



MAFAP SPAANA

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

ANALYSIS OF INCENTIVES AND DISINCENTIVES FOR COTTON IN MOZAMBIQUE

OCTOBER 2012



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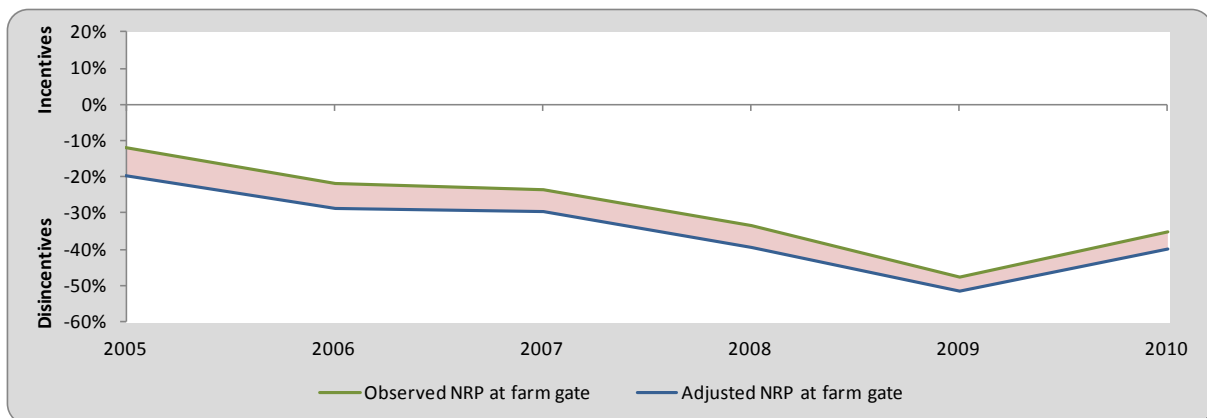
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SUMMARY OF THE NOTE

Product: Cotton
 Period analyzed: 2005 – 2010
 Trade status: Export in all years

- Cotton is the most important agricultural export crop in Mozambique and one of the major sources of income for 223 583 households (more than 1.3 million of inhabitants) in rural areas. On average, cotton contributes close to 17 percent of total agricultural exports and almost 2 percent of total exports;
- Production has been relatively volatile over the period of analysis, reaching its maximum of 131 000 tonnes in 2009/2010 compared to 71 000 tonnes in 2000/2001. Production is entirely dependent on household farming, accounting for almost 99 percent in 2010/2011;
- The cotton sector operates in a monopsony system (demand side), where ginning companies are granted concession rights as exclusive buyers of cottonseed in their respective areas of concession;
- Mozambique exports both cotton lint and seed and the main export destination is the South Asia.



The observed Nominal Rate of Protection (NRP, green line) indicates that cotton farmers have not received price incentives under the prevailing cost structure in the value chain. The adjusted NRP (blue line) captures the effects of market inefficiencies on farmers. The area in red shows the cost that these inefficiencies represent for producers.

- Overall our analysis shows that some policies and regulation have created disincentives to producers throughout the period analysed suggesting that the government policy of fixing the minimum price for cotton did not adequately create incentives for cotton growers;
- Disincentives at farm gate have largely been due to: i) levies and taxation; ii) market structure and lack of competition due to monopsony (ginners) in cotton sector; iii) low level of farm gate price; vi) excessive ginning cost; and v) low level of ginning outturn ratio of the Mozambican ginning sector further penalizing farmers;
- Actions to be taken to reduce disincentives could include: i) liberalization of the cotton sector, which will eliminate the monopsony; ii) investments in modernization of the ginning infrastructure in order to increase the ginning outturn ratio and the quality of cotton exported to the international market; and iii) carrying out a review of existing taxes, duties and levies.

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1. PURPOSE OF THE NOTE

This technical note aims to describe the market incentives and disincentives for cotton in Mozambique. 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

Cotton is the most important agricultural export crop in Mozambique¹ and one of the major sources of income for the rural households in the central and northern Mozambique. The cotton sector is generally characterized by low yields and low returns compared to other neighboring countries such as Malawi, Zimbabwe and Zambia, and has a high dependency on weather and climatic conditions due to its heavy reliance on a rain fed system of production (IAM, 2012; Third National Poverty Assessment, 2010).

The high significance of cotton in the Mozambican economy goes back to the colonial period when it was one of the most important agricultural export crops.

During this time, its production was dominated by large-scale agricultural producers specialized in production of commercial crops (such as tobacco, cashew and sugar-cane). These farmers operated in a concession system and supplied their production to the concessionaire companies.

After independence (1975), the cotton sector continued to play an important role in the Mozambican economy. The sector was heavily affected by the civil war as well as by the economic system and policies adopted by the Mozambican Government in the 80's which contributed to fluctuations in production and yields. Following the end of the civil war in 1992 and after the introduction of economic reforms in the early 90's, the sector showed signs of recovery, however it has so far not yet reached the historic production levels prior to independence (Benfica et al, 2005 and World Bank, 2010).

In the recent years, a new strategy of development has emerged which focuses on creating an environment conducive for attracting foreign direct investments (FDI) in mining and gas sectors. These sectors provide more than 80 per cent of Mozambique's total export earnings (compared to 1.23 percent of the cotton sector in 2010)². Despite the importance of the mining/gas sector in the Mozambican economy, the cotton sector continues to play an important role as a main source of income for 223,583 households (more than 1.3 million of inhabitants) in rural areas – where more than 70 per cent of population live.

PRODUCTION

As shown in Figure 1, cotton production was relatively volatile over the period of analysis, reaching its maximum of 131 000 tonnes in 2009/2010, which is however still below the maximum historic production of 144 061 tonnes achieved in the colonial period. Yields followed the same pattern of volatility and reached a maximum of 183 kg/ha between 2005/2006 – 2006/2007 (compared to 149 kg/ha in 2010/2011). Since the 2009/2010 harvest, production of cotton has seen a significant reduction³, in part attributed to unstable prices and demand conditions in the international market, as well as bad weather conditions (drought followed by heavy floods) which affected the production areas in the central and north regions of the country (IAM, 2010). The decrease in cotton production (in 2008/2009) was also attributed to the low producer prices in the previous years, which

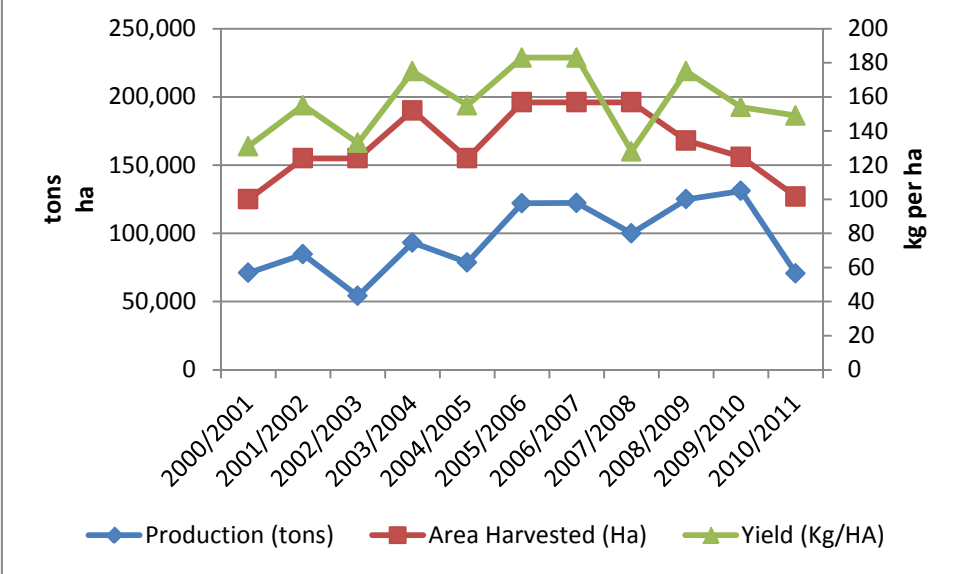
¹ Followed by tobacco, cashew and sugar-cane

² IAM (2012), INE and WDI (2012).

³ Farmers were forced to substitute the production of cotton with staple crops (such as maize, cassava and sorghum) because of low producer prices (crop substitution).

constituted a disincentive for farmers to engage in production of cotton – despite the improvement of the minimum price of the first quality cotton from 5.30 MT/kg to 8.10 MT/kg in 2009/2010 (IAM, 2010). In 2010/2011, cotton production covered 128,000 ha (compared to 212,000 ha in 2005/2006), constituting almost 2.3 percent of the entire cultivated area in Mozambique (5.6 million ha)⁴.

Figure 1: Seed-cotton production, area harvested and yield trends in Mozambique



Source: IAM and Indexmundi

As mentioned before, cotton is entirely dependent on household farming (Table 1); its production is based on intercrop and crop rotation systems of production which are dominated by staple crops (such as maize, cassava and sorghum). In 2011/2012, almost 223 538 households were engaged in cultivation of cotton (almost 2.2 percent of total farmers) - the average size of cultivated area by farmers is around 1.5 ha, with many farms operating on one hectare or less⁵. Crop portfolio diversification (intercrop production) is an effective on-farm strategy adopted by farmers for coping with production risks. Under this system, farmers mostly grow cotton together with other staple crops, using the inputs received from the concession company and from the government to grow cotton in the production of such staples. While this may aide in increasing the productivity of the staples and may have a positive impact on food security, on the other hand, this also contributes to reducing the productivity of cotton as they would use less quantity of inputs in the production of cotton. Further research on the impact of the crop portfolio diversification on the cotton yields would be helpful to better understand this situation.

Table 1: Cotton line production by sectors (households and SME⁶)

Production sector	2008/2009		2010/2011	
	Households	SME	Households	SME
Cabo Delgado	100%	--	100%	--
Nampula	99.62%	0.38%	99.31%	0.69%
Zambézia	100%	0%	100%	--
Sofala, Manica and Tete	100%	--	100%	--

Source: IAM

⁴ Source: TIA, 2008.

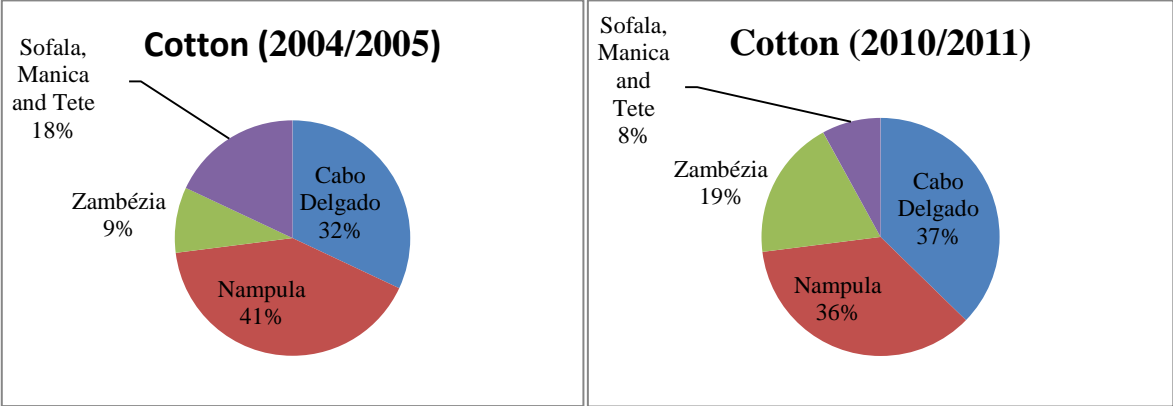
⁵ Source: Mozambican Cotton Institute (IAM - Instituto do Algodão de Moçambique).

⁶ SME – Small and medium enterprises.

Raw cotton production is mainly carried out in three provinces; Nampula, Cabo Delgado and Zambézia (Figure 2). During the period of analysis, cotton production increased by 10 points in the three main provinces. This increase is partly attributed to the increase of cultivated area and yields in Zambézia (TIA, 2008).

While the decrease of production in the provinces of Sofala, Manica and Tete can be partly attributed to the rising importance of the other sectors (such as mining sector in Tete), which could likely have influenced farmers to abandon agriculture and seek employment opportunities in the mining sector.

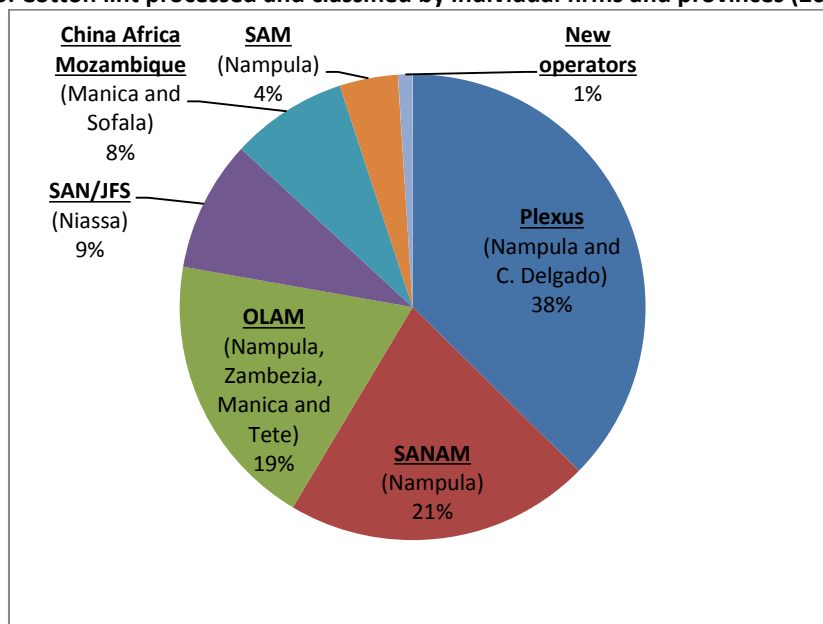
Figure 2: Distribution of raw cotton production in Mozambique by provinces (2007/2005 – 2010/2012)



Source: IAM

As far as ginning is concerned, three firms manage to process over 75 percent of total production (Figure 3). Plexus (located in the Cabo Delgado province) emerges as the biggest processing firm, accounting for 38 percent of total cotton lint processed and classified in 2010/2011, followed by SANAN (21 percent), OLAM (19 percent), SAN/JFS and African China Mozambique (8 percent). The relatively low number of processing companies operating in the cotton sector evidences the level of concentration of the market power in a restricted group of companies - one of the cited sources of unbalanced market power between farmers and processing companies (ginners) in the sector. Additionally, technologies and economies of scale are probably key determinants of the number of companies that are able to operate effectively on the domestic market.

Figure 3: Cotton lint processed and classified by individual firms and provinces (2010/2011)



Source IAM, 2012

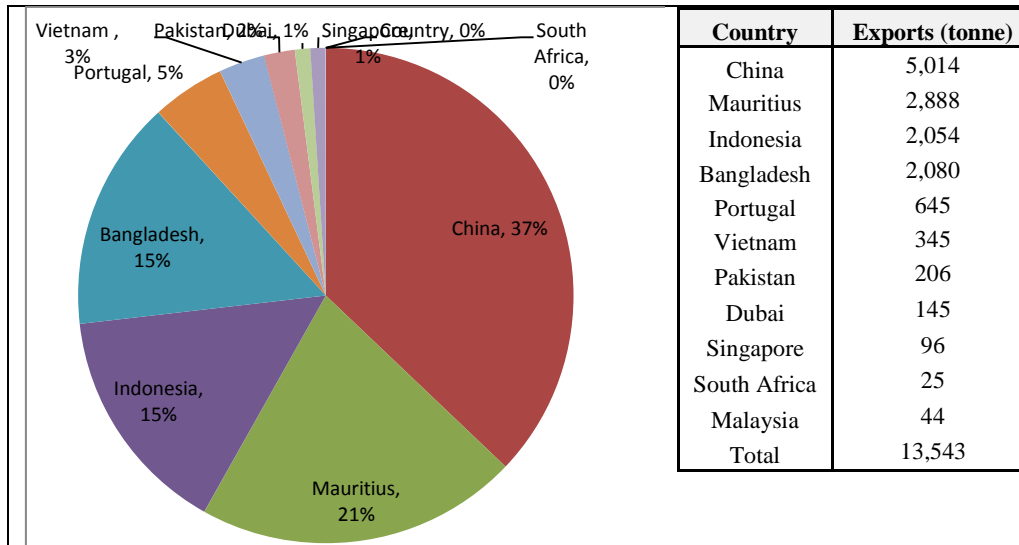
CONSUMPTION/UTILIZATION

About 10 percent of seed is retained by farmers after harvest to be used in the next season. The remaining 90 percent is sold to ginners at the minimum price fixed by the government authorities, the IAM (see below). After processing, almost 100 percent of the lint cotton is exported to the international market, mostly Asia. This is due to the inexistence of textile industry in Mozambique, which disappeared after the reforms of the agricultural sector in the 90's. In the past, the textile companies were State-owned, operating in a system of monopoly and taking advantage of the non-market orientation economic system prevailing at the time.

Regarding cotton seed, reports from the IAM indicate that significant parts of the seed obtained after processing is exported – however this cannot be verified due to lack of data. The capacity of the processing industry in Mozambique is poorly developed – and this could explain the export of the cotton seed to the international market.

Figure 4 below shows the major buyers of Mozambican lint cotton in 2010/2011. China emerges as the largest buyer, accounting for 37 per cent of total sales in 2010/2011, followed by Mauritius (21 percent), Indonesia (15 percent) and Bangladesh (15 percent). In contrast, during the colonial period, cotton produced in Mozambique was exported to Europe (notably Portugal), because the majority of textile industries were geographical located in Europe in this period.

Figure 4: Main trade partners of Mozambique for cotton lint in 2010/2011



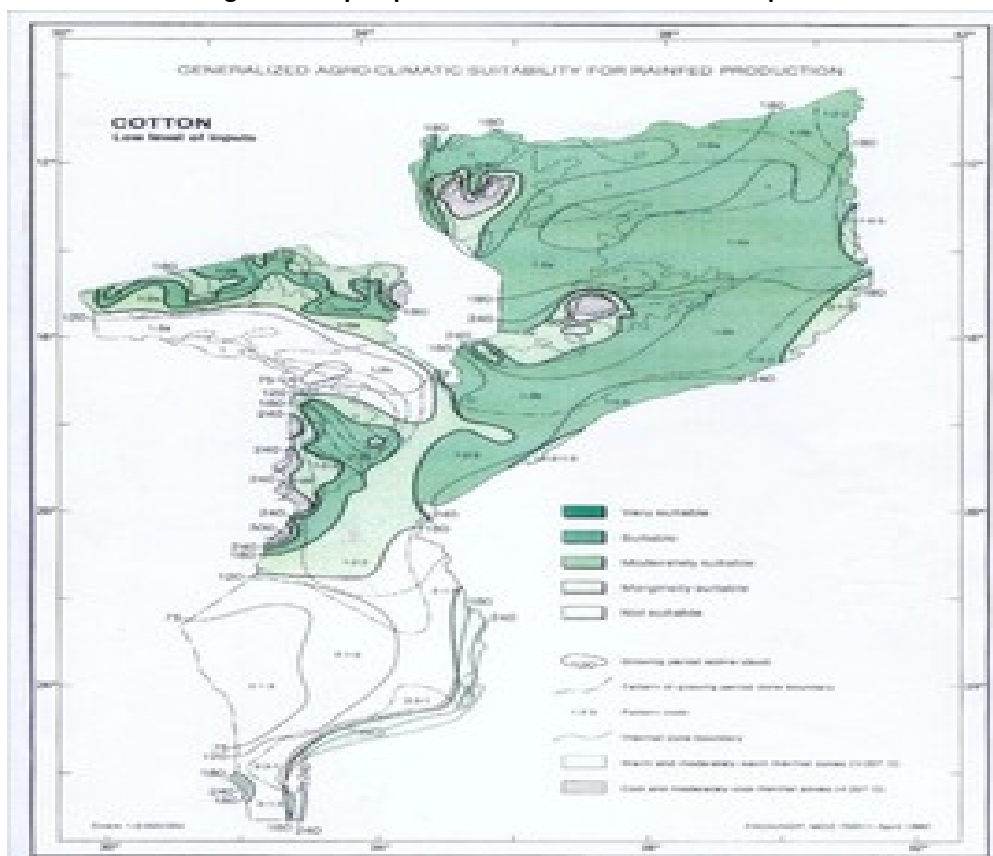
Source: IAM

MARKETING AND TRADE

During the colonial period, the Mozambican economy was structured mainly as a service economy for neighboring states, and integrated into a region dominated by South Africa. Under the colonial regime, companies were forbidden from spinning cotton as all lint cotton was exported to Portugal. Geographical and historical factors between the regions also contribute to the large differences in cotton production and trade in Mozambique. In terms of regional distribution of economic activities, the country was divided into two regions: the southern region was specialized in providing labor to the mining industry in South Africa, while central and northern regions were dedicated to agriculture. This economic structure still exists, but with some changes due to foreign direct investment in a number of large industrial projects (the so-called “mega-projects”) in the central and southern regions (notably Maputo and Tete).

The production map of cotton in Figure 5 below – the central and northern region are the major production areas (green areas in the map), while the south Mozambique has no significant cotton production.

Figure 5: Map of production of cotton in Mozambique

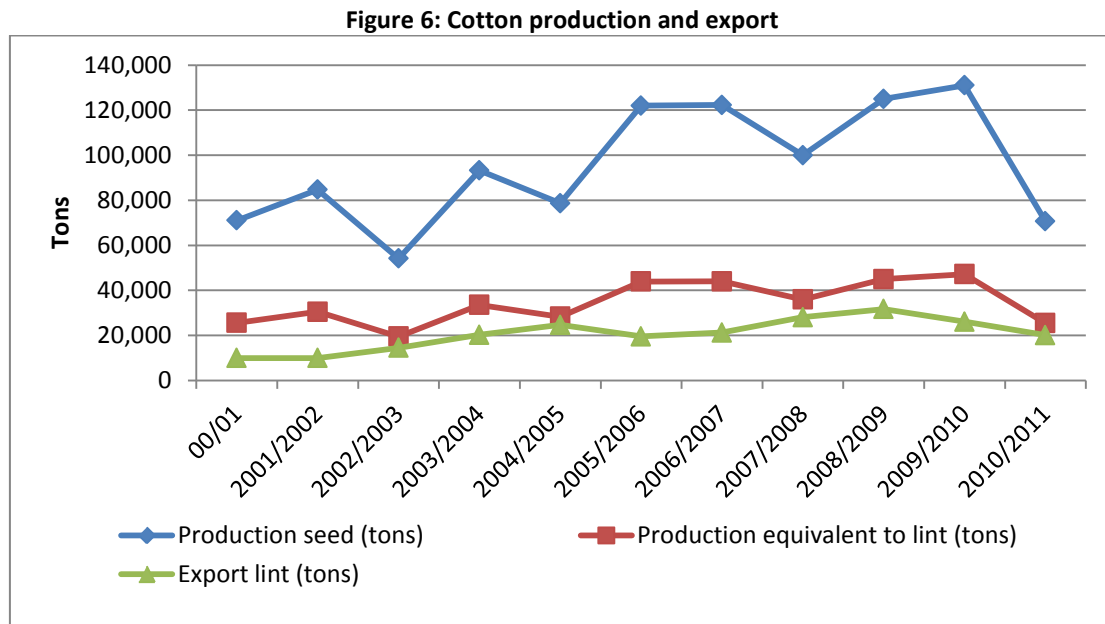


Source: IAM

Following the creation of the Cotton Institute of Mozambique (IAM) in 1991, marketing of seed cotton between smallholder farmers and processing companies is under the intermediation of the IAM. The IAM is also responsible for guaranteeing markets for all seed cotton produced by farmers. In cases where farmers have difficulties to sell their production, due to incapacity of processing companies to buy part/totally of the production from farmers for which they have contract arrangements, the IAM has the responsibility to buy these surplus. For example, in 2011 the IAM bought 42 tonnes of seed cotton in Inhambane province, due to the incapacity of the processing company (Algodao de Moçambique) to buy the production (IAM, 2012). Overall the best-established transaction for smallholders is selling cotton to the concession ginner at the end of the growing season. The second most frequent transaction is acquiring inputs, primarily free seeds offered by ginners (Bokusheva & Tombez, 2011). In order to get access to the trade network, smallholders are required to be registered as a “club or association” with the Mozambican Cotton Institute.

Figure 6 below shows the recent trends in cotton production and trade in Mozambique. As can be seen, the exports follow the same trend of production (with some delay related to production cycle), evidencing that the volatility of prices and demand conditions in the international market are directly transmitted to producers. Regarding the business strategy of ginners and traders, this is more related to maintaining/preserving their margins. This phenomenon is also visible combining Figures 6 and 8, the volatility of production and exports are positively correlated to the volatility of cotton outlook (index A).

In terms of export volume, Figure 6 shows that in 2009/2010, total cotton lint exports reached its maximum of 31 694 tonnes (compared to 10 000 tonnes in 2000/2001). This is partly attributed to the increase of international prices of cotton (Figure 8), which incentivized farmers to increase their production. Imports on the other hand were very low, almost close to zero, and hence were not included in the figure below. This is partly attributed to the disappearance of the Mozambican textile industry after the economic reforms in the 90's.



Source: IAM and FAOSTAT

Contrary to this export orientation, during the last decades of the XXth Century Mozambican textile industry was in a position to absorb the bulk of the cotton lint produced by local farmers, as well as importing cotton lint from neighboring countries (mostly in low season) to be used as input in the local industry. Wrapper/clothing (*capulana* in Portuguese) is one of the typical traditional clothing in Mozambique. In the past it was produced by the Mozambican textile industry and supplied in the domestic market as well as in the neighboring countries (notably Malawi). Presently (after transition to a market oriented economy)⁷, Mozambique is now a net importer of “*capulana*” (mainly from India), because the domestic textile industry was not able to survive the high competition from the Asian countries – putting Mozambique in a situation of net exporter of cotton lint and net importer of textiles. By 2005, all Mozambican textile mills had closed down (source GDS, 2005).

For the purpose of this study we will focus our analysis on price incentives and disincentives in the northern Mozambique (Nampula and Niassa). Nampula is where the majority of producers and processing industries are located. While Niassa is among the key production areas and is where the JFS group – the company which provided data on access cost is located. Additionally, the main port (Nacala port) where the cotton lint and seed is exported to the international market is located in Nampula province.

⁷ The majority of textile industries were State propriety, after the liberalization of the Mozambican economy (in later 80's), the industry was forced to operate in open market bases.

DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

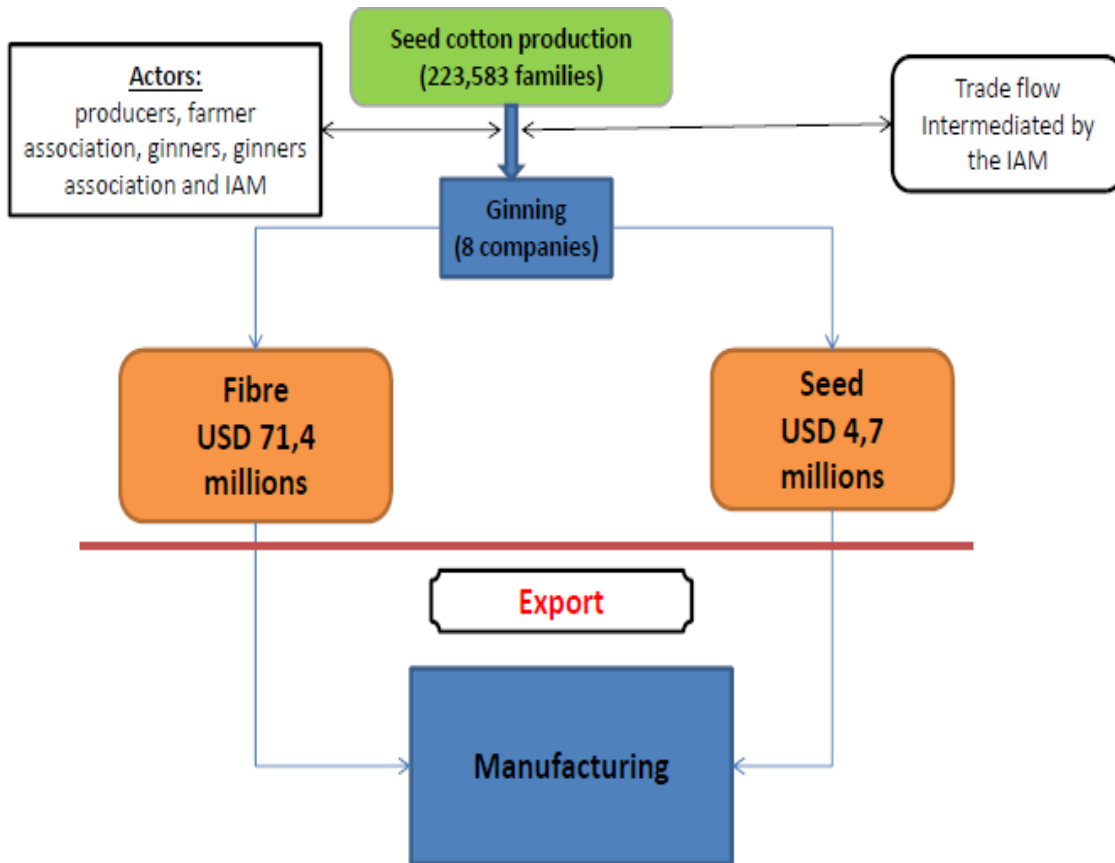
The cotton sector is not fully liberalized. Given the importance of the cotton sector in the Mozambican economy, the government created the Cotton Institute of Mozambique (IAM) in 1991, whose responsibility is to coordinate the production of seed cotton, protect the interest of all stakeholders operating in the cotton sector and to ensure a better function of the market. Years later (1998), the Mozambique Ginners Association (AAM)⁸ was created, to represent concessionaires, ginning companies, and autonomous cotton producers. The AAM's mandate is to promote coordination between members, develop dialogue between government and civil society, and to undertake initiatives to help develop the cotton sector (GDS, 2005).

After harvesting, farmers sell their production directly to ginning companies under the minimum price fixed by the government (IAM) and in agreement with the farmers and ginner association. After harvesting, the cotton is weighed and placed in silos in the producing villages, where it is transported by truck to the factories. Ginners have the responsibility to transport the cotton from farm gate to the factories (at their expense) - as part of the contractual arrangements between farmers – IAM – ginners. After processing and classifying the cotton (lint and seed), it is transported by road to the train station (Cuamba), where it is transported on the same day by train to Nacala Port, where it is exported. The export is processed directly by the ginners.

As mentioned before, the main processing industries of cotton are located in the central and northern regions (notably Nampula). There is no international market for raw cotton; hence farmers need to decompose it into lint and seed - which are traded internationally. Cotton has two or more final products, which comprise two or more important stages in the production, processing and marketing chain. Raw cotton is processed into lint (for exports) and seed which is processed and transformed into oil and soap mainly supplied in the domestic market. Presently, seed processing industry is very limited in Mozambique, due to the high competition from South Africa and Asian countries.

⁸ Associação de Algodoeiros de Moçambique.

Figure 7: Simplified market chain for cotton in Mozambique



Source: Authors

POLICY DECISIONS AND MEASURES

International and Regional Trade Policy Measures

In the last two decades, trade reforms such as the elimination of *exchange controls* and *quantitative restriction on imports and exports* have been implemented by the Mozambican Government in compliance with the *Washington consensus* which was based on market liberalization, fiscal discipline and privatization. Under these reforms, the prices of agricultural commodities and services were liberalized. However there are exceptions – the government fixes the minimum prices for seed cotton (at farm gate), sugar and petroleum products (source MozSAKSS, 2012).

Table 2: Minimum producer price of cotton seed (USD/tonnes)

Year	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Price	184	177	174	227	168	208	435

Source: IAM

At the international level, Mozambique is a member of the World Trade Organization (WTO) and the African Caribbean and Pacific Group of States (ACP), with preferential trade agreements with member countries. The country is also classified as a Least Developed Countries, a group of countries that are awarded preferential trade and access to some international markets.

At the regional level, Mozambique is a member of the Southern African Development Community (SADC) which commits its members to the removal of trade barriers. This should also include the elimination of the application of VAT (value-added tax) on trade among the SADC countries.

Price policies, marketing, regulation and licensing activities

Despite the liberalization of most products, cotton production in Mozambique is based on the concession scheme. The Mozambican government granted cotton ginning companies closed concessions as exclusive buyers for cotton seed in a specific geographical area (MozSAKSS, 2012). These companies are mostly located in the central and northern Mozambique (producing/surplus areas) and are presented in Figure 3 above.

The Ministry of Agriculture, through the IAM, has the responsibility of fixing the minimum purchase price for seed cotton (for both first and second quality). Since 2007, a new system of prices was adopted, consisting of fixation of the minimum prices in two phases: i) fixation of the indicative price before sowing of cotton starts (October/November); and ii) fixation of the official minimum price a few months before commercialization of the seed cotton starts (April/May). Tschirley et al. (2008) argues that, when producer prices are fixed before planting, ginning companies take on great risk. In Mozambique, the extent of this risk was fully revealed in the 2010/2011 season, when the IAM intervened to buy seed cotton in Inhambane, due to the incapacity of the ginning company (*Algodão de Moçambique*) to buy the production because of financial problems.

All ginning companies should be registered in the IAM, in order to have the certificate to work in the sector. The registration is subject to a tariff (*Taxa de Inscrição*), and the amount of the tariff depends on the quantity of cotton processed by the company, which ranges from 50 000 MT to 6 million (MT). In other words, the revenue from licensing/registration serves is to finance the IAM activities.

Among Eastern and Southern African countries, Mozambique operates the only local monopsony system in the region, and is the only country that maintains a fully administered, pan-seasonal and pan-territorial price. The government's role in price setting is strong in Mozambique, in part because of the very weak state of farmer organizations in the country (Tschirley et al. 2008: 53).

Export tax

The ginning companies are required to have their lint weighed and quality certified by the IAM. For these services, approximately 2.5 percent of the FOB value of exports is charged and collected by IAM (MozSAKSS, 2012). Cotton lint is classified under the HS⁹ category.

The net taxation of cotton as a major export commodity in many developing countries illustrates one of the dilemmas faced by these countries. The dilemma is precisely between promoting the production of an agricultural export commodity and the collection of revenues from export taxes which is important to finance the development of the sector, thereby undermining production incentives (World Bank, 2010).

⁹ Harmonized System Codes.

Import tariff

The local cotton industry is protected with a tariff fixed at 2.5 and 7.5 percent for cotton lint and for cotton thread, respectively. Generally in countries where cotton industry exist (e.g. textile), there is high level of protection of the industry - the burden of this protection is borne by consumers who end up subsidizing cotton producers and ginners. Generally, the protection of textiles also reduces cotton exports by making domestic markets more lucrative than exports. This is not the case in Mozambique, largely due to the inexistence of textile industries, which in theory disappeared after the liberalization of the Mozambican economy in the 90's.

Import of cotton fabric attracts a maximum 20 percent import tariff. In addition a VAT at 17 percent is applied on imports of cotton lint, thread and fabric.

Agriculture inputs subsidies and support services

Cotton is produced under the concession scheme in Mozambique and is subsidized by the government through the IAM. The ginners distribute free inputs (seed and fertilizer) during each cropping season as well as technical support to farmers during the two critical periods in the cotton growing cycle – before and soon after the sowing period and in the yield formation period (Bokusheva & Tombez, 2011). This is part of the contractual arrangements between farmers (223,583 families) – IAM – ginners. This also comprises the transportation of seed cotton from farm gate to the factory. This support serves to incentivize smallholder farmers engaging in production of cotton and reduce the risk of substitution of production. It also explains the dominance of household farming in the production of cotton. For the concession companies, it is more cost effective to provide support to the farmers and guarantee good quality of production, and concentrate their efforts in processing - which requires more complex curing process.

According to the World Bank (2010), in practice, the subsidies (seed and fertilizer) apparently provided for free by ginners to farmers are not completely free. In reality the actual costs are deducted from the price paid to farmers at the end of the season - partly to recover the cost of supplying fertilizer, seeds, sprays and chemicals to all cotton farmers. Also the Ministry of Agriculture through the IAM distributes seeds and fertilizer, as well as provides extension and other support services to cotton producers. The difficulty to access data on a specific amount of subsidies received by farmers hampers the identification of the real impact of agricultural policy on smallholder farmers and to determine the exact level of budgetary transfers to cotton farmers that were realized. This problem can be solved by public expenditure analysis, which is expected to take place under MAFAP in the future.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

To calculate the indicators to estimate incentives or disincentives to production (NRP)¹⁰ as well as the Market Development Gaps (MDGs), several types of data are required. These data were collected and are presented and explained hereafter.

As there is no international market for raw cotton, there is a need to decompose it into lint and seed, which are traded internationally. To compare farm gate prices (seed cotton) with international prices of cotton (lint and seed), the ginning outturn ratio (GOT) must be taken into account. The ginning outturn ratio is the conversion ratio from raw cotton to lint and seed. In Mozambique, the average ginning outturn ratio reported by IAM is 0.37 for lint¹¹ and 0.63 for seed. It is important to note that the prices of cotton in the different segments of value chain tend to differ significantly, i.e. at farm gate, ex-factory and border level. To take into account these variations, the benchmark price of cotton was calculated by weighting the two components of unginning raw cotton (lint and seed) by their relative contribution, namely, 0.37 (lint) and 0.63 (seed), to cotton (Tsakok, 1990).

TRADE STATUS OF THE PRODUCTS

Cotton is an export commodity in Mozambique for the whole period under analysis. Therefore, in our analysis, the trade status of the country is 'exporter' for all years.

BENCHMARK PRICES

Observed

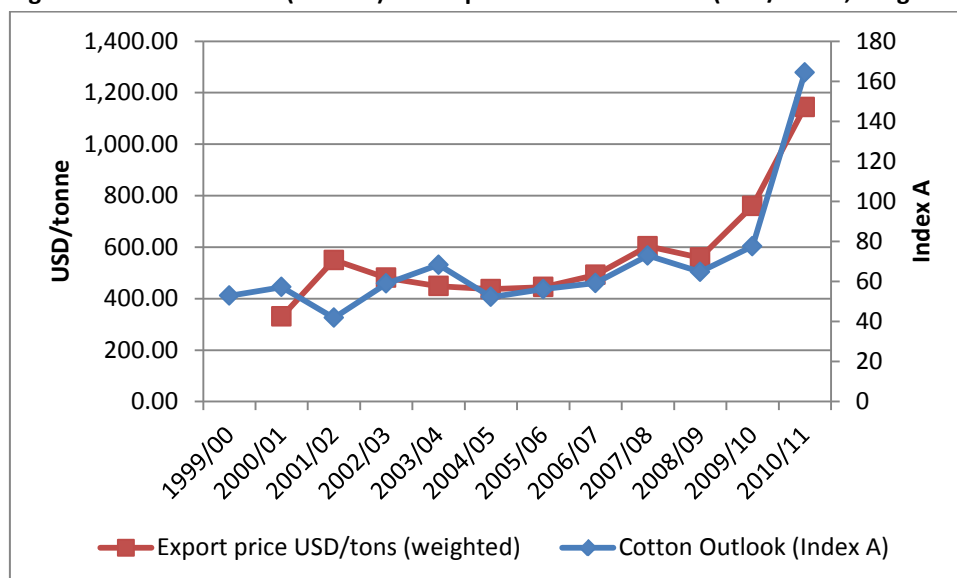
Calculating a reference parity price to determine whether Mozambique cotton farmers receive market incentives or disincentives requires establishing a benchmark border price. Since cotton is an export commodity in Mozambique, a benchmark price was calculated as the weighted average of the two components of seed cotton (lint and seed) by their relative contribution as mentioned above. This means that, a tonne of seed cotton processed produces 0.37 tons of lint and 0.63 tons of seed.

Figure 8 shows that the benchmark price was relatively volatile over the period under analysis, reaching its maximum of 1,144 USD/tons in 2010/11 compared to 330 USD/tons in 2000/01; in part attributed to unstable prices and demand conditions in the international market.

¹⁰ NRP - Nominal Rate of Protection.

¹¹ Vary low compared to other countries (ex. 0.42 in Mali)

Figure 8: Cotton outlook (index A) and export unit value trends (USD/tonne, weighted)



Source: IAM, FAOSTAT and own calculation

The standard international price is determined through the “*Cotlook index*”. Cotton outlook index is based on the interplay between demand and supply in the international market. The index is subdivided into two indexes: cotlook A index and cotlook B index. *Cotlook A index* is compiled from the lowest five prices offered to millers, on the assumption that these likely constitute the product most frequently traded on the day in question. The method of averaging the cheapest quotations has been proved to be the most reliable for calculating the Index. The base quality of the A Index is *MIDDLING 1-3/32*". The cotlook A index is calculated based on CIF prices from the Far East quotation. In Mozambique, the export price of cotton is calculated taking into account the cotton outlook A index. As it can be seen in Figure 8, the benchmark price used in the analysis follows the evolution of the Cotlook index.

Adjusted

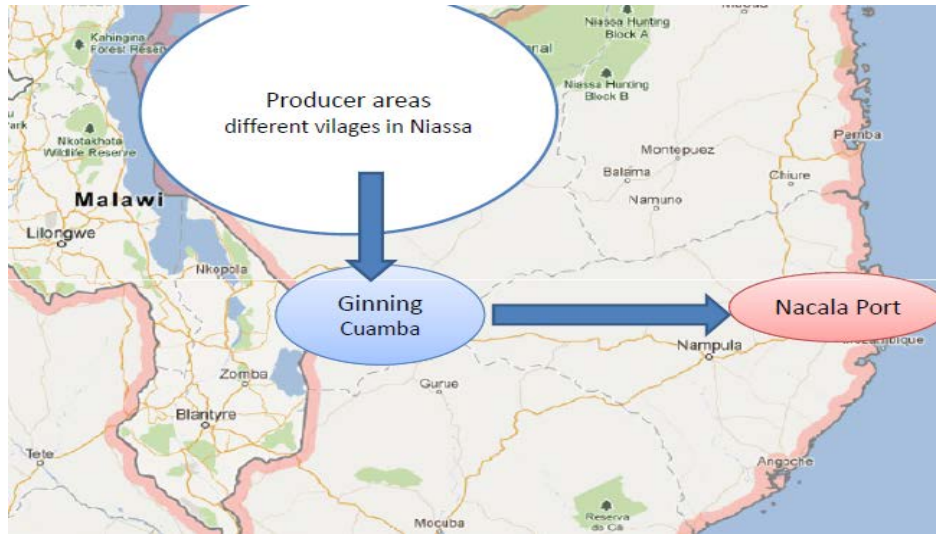
No adjustments to the benchmark price have been made.

DOMESTIC PRICES

Since cotton (lint and seed) is exported directly by the ginners, the wholesale market where the domestic cotton competes with the international production will be at the border (Nacala Port). The industrial structure of cotton in Mozambique means that ginners are direct exporters and no price at the gate of the ginner is reported. Therefore we only have one domestic price (farm gate price). We have constructed an artificial ginner gate price by deducting the observed access costs from border to factory which leads to a zero nominal rate of protection at wholesale level.

The data source for the farm gate price is the IAM. An overview of the analyzed product flow is given in Figure 9 below.

Figure 9: Overview of analyzed cotton flows from Cuamba to Nacala port



Source: Authors

As mentioned before, Mozambique has a national minimum pricing system for cotton that applies to all farmers and ginners who are awarded geographical concessions. Prices were usually negotiated and agreed upon with farmers almost 2 months before cotton procurement. Since 2007, a new system of prices was adopted, consisting of fixation of the minimum prices in two phases: i) fixation of the indicative price before sowing of cotton starts (October/November); and ii) fixation of the official minimum price a few months before commercialization of the seed cotton starts (April/May). The intention of the amendment was to minimize the risk of discrepancy between the minimum price and the dynamics of the international prices and exchange rate; as well as to assist farmers in deciding on their cotton producing plans and also as an incentive to minimize crop substitution.

Calculating (formula) the minimum price for seed cotton

Parity criteria of sharing the export earnings of cotton between ginners and farmers are used in the calculation of the minimum price (IAM, 2012). The income resulting from the trade of cotton (lint and seed) are equitably distributed to ginners and farmers. Below is the formula of calculation of the minimum price of cotton made available by the IAM.

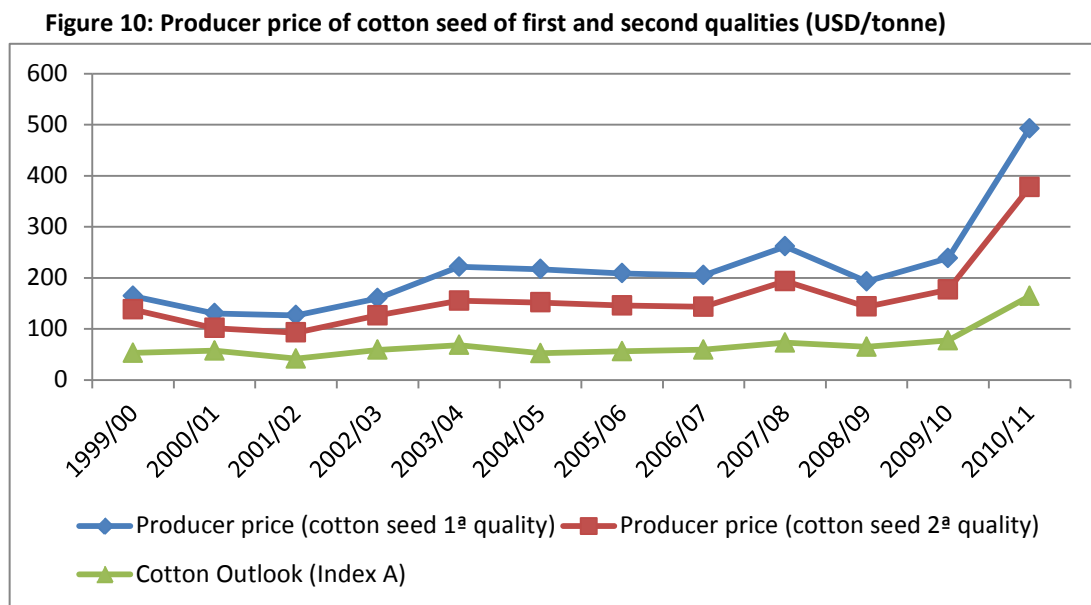
$$1. \quad PM = \{[IA - ((FS + DQ) - TT) \times FC \times TC] \times TD + VS\} \times PP$$

Where **PM** is the minimum price of seed cotton; **IA** is the cotton outlook A index; **FS** is the estimated cost of freight and insurance between Mozambique and the port of destination; **DQ** is the quality differential of cotton lint (based on the quality of cotton, first or second quality); **TT** is the transaction fees; **FC** is the conversion factor (Libra-weight to kilogram); **TC** is the exchange rate (MT/USD); **TD** is the ginning rate (calculated based on the income of processing seed cotton); **VS** is the value of seed after deducting 12 percent of the total seed resulting from ginning and given to farmers for sowing; and **PP** is the share of producer on the income from the trade of cotton (varies from 50 to 55 percent).

In the negotiation of the minimum price of cotton, which is under the intermediation of the IAM, all these variables are taken into consideration. The modality of equitable distribution of cotton revenues between farmers and ginners constitutes an incentive for cotton producers.

On the other hand, it raise challenges related to the effectiveness of its implementation, taking into account the imperfections of the market, i.e. unbalanced market power between ginners and farmers, asymmetrical distribution of information, etc.

Figure 10 below shows that the producer price of cotton (first and second quality) follow the same trend of volatility of the cotton A index, and there is a high correlation between the cotton A Index and the local farm gate price (formula 1), the correlation coefficient is about 0.93 (Bokusheva & Tombez, 2011). The actual price-setting mechanism transfers the variation from the international markets to the local market, and the mechanism of transmission is through the cotton outlook A index (*IA*) as shown in the formula 1 above.



Source: IAM

As shown in Figure 10, the producer prices (seed first and second quality) ranges from 130 to 492 (USD/tonne) and from 101 to 377 (USD/tonne), respectively. Overall the producer price of seed cotton first grade is 25 percent higher than the prices of seed cotton second grade. In the calculation of indicators, we only considered the producer price of seed cotton first quality, because it represents the main component of exports (IAM, 2012).

The producer price in Mozambique (seed cotton) is one of the lowest among African countries. Figure 11 below compares farm gate prices between Mozambique and 6 countries in West Africa. From 2000/2001 to 2009/2010, the producer price in Mozambican was very low compared to other countries in Figure 11 below. This is partly attributed to the low ginning outrun ratio of the Mozambican ginning industry compared to other countries, which is largely due to dirty cotton caused by poor picking techniques, use of mixed seed varieties, and cotton mixing when bulking which results in inconsistent fiber quality (World Bank, 2010), reducing its value in the international market.

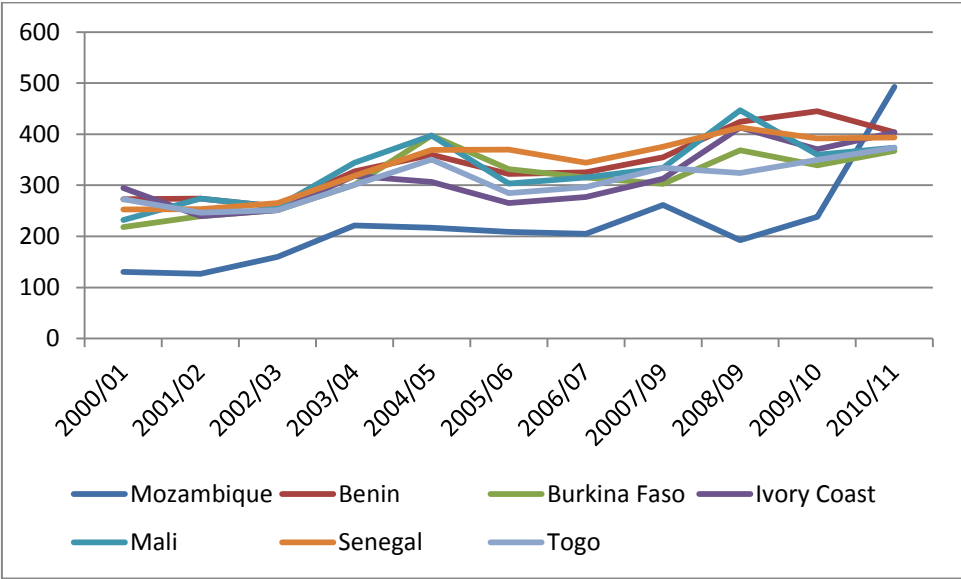
Figure 11 also shows that from 2009/2010, the producer prices in Mozambique were above the prices in all the countries under analysis. During the same period, the prices offered in other countries increased slightly, except in the case of Benin where they reduced. The increase of the

farm gate price in Mozambique was partly driven by the increase in the outlook index A (Figure 10), due to the high correlation between the index and the producer prices in Mozambique.

This shows that market signals and price transmission between the situation of the international market are better in Mozambique than in many other producing countries of Africa. Additionally, the appreciation of the nominal exchange rate (i.e., appreciation of Metical against dollar) from 2009 contributed to the increase of domestic prices of cotton in Mozambique. As the price paid to cotton producers is in local currency and the cotton lint is sold in the international market in US dollar, the appreciation of the exchange rate increases the domestic prices in local currency. The change of the exchange rate is transmitted to producer prices through TC (formula 1).

As the minimum price of seed cotton is fixed few months before the commercialization campaign starts, the appreciation of the exchange rate benefits more farmers than ginner (depreciation of exchange rate benefits ginner); while cotton is exported directly by ginner, they have to assume the losses resulting from the unfavourable movements of the exchange rate in order to respect the minimum price fixed before (Ginner Association). The Cotton Institute also argues that, for many years the minimum price was fixed without taking into consideration the rate of growth of the international prices. In 2010/2011, the IAM proposed high minimum price taking into consideration the increase of the international price in the previous years, this also explains the strong increase of the producer price as shown in the figure below.

Figure 11: Price differences (cottonseed - first quality) between Mozambique and West African countries (USD/tonne)



Source: IAM, and MAFAP technical note on cotton in Mali

EXCHANGE RATES

Observed

The exchange rate between the Mozambican Metical and the United States 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.

Table 3: Nominal exchange rate MT/USD

Year	2005	2006	2007	2008	2009	2010
Nominal Exchange Rate	23.06	25.40	25.84	24.30	27.52	33.96

Source: IMF

As shown in Table 5, from 2006 to 2008 the nominal exchange rate was stable, with slight reduction in 2008. The stability of Metical against the dollar (from 2006 to 2008) was due to the good performance of the Mozambican economy as well as the results of monetary reforms introduced by the Central Bank of Mozambique during this period. From 2008, the nominal exchange rate increased slightly reaching its maximum of 33.96 MT/USD in 2010 compared to 23.06 MT/USD in 2005. This was driven largely by the discovery of new vast reserves of coal and natural gas in 2008/2009, which prompted several billion dollar investments by the world's largest mining and oil companies, contributing to real exchange rate appreciation, with negative impact on the real economy (notably export sector), including cotton sub-sector. Official projection indicates that the nominal exchange rate is expected to continue appreciating as FDI (as well as foreign aid) rise.

Adjusted

As there is neither explicit exchange rate policy nor foreign currency controls there is no justification to consider an adjusted exchange rate.

ACCESS COSTS

Access costs were provided by the "Joao Ferreira dos Santos Grup (JFS)" for 2010. JFS is one of the biggest cotton companies operating in Niassa province, and accounts for 9 percent of the total export earnings of lint cotton in Mozambique in 2010/2011. The access costs are related to two segments of the cotton value chain:

- from producers (different villages in Niassa province) to processing factory (Cuamba/Niassa);
- from Cuamba to Nacala Port - where the cotton is exported (see Figure 9).

They cover all costs that are involved with taking cotton in both segments of the value chain, and are referred to transport cost, ginning cost, margins, custom brokers and transaction fee.

It is important to mention that, Mozambique operates a local *monopsony* system, where ginners have the right of exclusivity of buying seed cotton in their area of concession. This protects them from most competitive pressures and thus reduces incentives for cost containment. According to the World Bank (2010), a similar system exists in Uganda (hybrid system with purchase quotas).

Observed

The observed access cost in both segments of the cotton value chain (notably transport, ginning and transaction fees) was calculated using the average price/ton provided by the JFS group for 2010. We estimated the costs for the period 2005-2010 that we analyze by adjusting the value of 2010 with the consumer price index, as shown in Table 4 below.

Farm gate to ginning factory:

The distance between production villages and the ginning factory is approximately 200 km. All producing villages and the factory are located in Niassa province. The transport is provided by the ginning companies, as a result of the contractual arrangements between farmers association – IAM – ginners. The total observed access cost from the farm gate to ginning stood at 1,689 MT/tonnes in 2010, and estimated values for 2005/2009 were calculated using the consumer price index as shown in Table 4 below. The costs in this segment of the cotton value chain are relatively low (compared to the costs ginning - port). This is due to the fact that the costs (notably transport cost) from farm gate to the ginning factory are borne by ginning companies.

Ginning/Cuamba to border/Nacala port:

The cotton lint is mainly transported by train, the distance between Cuamba (ginning factory) to Nacala Port is 549 km and the infrastructure is relatively good. The access cost in this segment of the cotton value chain are relatively high compared to the cost from farm gate to ginning, it ranges from 4,059 MT/ton in 2005 to 11,308 MT/ton in 2010, as shown in Table 4 below. Ginning cost and profit margins are the main component of access cost in all segments of the cotton value chain, accounting for almost 60 percent of total access cost (Table 4). The other components of access cost are transport cost and customs brokers as shown in the Table 4 below.

As in the first segment of the cotton value chain (farm gate – ginning), the transport cost was provided by the JFS group and is referred to 2010. The total access costs are presented in Table 4 below.

Table 4: Observed access cost from farm gate – ginning – Nacala port (MT/tonne)

Access cost (MT/tonne)	2005	2006	2007	2008	2009	2010
Farm gate - ginning/Cuamba (seed cotton)						
Estimated average distance (farmers - factory)	Operating within the distance of 200 km					
Transport cost	462	523	565	624	644	726
Transaction fee (2.5% of export price)	256	312	390	340	523	972
Total	718	835	955	963	1,167	1,698
Ginning/Cuamba - Nacala Port (cotton lint/seed equivalent)						
Distance (Cuamba - Nacala port)	549 km					
Transport (factory - train station by road)	100	114	123	136	140	158
Transport (train station - Nacala port by train)	682	773	836	922	952	1,073
Ginning cost in cotton grain equivalent MT/ton	1,738	2,227	2,517	2,474	2,973	4,247
Margins (10 % of export price)	1,026	1,249	1,559	1,358	2,091	3,886
Customs brokers (0.5% of export price)	513	625	779	679	1,046	1,943
Total	4,059	4,988	5,814	5,569	7,203	11,308

Source: IAM, JFS and own calculations

Adjusted

Overall, we have not encountered strong evidence of excessive costs that justify substantial/additional adjustments to the observed market access costs in the both segments of the cotton value chain (farm gate – ginning – port). In the particular case of Cuamba - Nacala port which is the longest segment and where the cotton is mainly transported by train, we know that ginners ship cotton lint directly (in the same day) from Cuamba to Nacala port without additional costs (such as storage). As a result, the difference between the observed and adjusted access cost is small, as shown in the Annex II.

EXTERNALITIES

No externalities have been taken into account in the analysis.

BUDGET AND OTHER TRANSFERS

Although we are aware of the existence of some specific budget transfer to producers of cotton as a result of subsidies on agricultural inputs to cotton farmers, no specific data on the expenditures targeted towards cotton production are currently available. As consequence we will only calculate NRPs and not NRAs at this stage.

QUALITY AND QUANTITY ADJUSTMENTS

To compare farm gate prices (seed cotton) with international prices of cotton (lint and seed), the ginning outturn ratio (GOT) must be taken into account. In Mozambique, the average ginning outturn ratio reported by IAM is 37 percent. A quantity conversion factor was not taken into account in the calculation of indicators due to the fact that the benchmark price was calculated by weighting the two components of unginned raw cotton (lint and seed) by their relative contribution, according to what we mentioned before.

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 cotton in Mozambique.

Table A1: Sources of data used in the calculations of indicators

Concept	Description	
	Observed	Adjusted
Benchmark price	<i>FOB price calculated as unit value from export data reported in FAOSAT (see Figure 10)</i>	N.A.
Domestic price at point of competition	<i>Constructed by deducting from price difference between the benchmark price in local currency and observed access costs from Nacala port to Cuamba (location of ginning).</i>	N.A.
Domestic price at farm gate	<i>Annual average of producer price in the main producing area (Nampula and Niassa) for first quality of seed cotton as reported by Mozambican Cotton Institute (see Figure 10)</i>	N.A.
Exchange rate	<i>Annual average of exchange rate as reported by IMF (see Table 3)</i>	N.A.
Access cost to point of competition	<i>Ginning cost; customs brokers; transport; and 10% margin profit (see Table 4)</i>	<i>Ginning cost; transport; and 10% margin profit (see Table 4)</i>
Access costs to farm gate	<i>2.5 percent transaction fee and transport cost from farm gate to ginner (see Table 4)</i>	N.A.

Source: authors

The data used for this analysis is summarized below.

Table A2: Data and values used in the calculations of indicators

		Year	2005	2006	2007	2008	2009	2010
DATA	Unit	trade status	x	x	x	x	x	x
Benchmark Price		Symbol						
Observed	USD/TONNE	Pb(int\$)	444.72	491.76	603.25	558.86	760.04	1,144.39
Adjusted	USD/TONNE	Pba						
Exchange Rate								
Observed	MT/USD	ERo	23.06	25.40	25.84	24.30	27.52	33.96
Adjusted	MT/USD	ERa						
Access costs border - point of competition								
Observed	MT/TONNE	ACowh	4,058.71	4,987.53	5,814.23	5,569.16	7,202.76	11,307.61
Adjusted	MT/TONNE	ACawh	3,545.94	4,362.98	5,034.81	4,890.12	6,157.01	9,364.43
Domestic price at point of competition	MT/TONNE	Pdwh	6,196.85	7,503.50	9,774.07	8,011.60	13,712.19	27,556.02
Access costs point of competition - farm gate								
Observed	MT/TONNE	ACofg	718.08	835.09	955.20	963.41	1,167.05	1,697.59
Adjusted	MT/TONNE	ACafg						
Farm gate price	MT/TONNE	Pdfg	4,811.79	5,209.84	6,752.34	4,680.28	6,563.53	16,719.02
Externalities associated with production	MT/TONNE	E						
Budget and other product related transfers	MT/TONNE	BOT						
Quantity conversion factor (border - point of competition)	Fraction	QTwh						
Quality conversion factor (border - point of competition)	Fraction	QLwh						
Quantity conversion factor (point of competition - farm gate)	Fraction	QTfg						
Quality conversion factor (point of competition - farm gate)	Fraction	QLfg						

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 NRPo generate the NRPa 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 and the results are presented in Tables 5 and 6 below.

Table 5: MAFAP price gaps for cotton in Mozambique (MT per tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
Observed price gap at farm gate	-667	-1,459	-2,067	-2,368	-5,982	-9,139
Adjusted price gap at farm gate	-1,180	-2,083	-2,846	-3,047	-7,027	-11,083

Source: Own calculations using data as described above.

Table 6: MAFAP nominal rates of protection (NRP) for cotton in Mozambique (%)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
Observed NRP at farm gate	-12.17%	-21.87%	-23.43%	-33.60%	-47.68%	-35.34%
Adjusted NRP at farm gate	-19.69%	-28.56%	-29.65%	-39.43%	-51.71%	-39.86%

Source: Own calculations using data as described above.

Table 7: MAFAP Market Development Gaps for cotton in Mozambique (MT per tonne)

	2005	2006	2007	2008	2009	2010
Trade status for the year	x	x	x	x	x	x
Access costs gap to wholesale (ACGwh)	-513	-625	-779	-679	-1,046	-1,943

Source: Own calculations using data as described above.

4. INTERPRETATION OF THE INDICATORS

Figures 12 and 13 below shows price gaps and nominal rate of protection for cotton producers in northern Mozambique. The price gaps provide an absolute measure of the deviation of domestic price from the comparable export price, while the nominal rate of protection is the price gap in relative terms. The market development gap measures the deviation between the observed and adjusted access costs from farm gate to wholesale, which is important to identify potential inefficiencies along the value chain. In this analysis, only the farm gate indicators were considered, because there is no wholesale market in the segment of the cotton value chain in Mozambique, and the market flow is between farm gate and border – where the domestic cotton competes with the international cotton.

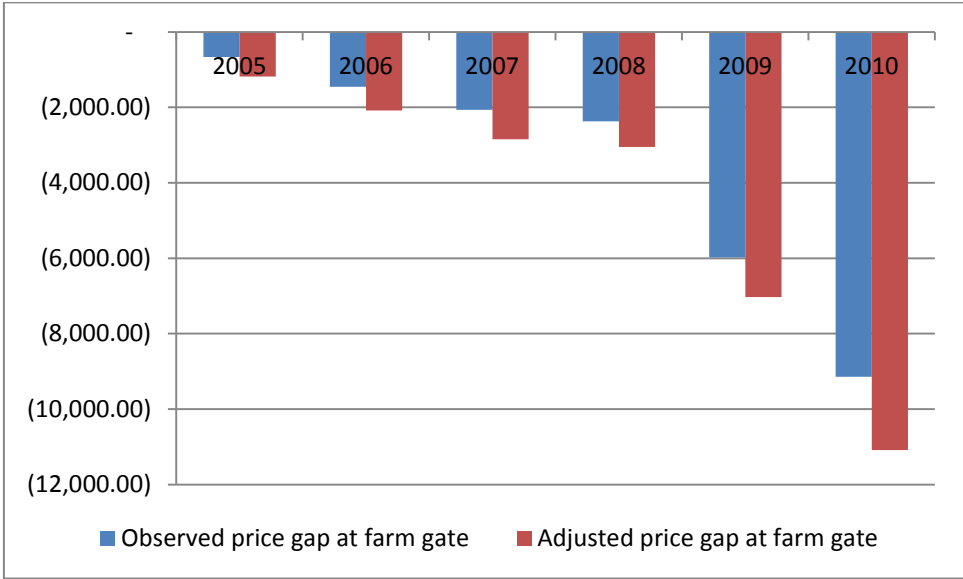
The observed and adjusted price gaps at farm gate are negative and indicate a strong deviation of producer price from the comparable export price in all years under analysis. The price gaps (observed) range from -667 MT/tons in 2005 to -9,139 MT/tons in 2010. The negative and strong deviation of the farm gate price from the comparable export price in part could represent the effect of 17 percent VAT on transport cost from the farm gate to factory and 2.5 percent export tax charged by the IAM to finance its activities which is likely to be transmitted to producers. Additionally, the inputs apparently distributed for free by the concessionary companies to farmers which in reality the actual costs are deducted from the price paid to farmers, this could partly have contributed to pulling down the farm gate price and as a consequence, increasing the deviation of farm gate price from the comparable export price. Also, in the period 2005-2009, producer price of cotton in Mozambique was relatively low (compared to other countries, see Figure 11) and remained stagnant during this period whereas the export price of cotton (notably lint) increased somewhat in the same period, this partly explains the negative and strong deviation of producer prices from the comparable export price of cotton (lint and seed).

In 2010, the farm gate price increased significantly above the reference price or parity price (Figure 11) - this contributed to reducing the disincentive at farm level in the same year (Figure 13), but was not sufficient enough to increase the NRP to a positive level. The strong increase of the producer price was influenced by the favorable prices in the international market which was translated into high producer prices (Figure 10). Additionally, the appreciation of Metical in 2009/2010 (Table 3) contributed to increase the price paid to farmers, as they are paid in local currency and the cotton (lint and seed) is sold in the international market in US dollars. According to the IAM and Ginner Association, the appreciation of the exchange rate was the main reaction of the strong increase of the producer price in 2010. Also in 2010, production of seed cotton in Mozambique declined (Figure 1), despite the strong increase of the producer prices in the same year. According to the IAM report (2012), the decrease of production in 2010 was influenced by the low prices in previous years (Figure 10) - farmers were not motivated to increase their production because of low prices.

Regarding the NRP, it is negative in all years under analysis and ranges (observed) from -12 percent in 2005 to -48 percent in 2009, evidencing non protection (disincentive) of cotton producers (Figure 13). The reason of the negative NRP (price disincentives) is the same as the observed price gaps and is presented above.

Regarding the difference between observed and adjusted NRP (Figure 13); it suggests limited efficiency gains along the value chain. A better value chain functioning from farm gate to the point of competition should address the excessive ginning cost, indirect tariffs (such as VAT), transport cost (notably ginning to port)¹², weak infrastructure¹³ and asymmetrical distribution of market power between ginners and farmers. This difference (observed Vs. adjusted NRP) constitutes a market development gap, as shown by the negative access cost to farm gate in Figure 14, which means that through investment and increased competition (notably abolition of monopsony on ginners); the market access costs gap to farm gate could be reduced by up to 1,943 MT /ton, for example in 2010 (Figure 14).

Figure 12: Observed and adjusted price gaps for cotton at wholesale and farm gate in Mozambique (MT per tonne)



¹² The cost of train transportation from Cuamba to Nacala port in 2010 was 1,073 (MT/ton), compared to 682 (MT/ton) in 2005. These costs increased significantly in 5 years for the same distance (549 km). Obviously, transportation cost is highly related to cost of fuel which account to 68 percent of the vehicle operating costs (World Bank, 2009). Therefore, taxes on fuel play a role in determining commodity transportation costs.

¹³ For example, the majority of roads in the producing villages (farm gate - ginning) are not paved and it is difficult to circulate in the rainy season.

Figure 13: Observed and adjusted NRP for cotton at wholesale and farm gate in Mozambique (%)

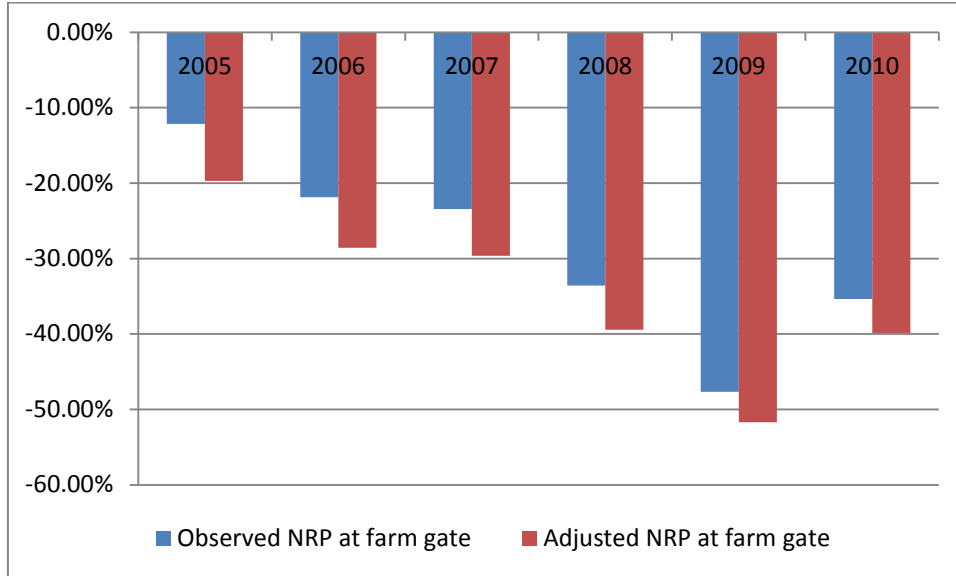
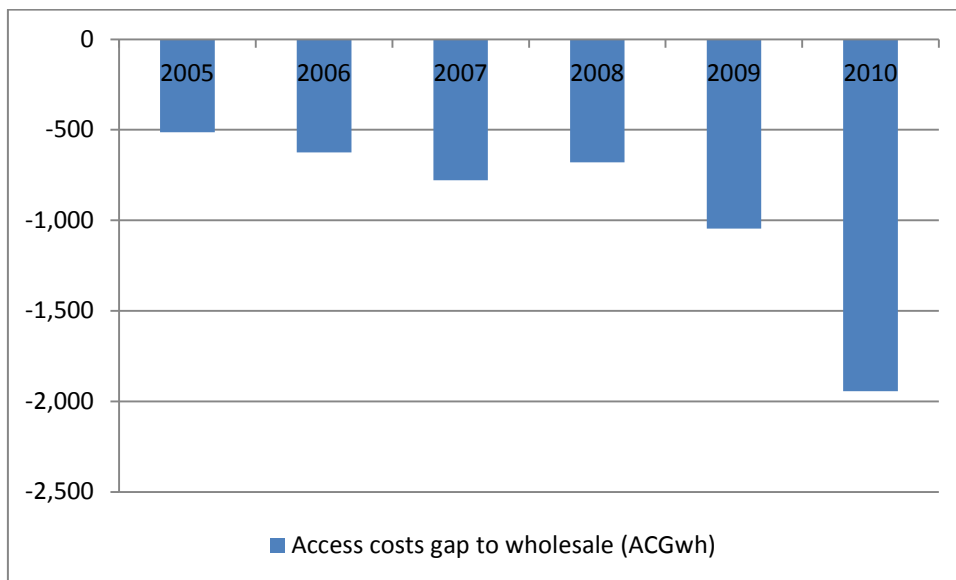


Figure 14: Market Development Gap for cotton in Mozambique (MT per tonne)



Source: Own calculations

5. RELIMINARY CONCLUSIONS AND RECOMMENDATIONS

MAIN MESSAGE

Overall our analysis shows that the effect of policy and regulation throughout the period in analysis has created disincentives to producers, suggesting that the system of fixation of the official minimum price is apparently ineffective in protecting cotton growers.

Disincentives at farm gate have largely been due to: i) levies and taxation; ii) market structure and lack of competition due to monopsony (ginners) in cotton sector; iii) low level of farm gate price; vi) excessive ginning cost; and v) low level of ginning outturn ratio of the Mozambican ginning sector further penalizes farmers.

The introduction of reforms in Mozambique in the later 80's and consequent creation of the IAM in 1991 was not sufficient enough to eliminate the monopsony system prevailing in the Mozambican cotton sector, which constitutes a barrier for competition in the sector. Also the monopsony system constitutes a problem for farmers because they depend on only one channel (ginning company granted concession right) to access inputs, this can affect the production of other crops as they use the same inputs in production of staple crops (such as maize).

Furthermore, Figure 10 above shows strong increase of producer price from 2009/10, an increase which was not sufficient enough to increase the NRP at farm gate to a positive level (Figure 12).

PRELIMINARY RECOMMENDATIONS

In order to attract farmers to engage more in cotton production it will be important to introduce reforms in the sector, such as the elimination of monopsony in order to increase the competitiveness in the sector and regular update of producer price in order to reflect the increase of the prices in the international market. Overall the suggested policy reforms could include the following measures:

- Liberalization of the cotton sector, which will eliminate the monopsony. Costs can drop significantly when the power of monopolistic/monopsonistic structures is constrained. This could lead to higher producer prices that benefit growers directly as the price paid to farmers is generally very low after deducting all costs including ginning and profit margins;
- Policy measures to empower farmers association will be important for example in the negotiation of the minimum price. According to the World Bank (2010), the Mozambican farmers association is one of the weakest in Africa, this is visible by the very low producer prices in Figure 11 compared to other countries;
- Investments in modernization of the processing industry in Mozambique would contribute to increase the ginning outturn ratio and the quality of cotton exported to the international market.

LIMITATIONS

Data issues:

- The unavailability of data on ex-factory price constituted a barrier to better understanding how incentives/disincentives are split between farmers and ginners;
- Unavailability of disaggregated data on processing costs. The available data from IAM is only for 2006/2007 and compounds all the components of ginning costs, which creates difficulties for deeper analysis to understand the real cost of processing seed cotton into lint and seed;
- Quality of data constitutes a limitation in the calculation of indicators.

FURTHER INVESTIGATION AND RESEARCH

Further analysis to better understand the components of the access cost (notably processing costs) will be helpful to strengthen our understanding of the market development gap in the value chain analysis.

Our analysis focused on the Niassa province (Cuamba), because of availability of data on access cost. The most important cotton market where the majority of ginners are concentrated is Nampula. This analysis would benefit from further market analysis considering Nampula as point of competition.

Further analysis on the impact on the cotton production and productivity, of diverting inputs meant for production of cotton to produce other staple crops.

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ANNEX I: Methodology Used

A guide to the methodology used by MAFAP can be downloaded from the MAFAP website or by clicking [here](#).

ANNEX II: Data and calculations used in the analysis

Name of product		Cotton		Local currency		Metals (MT)					
International currency		US Dollars (USD)									
DATA		Unit	Symbol	Year trade status	2005	2006	2007	2008	2009	2010	
					x	x	x	x	x	x	
Benchmark Price	Observed	USD/TONNE	P _{b(int)}		444.72	491.76	603.25	558.86	760.04	1,144.39	
	Adjusted	USD/TONNE	P _{ba}								
Exchange Rate	Observed	MT/USD	ER _c		23.06	25.40	25.84	24.30	27.52	33.96	
	Adjusted	MT/USD	ER _a								
Access costs border - point of competition	Observed	MT/TONNE	AC _{o(wh)}		4,058.71	4,987.53	5,814.23	5,569.16	7,202.76	11,307.61	
	Adjusted	MT/TONNE	AC _{a(wh)}		3,545.94	4,362.98	5,034.81	4,890.12	6,157.01	9,364.43	
Domestic price at point of competition	Observed	MT/TONNE	P _{o(wh)}		6,196.85	7,503.50	9,774.07	8,011.60	13,712.19	27,556.02	
Access costs point of competition - farm gate	Observed	MT/TONNE	AC _{o(fg)}		718.08	835.09	955.20	963.41	1,167.05	1,697.59	
	Adjusted	MT/TONNE	AC _{a(fg)}								
Farm gate price	Observed	MT/TONNE	P _{o(fg)}		4,811.79	5,209.84	6,752.34	4,680.28	6,563.53	16,719.02	
Externalities associated with production	Adjusted	MT/TONNE	E								
Budget and other product related transfers	Observed	MT/TONNE	BOT								
Quantity conversion factor (border - point of competition)	Adjusted	Fraction	QT _{wh}								
Quantity conversion factor (border - point of competition)	Observed	Fraction	QL _{wh}								
Quantity conversion factor (point of competition - farm gate)	Adjusted	Fraction	QT _{fg}								
Quantity conversion factor (point of competition - farm gate)	Observed	Fraction	QL _{fg}								
CALCULATED PRICES		Unit	Symbol		2005	2006	2007	2008	2009	2010	
Benchmark price in local currency	Observed	MT/TONNE	P _{b(local)}		10,255.57	12,491.03	15,588.30	13,580.76	20,914.94	38,863.62	
	Adjusted	MT/TONNE	P _{ba(local)}		10,255.57	12,491.03	15,588.30	13,580.76	20,914.94	38,863.62	
Reference Price at point of competition	Observed	MT/TONNE	RP _{o(wh)}		6,196.85	7,503.50	9,774.07	8,011.60	13,712.19	27,556.02	
	Adjusted	MT/TONNE	RP _{a(wh)}		6,709.63	8,128.05	10,553.49	8,690.64	14,757.93	29,499.20	
Reference Price at Farm Gate	Observed	MT/TONNE	RP _{o(fg)}		5,478.77	6,668.40	8,818.87	7,048.19	12,545.13	25,858.43	
	Adjusted	MT/TONNE	RP _{a(fg)}		5,991.55	7,292.96	9,598.29	7,727.22	13,590.88	27,801.61	
INDICATORS		Unit	Symbol		2005	2006	2007	2008	2009	2010	
Price gap at point of competition	Observed	MT/TONNE	PG _{o(wh)}		-	-	-	-	-	-	
	Adjusted	MT/TONNE	PG _{a(wh)}		(512.78)	(624.55)	(779.41)	(679.04)	(1,045.75)	(1,943.18)	
Price gap at farm gate	Observed	MT/TONNE	PG _{o(fg)}		(666.98)	(1,458.56)	(2,066.53)	(2,367.90)	(5,981.60)	(9,139.40)	
	Adjusted	MT/TONNE	PG _{a(fg)}		(1,179.76)	(2,083.11)	(2,845.95)	(3,046.94)	(7,027.35)	(11,082.59)	
Nominal rate of protection at point of competition	Observed	%	NRPO _{wh}		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Adjusted	%	NRPA _{wh}		-7.6%	-7.7%	-7.4%	-7.8%	-7.1%	-6.6%	
Nominal rate of protection at farm gate	Observed	%	NRPO _{fg}		-12.2%	-21.9%	-23.4%	-33.6%	-47.7%	-35.3%	
	Adjusted	%	NRPA _{fg}		-19.7%	-28.6%	-29.7%	-39.4%	-51.7%	-39.9%	
Nominal rate of assistance	Observed	%	NRA _o		-12.2%	-21.9%	-23.4%	-33.6%	-47.7%	-35.3%	
	Adjusted	%	NRA _a		-19.7%	-28.6%	-29.7%	-39.4%	-51.7%	-39.9%	



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