in a dynamic parallel market for foreign exchange. For that reason, an adjusted exchange rate has been applied from 2007 to express the difference between the nominal exchange rate and the exchange rate in the parallel market. The values used are annual averages of parallel market exchange rates of Malawi Kwacha to the US dollar, as calculated by the Reserve Bank of Malawi.

The IMF has confirmed that the overvaluation of the Malawi Kwacha gradually increased to 10.8 percent on average in 2010. In 2011, the African Development Bank indicated in a report that the

Malawi kwacha remained overvalued by between 10 and 20 percent in early 2011. Despite a 10 percent devaluation in August 2011, parallel market rates have more recently increased to MWK 230 in December 2011 against an official rate of MWK 165 to the US dollar.

Table 4: Malawi Kwacha/US dollar exchange rates, 2005-2010

	2005	2006	2007	2008	2009	2010
Official Nominal Exchange Rate	118.42	136.01	139.96	140.52	141.17	150.49
Parallel Market Exchange Rate	118.42	136.01	140.94	138.24	147.15	166.83

Source: IMF, Reserve Bank of Malawi

In June 2011, several donors including the World Bank, the EU, the AfDB and DFID suspended their general budget support to Malawi as a result of the absence of agreement between Malawi and the IMF on the review of reforms to address external economic imbalances, including exchange rate misalignment.

ACCESS COSTS

Observed

Access costs analyzed include both the cost to bring the commodity from the border to the wholesale, as well as from the farm to the wholesale. In this note, the tobacco auction is taken as the wholesale market.

Observed market access costs from the farm gate to the auction are taken as the total of costs, duties and levies but minus the TCC levy and the Withholding Tax as these are to be regarded as implicit trade policies. All other costs and levies are considered to represent the delivery of a service and are therefore part of the access costs.

From the auction to the border, no explicit or implicit trade policies are assumed. Therefore, the observed access costs are taken as the difference between the auction price and the FOB price at the border, as this difference encompasses both all storage, transport and process costs, as well as trader margins.

Adjusted

Two alternative sets of adjusted market access costs are estimated. As mentioned by Chirwa (2011), the tobacco chain suffers from a lack of effective competition and poor regulation. This has resulted in monopsony power and high access costs along the value chain. Both Koester (2004) and Jaffee (2003) provide indications on the efficiency and effectiveness of the different components of the access costs, and to what extent they are excessive. On the basis of these analyses, the following adjustments are made:

- the classification service for which TCC enforces a levy is considered not efficient and obsolete. Therefore, it is considered an excessive cost and excluded in the adjusted access costs;
- domestic transport from farm gate to auction is considered one of the least efficient elements of the tobacco chain. It is estimated that increased competition among transporters could result in a reduction of 3 USD cents per kg;

- farmers are legally bound to sell their tobacco leaf at the auction, which is operated by a monopoly. Increased competition in the auction sector or lifting the restrictions on direct sales could reduce the costs for farmers to market their goods. This could result in greater efficiency and lower auctioneers' commissions. For that reason, in the adjusted access costs, commission has been reduced by 1 percent to 1.5 percent;
- by using international transport through the Mozambican port of Nacala – instead of Durban – savings of 8 USD cents per kg could be realized (Jaffee, 2003); The Nacala corridor is the shortest and potentially cheapest route for Malawian exports to a deep sea container port but access is limited due to bad roads. With AfDB financing (the 'Multi-Nacala Corridor Project'), 1,033 kilometers of roads and border posts are to be constructed. This will reduce ground transportation costs for Malawian exports as the distance to Durban is almost 3 000 km;
- the current structure of the sector has resulted in strong concentrations of market power among a limited number of buyers. According to Jaffee (2003), profit margins of buyers vary between 10 and 15 percent of the value of processed leaf. At a global level, the operating margin of tobacco merchant Universal (also one of the main buyers in Malawi through its subsidiary Limbe Leaf) in 2011 was 9.9 percent. For that reason, in the calculation of the adjusted access costs we assume that 10 percent would be the maximum profit margin for the buyer if a more competitive market environment for buyers would exist.

Table 5: Observed and adjusted access costs from farm gate to auction from 2005 - 2010, in MWK/tonne

Farm Gate to Point of Competition
Observed & Adjusted Acces Costs

		USDcts/kg	USD/ton	2005	2006	2007	2008	2009	2010
Exchange Rate				118.42	136.01	139.96	140.52	141.17	150.48
Average Auction Price in MWK/ton				132,115.39	142,071.11	247,303.24	340,260.32	186,694.47	189,175.37
Levies	Classification Levy	0.35	3.5	414.47	476.05	489.85	491.83	494.08	526.68
	Research (ARET) Levy	1%		1,321.15	1,420.71	2,473.03	3,402.60	1,866.94	1,891.75
Marketing	Auction Commission	2.5%		3,302.88	3,551.78	6,182.58	8,506.51	4,667.36	4,729.38
	Auction Seller Sheet	0.05	0.5	59.21	68.01	69.98	70.26	70.58	75.24
Transport	Farm to satellite depot	4.9	49	5,802.57	6,664.66	6,857.91	6,885.61	6,917.18	7,373.52
	Satellite to auction	1.74	17.4	2,060.50	2,366.64	2,435.26	2,445.09	2,456.30	2,618.35
Association	Association Fee	0.7	7	828.94	952.09	979.70	983.66	988.17	1,053.36
Packaging	Hessian Scheme	0.31	3.1	367.10	421.64	433.87	435.62	437.62	466.49
Observed Access Costs in MWK/ton				**14,156.83**	**15,921.58**	**19,922.18**	**23,221.19**	**17,898.25**	**18,734.78**
Adjustments	Remove classification lev	0.35	3.5	414.47	476.05	489.85	491.83	494.08	526.68
	Reduce auction commis:	1%		1321.15	1420.71	2473.03	3402.60	1866.94	1891.75
	Reduce transport costs	3	30	3552.59	4080.41	4198.72	4215.68	4235.01	4514.40
Adjusted Access Costs in MWK/ton				**8,868.61**	**9,944.41**	**12,760.57**	**15,111.07**	**11,302.21**	**11,801.94**

Table 6: Observed and Adjusted Access Costs from Auction to Border from 2005 - 2010, in MWK/tonne

Auction to Border
Observed and Adjusted Access Costs

		USDcts/kg	USD/ton	2005	2006	2007	2008	2009	2010
Exchange Rate				118.42	136.01	139.96	140.52	141.17	150.48
Average Auction Price in MWK/ton				132,115.39	142,071.11	247,303.24	340,260.32	186,694.47	189,175.37
Commission	Buyer commission at auction	5	50	5,920.99	6,800.68	6,997.86	7,026.13	7,058.35	7,524.00
Processing	Leaf processing	43	430	50,920.49	58,485.82	60,181.63	60,424.76	60,701.79	64,706.40
Interest	Interest on w orking capital	1.64	16.4	1,942.08	2,230.62	2,295.30	2,304.57	2,315.14	2,467.87
Transport	Transport to Durban, green leaf equivalent	22	224	15,299.83	17,572.95	18,082.48	18,155.53	18,238.77	19,442.02
Margin	Profit margin of leaf merchant			24,378.67	57,623.97	10,514.87	25,503.39	168,622.73	169,683.31
Observed Access Costs auction to border				**98,462.06**	**142,714.05**	**98,072.15**	**113,414.38**	**256,936.77**	**263,823.60**
Adjustments	Reduce transport costs	8	80	5462.04	6273.54	6455.45	6481.52	6511.24	6940.80
	Reduce profit margins	max 18% of auction price			32676.35			132553.07	134314.51
Adjusted Access Costs auction to border				**93,000.02**	**103,764.15**	**91,616.71**	**106,932.86**	**117,872.46**	**122,568.29**

Source: Koester (2004), Jaffee (2003), own calculations

EXTERNALITIES

No externalities have been taken into account in the analysis.

BUDGET AND OTHER TRANSFERS

In the analysis, the farm input subsidy programme has been mentioned as a source of budgetary transfers to tobacco farmers. However, additional research will be carried out to determine the amounts of the programme specifically targeted towards tobacco production. These estimates will be included in a future update of this technical note.

QUALITY AND QUANTITY ADJUSTMENTS

In our analysis a quantity adjustment of 0.76 has been applied because of weight losses during leaf processing, after sale at auction but before the product is exported. A quantity adjustment is justified as the weight loss is not the result of a natural process, but of factory processing to remove stalks and prepare the leaf for export.

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 tobacco in Malawi.

Table 7: Sources of data used in the calculations of indicators

		Description	
Concept		***Observed***	***Adjusted***
Benchmark price		*FOB price is annual average per tonne of tobacco as recorded by the National Statistics Office of Malawi.*	*N.A.*
Domestic price at point of competition		*Annual weighted average of auction prices of all tobacco varieties, as obtained from the National Statistics Office.*	*N.A.*
Domestic price at farm gate		*Annual average farm gate prices have been calculated on the basis of the auction price as they consist of the residual of the auction price after deduction of all duties, fees, levie, taxes and costs.*	*N.A.*
Exchange rate		*Annual average of exchange rate as reported by IMF.*	*Average annual parallel market rate as estimated by the Reserve Bank of Malawi*
Access cost from border to point of competition		*Observed access costs between the auction and the border are taken as the total of storage, transport and processing costs, as well as margins. These are based on Koester (2004) and Jaffee (2003).*	*No adjustments to the access cost from auction to border were made.*
Access cost from farm-gate to border		*Observed access costs between the farm gate and the auction are taken as the total of transport costs, duties, levies, taxes and fees, as well as margins. These are based on Koester (2004) and Jaffee (2003).*	*Based on Prowse (2011), Koester (2004) and Jaffee (2003), the following adjustments were made: 1) Classification levy was excluded, 2) Domestic and international transport costs were reduced, 3) Auction commission and margins were reduced because of market power concentration.*
QT adjustment	Bor-Wh	*Because of weight losses during processing, a quantity adjustment of 0.76 has been applied, based on data from Prowse (2011).*	*N.A.*
	Wh-FG	*N.A.*	*N.A.*
QL adjustment	Bor-Wh	*N.A.*	*N.A.*
	Wh-FG	*N.A.*	*N.A.*

The data used for this analysis is summarized below.

Table 8: Data and values used in the calculations of indicators

		Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
		trade status	*x*	*x*	*x*	*x*	*x*	*x*
DATA	*Unit*	*Symbol*						
Benchmark Price								
Observed	USD/TON	$P_{b(int\$)}$	2,562.00	2,755.00	3,247.00	4,248.00	4,135.00	3,961.00
Adjusted	USD/TON	P_{ba}						
Exchange Rate								
Observed	MWK/USD	ER_o	118.42	136.01	139.96	140.52	141.17	150.48
Adjusted	MWK/USD	ER_a	118.42	136.01	140.94	138.24	147.15	166.83
Access costs border - wholesale								
Observed	MWK/TON	AC_{owh}	98,462.06	142,714.05	98,072.15	113,414.38	256,936.77	263,823.60
Adjusted	MWK/TON	AC_{awh}	93,000.02	103,764.15	91,616.71	106,932.86	117,872.46	122,568.29
Domestic price at wholesale	MWK/TON	P_{dwh}	132,115.39	142,071.11	247,303.24	340,260.32	186,694.47	189,175.37
Access costs wholesale - farm gate								
Observed	MWK/TON	AC_{ofg}	14,156.83	15,921.58	19,922.18	23,221.19	17,898.25	18,734.78
Adjusted	MWK/TON	AC_{afg}	8,868.61	9,944.41	12,760.57	15,111.07	11,302.21	11,801.94
Farm gate price	MWK/TON	P_{dfg}	117,804.62	125,972.71	227,199.12	316,856.45	168,612.71	164,569.71
Externalities associated with production	MWK/TON	E						
Budget and other product related transfers	MWK/TON	BOT						
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}	0.76	0.76	0.76	0.76	0.76	0.76
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}						
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}						
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}						

CALCULATION OF INDICATORS

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

Box 1: MAFAP POLICY INDICATORS

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

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

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

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

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

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

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

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

In this analysis, only Nominal Rates of Protection were calculated. The NRA includes budgetary and other transfers. In the case of tobacco in Malawi, calculations of transfers that can be assigned to tobacco production will be calculated and incorporated in a revised version of this technical note. When transfers have been included, the Nominal Rate of Assistance will also be calculated.

Table 9: MAFAP price gaps for tobacco in Malawi 2005-2010 (MWK per tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
Observed price gap at wholesale	-	-	-	-	-	-
Adjusted price gap at wholesale	(5,462.54)	(38,942.48)	(8,880.51)	888.10	(157,866.67)	(190,474.70)
Observed price gap at farm gate	(153.95)	(176.82)	(181.94)	(182.68)	(183.52)	(5,870.89)
Adjusted price gap at farm gate	(10,904.70)	(45,096.46)	(16,224.05)	(7,404.69)	(164,646.22)	(203,278.42)

Source: Own calculations using data as described above.

Table 10: MAFAP nominal rates of protection (NRP) for tobacco in Malawi 2005-2010 (%)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
Observed NRP at wholesale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Adjusted NRP at wholesale	-3.97%	-21.51%	-3.47%	0.26%	-45.82%	-50.17%
Observed NRP at farm gate	-0.13%	-0.14%	-0.08%	-0.06%	-0.11%	-3.44%
Adjusted NRP at farm gate	-8.47%	-26.36%	-6.66%	-2.28%	-49.40%	-55.26%

Source: Own calculations using data as described above.

Table 11: MAFAP Market Development Gaps for tobacco in Malawi 2005-2010 (MWK per tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
International markets gap (IRG)	-	-	-	-	-	-
Exchange policy gap (ERPG)	(0.50)	7.42	(2,425.06)	7,369.63	(18,802.35)	(49,219.39)
Access costs gap to point of competition (ACG_{wh})	(5,462.04)	(38,949.90)	(6,455.45)	(6,481.52)	(139,064.31)	(141,255.31)
Access costs gap to farm gate (ACG_{fg})	(5,288.22)	(5,977.16)	(7,161.60)	(8,110.11)	(6,596.04)	(6,932.83)

Source: Own calculations using data as described above.

4. INTERPRETATION OF THE INDICATORS

Figure 12 and Figure 13 present the two sets of indicators that MAFAP will generate, including price gaps and Nominal Rates of Protection and Nominal Rates of Assistance. Price gaps give an absolute picture of the policy effort (observed) and of international markets and market development gaps while the ratios provide a percentage that can be compared across countries and products.

The observed price gaps at wholesale (auction) are zero in all years under review since no incentives or disincentives as a result of explicit or implicit trade policies are recorded. At the farm gate level, NRPs show a minor disincentive of around 0.1 percent in the period 2005-2009, which means that observed prices at the farm gate were slightly lower than reference prices. This is the result of the cess levy that is charged to producers by the Tobacco Control Commission and which constitutes a *de facto* export tax. In the same period, a withholding tax of 7 percent on tobacco's gross proceeds was in effect but an exemption applied for smallholders. For that reason, the withholding tax was not taken into account in our analysis and does not appear as a disincentive to production in our calculations. In 2010, however, the tax exemption for smallholders was lifted while at the same time the tax rate was lowered to 3 percent. This resulted in an increased tax burden for producers, which is reflected by a further increase in the negative price wedges and Nominal Rates of Protection.

When taking into account the structure of the value chain and the adjustments made to correct for excessive profits and costs and inefficiencies, the picture presented is different.

In 2005, Malawi suffered from a severe drought that affected production both of food crops and of tobacco. The reduced supply during the 2005 marketing season kept auction prices at a relatively high level in dollar terms. The disincentive of 3.97 percent recorded in this year was mainly due to excessive transportation costs to Durban that penalize the export of tobacco from Malawi. In 2006, however, a strong increase in domestic tobacco production resulted in a lower auction price in US dollar terms. Because of the strong depreciation of the Malawi Kwacha however, in local currency a higher auction price was registered. While the auction price in US dollars decreased, the international benchmark price increased. This resulted in a larger price gap between the reference prices at the border and at the auction, and enabled leaf buyers to increase their profit margins at the expense of producers. The disincentive at auction level rose to 21.51 percent. At farm level, the negative NRP amounted to 26.36 percent, as in addition to the excessive profits of traders, growers were further penalized by excessive transportation costs, auction commission and classification levy.

In 2007 and 2008, the situation changed and a strong increase in the benchmark price was also translated into higher auction prices. In 2008, the average auction price reached levels more than double of those in 2006. The excessive profit margins of traders disappeared and disincentives went down accordingly. In 2007, a 6.66 percent disincentive was still recorded at the farm gate, which further decreased to 2.28 percent in 2008, still due to the same inefficiencies along the value chain as in earlier years.

The price spike in 2008 and favorable climate conditions led to a bumper harvest in 2009, when for the first time tobacco production in Malawi reached levels over 200 000 tonnes. While the international benchmark price remained almost at the same level as in 2008, the high volumes of supply offered at the auction strongly suppressed auction prices in 2009 which fell by 45 percent compared to the annual averages a year earlier. This allowed for a strong increase in profit margins

for leaf merchants, who could benefit from the excess supply and low prices at the auction on the one hand, and from the relatively high price levels on the international market on the other. This allowed for a strong increase in the negative price gaps and NRPs at auction level reaching disincentive levels of 45.8 percent in 2009 and 50.17 percent in 2010.

In the same period of 2009 and 2010, overvaluation of the Malawi Kwacha also increasingly penalized producers. Although auction prices are set in US dollars, many smallholder farmers receive payments in local currency at the official nominal exchange rate. The disincentive created by this overvaluation became particularly strong in 2010, when producers could have received MWK 49,219 (the “exchange policy gap”) more per tonne of tobacco if the exchange rate would be adjusted.

In the current analysis, budgetary transfers are not taken into account and no Nominal Rate of Assistance is calculated. Since significant transfers were realized in the period 2005-2009 through input subsidies targeted to tobacco producers, it is not unlikely that though tobacco production is hurt by persistent price disincentives, some of these disincentives are offset by budgetary support to producers.

Figure 12: Observed and adjusted price gaps for tobacco at wholesale and farm gate in Malawi 2005-2010 (MWK/tonne)

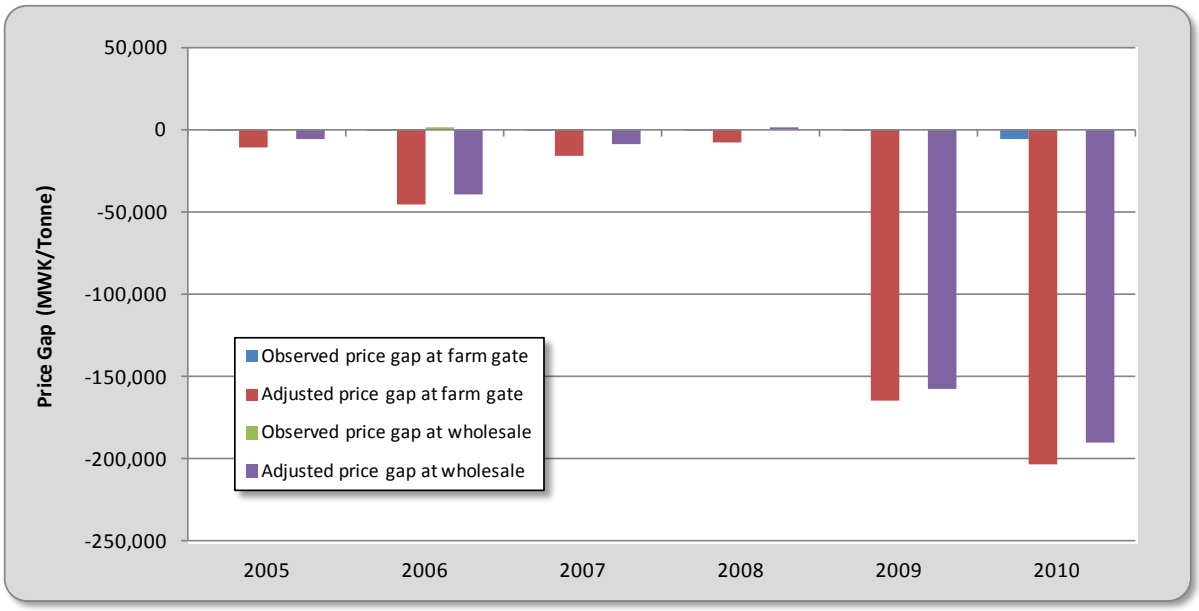
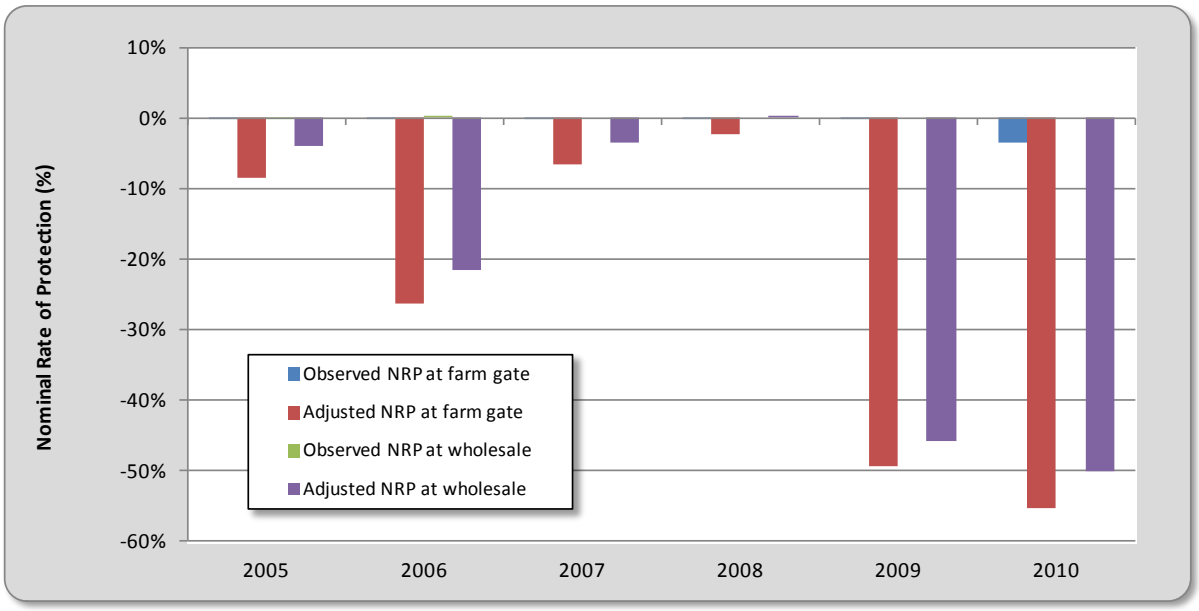


Figure 13: Observed and adjusted nominal rate of protection at wholesale and farm gate for tobacco in Malawi 2005-2010



5. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

MAIN MESSAGE

On the basis of the data currently collected and assuming no major data problems, it seems that the government objective of increasing tobacco production has not been supported by the current policy framework. Our analysis shows that the effect of policy and regulation throughout the period 2005 – 2010 has created disincentives to producers.

The disincentives that we observe in our analysis consist of four main categories:

- disincentives as a result of levies and taxation;
- disincentives as a result of exchange rate policy;
- disincentives as a result of market structure and lack of competition;
- disincentives as a result of excessive transportation costs.

Since the liberalization of tobacco production and marketing in the 1990s, tobacco has become Malawi's most supported and accessible cash crop. Both the Ministry of Agriculture and the Agricultural Research and Extension Trust have provided high quality seeds and technical assistance to tobacco farmers. The National Smallholder Farmers' Association of Malawi is a strong association that negotiates and organizes transport services and storage. In addition, from 2005-2009, tobacco production was further promoted by an extensive input subsidy programme. Attracted by the accessibility and potentially attractive returns, smallholder farmers have become massively engaged in tobacco production and the total volume of production rose to more than 200 000 tonnes in 2009.

However, in recent years input subsidies for tobacco producers have been abolished and the tax exemption on withholding tax for smallholders clubs has been removed. From our analysis it follows that, particularly in 2009 and 2010, leaf merchants have been able to benefit from lack of competition and concentrations of market power by keeping auction prices low – at the expense of producers. The Government has also started to pursue a diversification strategy to reduce the dependency on tobacco by promoting the production of other cash crops, such as soya and groundnuts. Finally, the global outlook for the tobacco market is uncertain as anti-smoking policies in many countries, in particular the United States and Europe have reduced the growth rates of demand for cigarettes and tobacco. For all these reasons, it can be doubted whether the growth of the Malawian tobacco sector that was realized in the 2006 – 2009 period will be sustained without further reforms that reduce disincentives.

PRELIMINARY RECOMMENDATIONS

In order to increase the attractiveness of investing in tobacco production for growers it will be beneficial for the development of the tobacco market if existing disincentives are reduced and market structure is improved in order to make it more competitive and transparent. Based on our analysis, suggested policy reforms could include the following measures:

- in general, costs can drop significantly when the power of monopolistic structures is constrained. This could lead to higher auction prices that benefit growers directly as the price that farmers receive is based on the price at the auction. Removal of the auction monopoly

in order to open the market for more direct contracting arrangements or the establishment of competing auctions could both be considered;

- a more competitive market environment will reduce the concentration of power among a small group of leaf buyers. Strengthening of the Tobacco Control Commission as independent market regulator, with the purpose of improved monitoring of market behavior, could be an important step towards a reduction of anti-competitive practices and excessive profit margins;
- a wide range of taxes, duties, levies and fees is collected on the gross proceeds of tobacco sold at the auction. It is advised that an in-depth review is conducted to determine if further reductions of these taxes can be realized to raise the share of auction prices received by farmers.

LIMITATIONS

The first limitation is that under the current phase of MAFAP no structural, in-depth collaboration with local counterparts is envisaged in Malawi. This limits the possibilities of data collection and analysis, as local technical and institutional partners are better able to link certain outcomes to specific policy measures, as well as their level of enforcement.

The second limitation is the limited level of information regarding the operation of leaf buyers in the Malawian tobacco market. As only a limited number of traders are active buyers at the tobacco auction floors, it is difficult to get information on these companies' profit margins.

FURTHER INVESTIGATION AND RESEARCH

- carry out analysis of farm-level costs and revenues in an effort to estimate profitability of smallholder tobacco production at the farm level. This will help to determine the importance of tobacco for food security of rural households;
- conduct an analysis of the input subsidies to the tobacco sector in order to estimate the level of budgetary transfers and the Nominal Rates of Assistance;
  evaluate alternative marketing systems and the possible effects of increased direct contract arrangements between growers and buyers.

BIBLIOGRAPHY

Chirwa, Ephraim (2011) Analysis of the Tobacco Industry in Malawi, United Nations Conference on Trade and Development

Jaffee, Steven (2003) Malawi's Tobacco Sector: Standing on One Strong Leg is Better Than on None, Africa Region Working Paper Series No. 55. Washington D.C: World Bank.

Government of Malawi (2010) Agricultural Sector Wide Approach program (ASWAp). Ministry of Agriculture and Food Security, Lilongwe, Malawi

Government of Malawi (2006) Malawi Growth and Development Strategy (MGDS). Ministry of Economic Planning and Development, Lilongwe, Malawi.

Harashima, Azusa, (???) The impact of tobacco production liberalization on smallholders in Malawi, IDE Discussion Paper no. 170, Institute of Developing Economies

Minot, Nicholas, Mylène Kherallah and Philippe Berry (2000) "Fertilizer market reform and the determinants of fertilizer use in Benin and Malawi," MSSD Discussion Papers, No.40, International Food Policy Research Institute

National Statistical Office (2010) Statistical Year Book – 2010, Zomba, Malawi

Place, Frank and Keijiro Otsuka (2001) "Tenure, Agricultural Investment, and Productivity in the Customary Tenure Sector of Malawi," Economic Development and Cultural Change, 50(1): 77-99.

Prowse M. (2011) A comparative Value Chain Analysis of Burley Tobacco in Malawi- 2003/04 and 2009/10. Institute of Development Policy and Management Working Paper/ 20011.09, University of Antwerp, Belgium.

Takane, Tsutomu (2007) Malawi no Syounou (Smallholders, Economic Liberalization, and Rural Livelihoods in Malawi), Kenkyu Sousho, No. 561, Institute of Developing Economies.

Tobacco Control Commission (2010) Annual Report 2009-2010 season. Lilongwe, Malawi.

UNDP, Diagnostic Trade Integration Study Malawi, 2004

ANNEX I: Methodology Used

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

ANNEX II: Data and calculations used in the analysis

Name of product	Tobacco
International currency	USD

Local currency	MWK

	DATA		Unit	Symbol	Year trade status	2005 x	2006 x	2007 x	2008 x	2009 x	2010 x	Notes
	Benchmark Price											
1		*Observed*	XXX/TON	$P_{b(int\$)}$		**2,562.00**	**2,755.00**	**3,247.00**	**4,248.00**	**4,135.00**	**3,961.00**	NSO
1b		*Adjusted*	XXX/TON	P_{ba}								
	Exchange Rate											
2		*Observed*	YYY/XXX	ER_0		118.42	136.01	139.96	140.52	141.17	150.48	
2b		*Adjusted*	YYY/XXX	ER_a		118.42	136.01	140.94	138.24	147.15	166.83	
	Access costs border - point of competition											
3		*Observed*	YYY/TON	AC_{wh}		98,462.06	142,714.05	98,072.15	113,414.38	256,936.77	263,823.60	
3b		*Adjusted*	YYY/TON	AC_{wha}		93,000.02	103,764.15	91,616.71	106,932.86	117,872.46	122,568.29	
4	**Domestic price at point of competition**		YYY/TON	P_{dwh}		**132,115.39**	**142,071.11**	**247,303.24**	**340,260.32**	**186,694.47**	**189,175.37**	Auction prices, weighted
	Access costs point of competition - farm gate											
5		*Observed*	YYY/TON	AC_{fg}		14,156.83	15,921.58	19,922.18	23,221.19	17,898.25	18,734.78	
5b		*Adjusted*	YYY/TON	AC_{fga}		8,868.61	9,944.41	12,760.57	15,111.07	11,302.21	11,801.94	
6	**Farm gate price**		YYY/TON	P_{dfg}		117,804.62	125,972.71	227,199.12	316,856.45	168,612.71	164,569.71	
7	Externalities associated with production		YYY/TON	E								
8	Budget and other product related transfers		YYY/TON	BOT								From PE Analysis
	Quantity conversion factor (border - point of competition)		Fraction	QT_{wh}		0.76	0.76	0.76	0.76	0.76	0.76	
	Quality conversion factor (border - point of competition)		Fraction	QL_{wh}								
	Quantity conversion factor (point of competition - farm gate)		Fraction	QT_{fg}								
	Quality conversion factor (point of competition - farm gate)		Fraction	QL_{fg}								

	CALCULATED PRICES		Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
	Benchmark price in local currency										
9		*Observed*	YYY/TON	$P_{b(loc\$)}$	303,392.04	374,707.55	454,441.31	596,940.40	583,725.31	596,051.28	[1]*[2]
10		*Adjusted*	YYY/TON	$P_{b(loc\$)a}$	303,392.04	374,707.55	457,632.18	587,243.52	608,465.25	660,813.63	[1]*[2b]
	Reference Price at point of competition										
11		*Observed*	YYY/TON	RPO_{wh}	132,115.89	142,063.69	247,303.24	340,260.32	186,694.47	189,175.37	([9]*[QTwh])-[3]
12		*Adjusted*	YYY/TON	RPA_{wh}	137,577.93	181,013.59	256,183.75	339,372.22	344,561.13	379,650.07	([10]*[QTwh])-[3b]
	Reference Price at Farm Gate										
13		*Observed*	YYY/TON	RPO_{fg}	117,959.07	126,142.11	227,381.07	317,039.13	168,796.22	170,440.59	[11]-[5]
14		*Adjusted*	YYY/TON	RPA_{fg}	128,709.32	171,069.18	243,423.18	324,261.14	333,258.92	367,848.13	[12]-[5b]

	INDICATORS		Unit	Symbol	2005	2006	2007	2008	2009	2010	Formula
	Price gap at point of competition										
15		*Observed*	YYY/TON	PWO_{wh}	(0.50)	7.42	-	-	-	-	[4]-[11]
16		*Adjusted*	YYY/TON	PWA_{wh}	(5,462.54)	(38,942.48)	(8,880.51)	888.10	(157,866.67)	(190,474.70)	[4]-[12]
	Price gap at farm gate										
17		*Observed*	YYY/TON	PWO_{fg}	(154.45)	(169.40)	(181.94)	(182.68)	(183.52)	(5,870.89)	[6]-[13]
18		*Adjusted*	YYY/TON	PWA_{fg}	(10,904.70)	(45,096.46)	(16,224.05)	(7,404.69)	(164,646.22)	(203,278.42)	[6]-[14]
	Nominal rate of protection at point of competition										
19		*Observed*	%	$NRPO_{wh}$	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	[15]/[11]
20		*Adjusted*	%	$NRPA_{wh}$	-3.97%	-21.51%	-3.47%	0.26%	-45.82%	-50.17%	[16]/[12]
	Nominal rate of protection at farm gate										
21		*Observed*	%	$NRPO_{fg}$	-0.13%	-0.13%	-0.08%	-0.06%	-0.11%	-3.44%	[17]/[13]
22		*Adjusted*	%	$NRPA_{fg}$	-8.47%	-26.36%	-6.66%	-2.28%	-49.40%	-55.26%	[18]/[14]
	Nominal rate of assistance										
23		*Observed*	%	NRAO	-0.13%	-0.13%	-0.08%	-0.06%	-0.11%	-3.44%	([17]+[8])/[13]
24		*Adjusted*	%	NRAA	-8.47%	-26.36%	-6.66%	-2.28%	-49.40%	-55.26%	([18]+[8])/[14]

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