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Quantitative Value Chain Analysis

An Application to Malawi

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Abstract

The Government of Malawi has since 2005 been pursuing a growth strategy mainly based on increasing the volume of agricultural exports. This entails that Malawi should endeavor to improve the competitiveness of its agricultural commodities so as to gain an increasing share of the regional and international markets. This paper analyzes the competitiveness of the country's key agricultural commodities—tobacco, maize, cotton, and rice—using prices that prevailed in the 2007/08 agricultural season. The paper employs a quantitative value chain methodology to assess the country's prospects for competitiveness and suggest weak links along the value chain that require attention in order to improve trade competitiveness. The results indicate that Malawi has some competitive advantage in the production and exportation of tobacco and cotton, and that this mostly derives from its low labor cost advantage. However, the results indicate that based on 2007/08 prices and costs, Malawi does not have competitive edge in maize and rice production for export. As such, Malawi would better pursue an import substitution strategy in these cereals, and perhaps only aim at the export market when regional market opportunities arise. Key factors that underpin Malawi's narrow competitiveness include the high cost of inorganic fertilizer and other inputs, low productivity, and the higher trader margins and intermediation costs along the value chains. Furthermore, farm gate prices in Malawi are higher than in other countries, and this undercuts its trade competitiveness.

This paper—a product of the Agricultural and Rural Unit, Africa Region—is part of a larger effort in the department to share the findings with a larger audience and encourage informed policy discussion. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at htchale@worldbank.org.

QUANTITATIVE VALUE CHAIN ANALYSIS: AN APPLICATION TO MALAWI

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Key words: agricultural competitiveness, value chain, Malawi

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[1] This report was prepared by a team from the World Bank led by Jos Verbeek (PREM) as part of the background work for Malawi's Country Economic Memorandum (CEM). The primary data collection and analysis for the Value Chain Study was undertaken by John Keyser (consultant) together with Hardwick Tchale (Agricultural Economist, AFTAR). The preparation of the report and the subsequent reviews were undertaken by the Agriculture Team comprising David Rohrbach (Senior Agricultural Economist, AFTAR), Hardwick Tchale (Agricultural Economist, AFTAR), Hans Binswanger (Consultant) and Jos Verbeek (Lead Economist, PREM).

Initial drafts of the paper were presented at a stakeholders' forum where all stakeholders had a chance to comment on the preliminary findings. Additional comments and reviews were provided by staff from key stakeholder institutions such as Ministry of Agriculture and Food Security, the Tobacco Industry, National Smallholder Farmers Association of Malawi (NASFAM) and other farmer organization representatives.

I. INTRODUCTION

1. This report presents the results of an analysis of Malawi's competitiveness in key agricultural value chains. The analysis is based on prices prevailing in the 2007/08 agriculture season before the spike in agricultural commodity prices that preceded the global financial crisis. Specifically, the report covers two levels of smallholder management for open pollinated and hybrid maize, irrigated and non-irrigated rice, burley tobacco, and cotton. For the sake of completeness, the results of other recent value chains undertaken in Malawi have also been summarized and the main conclusions synchronized with those from this particular analysis.

2. The main objectives of the analysis are:

- **To determine private costs and profitability of different stages in the value chain:** Only by understanding the costs and returns to farming itself and the other stages of production and distribution until the final market can policymakers begin to understand the incentives for production, processing, and shipping, as well as the incentives for improvement in each stage.
- **To understand cost composition:** By analyzing the detailed cost structures of individual value chain participants, value chain analysis (VCA) can identify the types of costs that account for the majority of total value, and therefore focus on specific areas where new investment or other improvement could have the greatest impact on sector profitability and growth.
- **To measure trade competitiveness:** This was aimed at exploring Malawi's competitiveness in regional and global markets i.e. what are Malawi's best opportunities for import substitution or exports? To do this, we compared the results with other countries in the region and beyond (Zambia, Mozambique, Cameroon, Nigeria, Brazil and Thailand) in which a similar methodology was applied during the past two years under the World Bank supported study on Competitive Commercial Agriculture in Africa (CCAA) [1].

3. To address these issues, the analysis covers two levels of smallholder management for open pollinated and hybrid maize, irrigated and non-irrigated rice, burley tobacco, and cotton. Beyond farm production, the analysis is also based on enterprise budgets for the most typical crop assembly, processing, and distribution arrangement for each commodity up to the point where total accumulated value can most realistically be compared with an import or export parity price as a final measure of trade competitiveness. By identifying the types of costs that account for the majority of total value and where these costs occur, the value chain approach is designed to help policy makers and project planners zero in on specific areas where new investment or other types of improvement could have the greatest impact on profitability, competitiveness, and growth.

[1] See Keyser, John C (2006). Definition of Methodology and Presentation of Templates for Value Chain Analysis, Competitive Commercial Agriculture in Africa (CCAA), The World Bank, Environmental, Rural and Social Development Unit, Washington DC. The methodology is built around a set of interlinked Excel templates designed to calculate standard indicators of costs and profitability at each major stage of the production cycle. By filling in the elements of each template for individual commodities and farm systems, the methodology offers a practical way to establish benchmark prices that can be compared with international standards and identify specific areas where costs can most effectively be reduced through policy change or other types of investment.

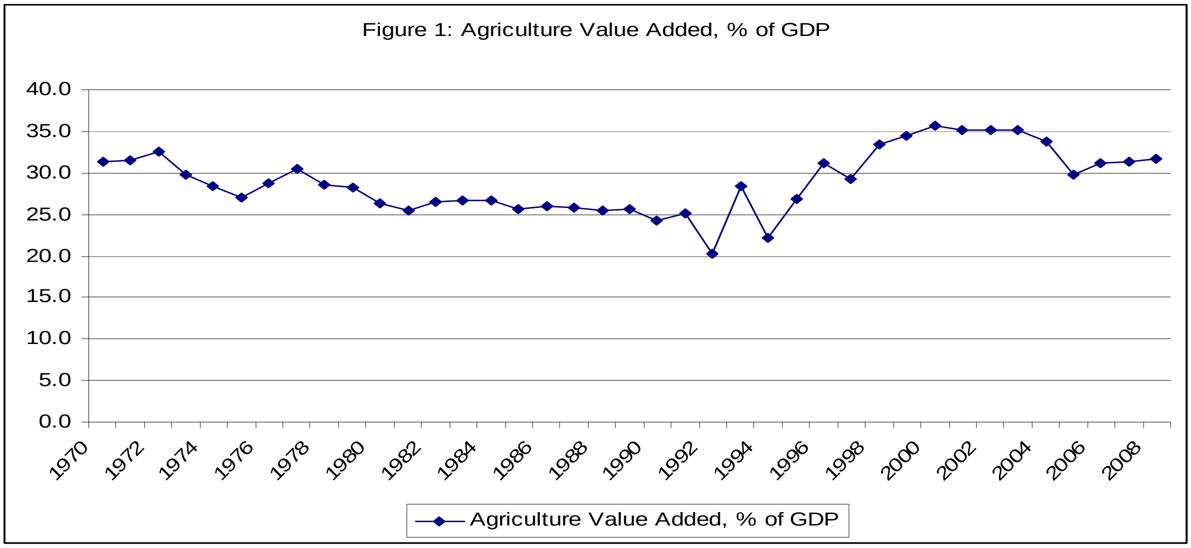
4. Several limitations also need to be recognized. Most importantly, the results are based on indicative data and the analysis seeks to provide a general picture of the underlying costs, profits, and trade competitiveness only. The data used for the analysis were crosschecked through various discussions with sector investors and other key informants to ensure that the results provide a reliable picture of the 2007/08 conditions, but are not based on any kind of large sample survey or other extensive data collection exercise. Differences in yield, price, and market opportunities all have an important bearing on producer profits and trade competitiveness and the discussion should not be interpreted as a definitive assessment of individual business opportunities or project priorities. Again, the main objective is to provide information needed to assess potential investments and sector policies as part of a much larger Country Economic Memorandum.

5. The paper is organized in eleven sections including the introduction. Section II provides the country context, highlighting the importance of agriculture to the Malawi economy. Section III provides a brief overview of the methodology and main assumptions used for the value chain analysis. Sections IV to VIII highlight the main analytical results beginning with the input analysis, followed by the results for maize, rice, burley tobacco, and cotton value chains, respectively. Section IX presents a review of other value chains and related studies, with a view to synchronizing their findings to those of this study. Section X briefly discusses the key factors affecting agricultural competitiveness and also summarizes the results of some simulations that were undertaken to assess the impact of a number of scenarios on farm income and trade competitiveness. Section XI concludes with key findings and their policy implications.

II. COUNTRY CONTEXT

6. **Agriculture in Malawi contributes over 35% to national GDP, employs over 80% of the labor force and contributes over 80% of the export earnings**. Agriculture is the most critical for the Malawi economy in terms of job creation, export diversification, poverty reduction and overall growth. Real GDP growth in Malawi in 2007 was estimated at 7.9 percent and was projected at 7.4 percent in 2008. Although this was a slight reduction from the 8.2 percent achieved in 2006, economic growth has maintained an upward trend. This is attributed mainly to the improvements in agricultural sector performance. Malawi has made strong strides in total maize output from 2.6 million tons in 2006, 3.4 million tons in 2007 and 3.6 million tons estimated for 2008/09 season. Although total tobacco output has not improved much, total proceeds from sales were estimated at USD195.2 million in 2007 and over USD460 million in 2008 on account of better tobacco prices at the auction floors.

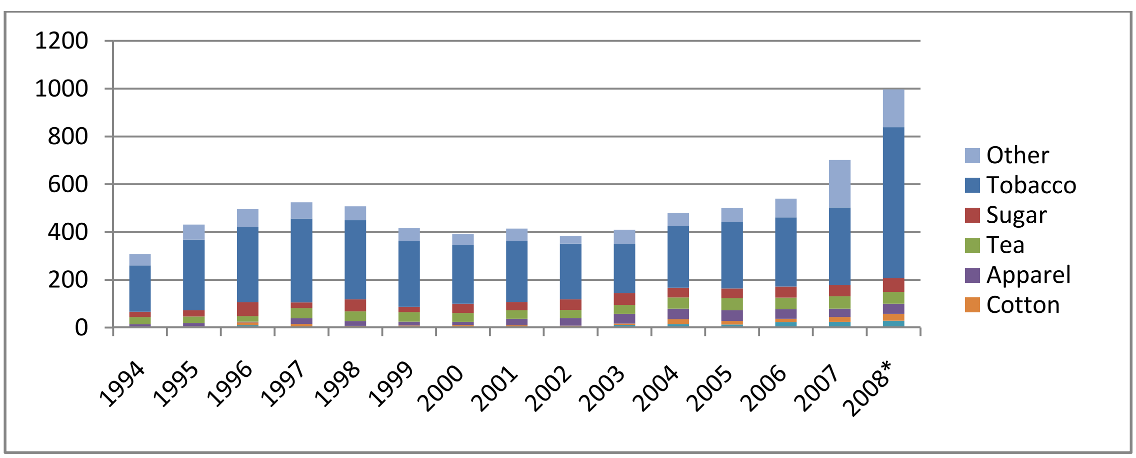
Figure 1. Agriculture's share of total GDP (1970 – 2008)



Source: Economic Reports, various years.

7. **Agricultural sector in Malawi is highly dominated by a few food and cash crops**. In spite of past attempts to diversify the food and export basket, there is still high concentration on maize and tobacco as key food and cash crops, respectively. For example, in 2007, the main products with positive volume growth were tobacco (53 percent), sugar (9 percent), tea (9 percent), cotton (3 percent) and edible nuts (4 percent). Although there is a slight shift away from tobacco, Malawi's agricultural export base is highly concentrated in tobacco (see Figure 2). This high dependence on a narrow range of commodities makes Malawi agriculture highly vulnerable to effects of climate change (such as drought), in the case of maize and to the international lobbies against tobacco. The estate sector is relatively small and is confined to specific cash crops such as tobacco, tea and sugar. Its growth has been stagnant since the 1990s[2].

Figure 2: Composition of Malawi's agricultural export commodities by value ('000 USD)



8. **Food crops such as maize, cereals and roots and tubers form the basis of agricultural production in Malawi**, and are grown by the majority of smallholder farmers on

[2] The estate sector includes about 30,000 estates with about 1.1 million hectares under leasehold tenure. Comparatively, the smallholders occupy over 6 million hectares under the customary tenure.

over 80 percent of the total arable land. Of this maize alone is grown on over 70% of the arable land. With most of the arable land in the smallholder subsistence sector, Malawi does not have a lot of room for export diversification, at least compared to the neighboring countries. The livestock sub-sector contributes about 7 percent of agricultural GDP, and in 2007, the cattle population was estimated at about 800,000 while that of shoats (goats, pigs and sheep) was estimated at 2.3 million, 636,000 and 175,394, respectively. Fishing and forestry sub-sectors each account for less than 6 percent of agricultural GDP.

9. **Food security has improved since 2006 due to the recorded surpluses in maize and other food crops**. The food balances sheets have shown a positive trend since 2006 season (see Table 1). However, in spite of the national food surpluses, the market signals indicate some increases in the producer price of maize which is inconsistent with the declared surpluses. Many attribute the market tightening to speculation among the private traders, and an anticipation of over-estimation of the food production level.

Table 1: Trends in domestic food gap (energy foods)

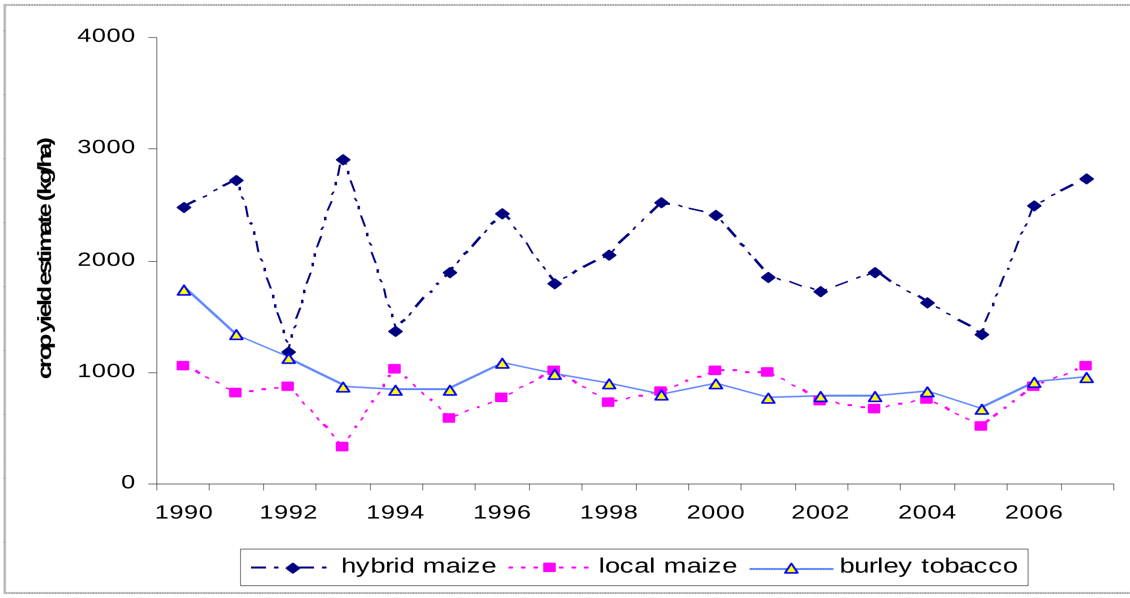
Year	Total Food Requirement (MT)	Domestic Availability (MT)	Gross maize Gap/ Surplus (MT)
1999/00	2,023,625	2,023,625	98,870
2000/01	1,643,274	2,432,334	789,060
2001/02	1,825,449	1,495,104	-195,229
2002/03	2,035,643	1,351,549	-684,094
2003/04	2,016,052	1,966,024	-50,028
2004/05	2,039,291	1,502,259	-537,032
2005/06	2,183,506	2,620,513	487,007
2006/07	2,255,049	3,444,655	1,189,606
2007/08	2,352,668	2,790,546	437,878

Source: Ministry of Agriculture and Food Security.

10. **Although total agricultural output has been increasing over the past decade, Malawi's agricultural productivity, particularly among the majority of the smallholder farmers, has shown signs of stagnation or decline.** For example, as shown in Figure 3, there has been no long-term improvement in average maize yields. Maize yields remain highly dependent on weather patterns and the implementation of input support programs, such as for example, the starter pack in the late 1990s, the drought recovery and targeted inputs program in early to mid 2000, and the input subsidy program thereafter. In the case of tobacco, the substantial yield gains attained in the early 1990s more especially after the repeal of the Special Crops Act have been reversed as average tobacco yield has been almost stagnant since the mid-1990s[3]. Most of the yield stagnation and fluctuations experienced in the first half of the last decade can be attributed to low adoption and less intensive use of productive agricultural technologies, unreliable rainfall pattern and also production inefficiencies.

[3] The repeal of the Special Crops Act provided the smallholder farmers the right to grow and sell burley tobacco. Before 1991, burley tobacco was exclusively and legally an estate crop (Ng'ong'ola et al. 1997).

Figure 3: Yield trends in major smallholder crops, 1990 to 2007



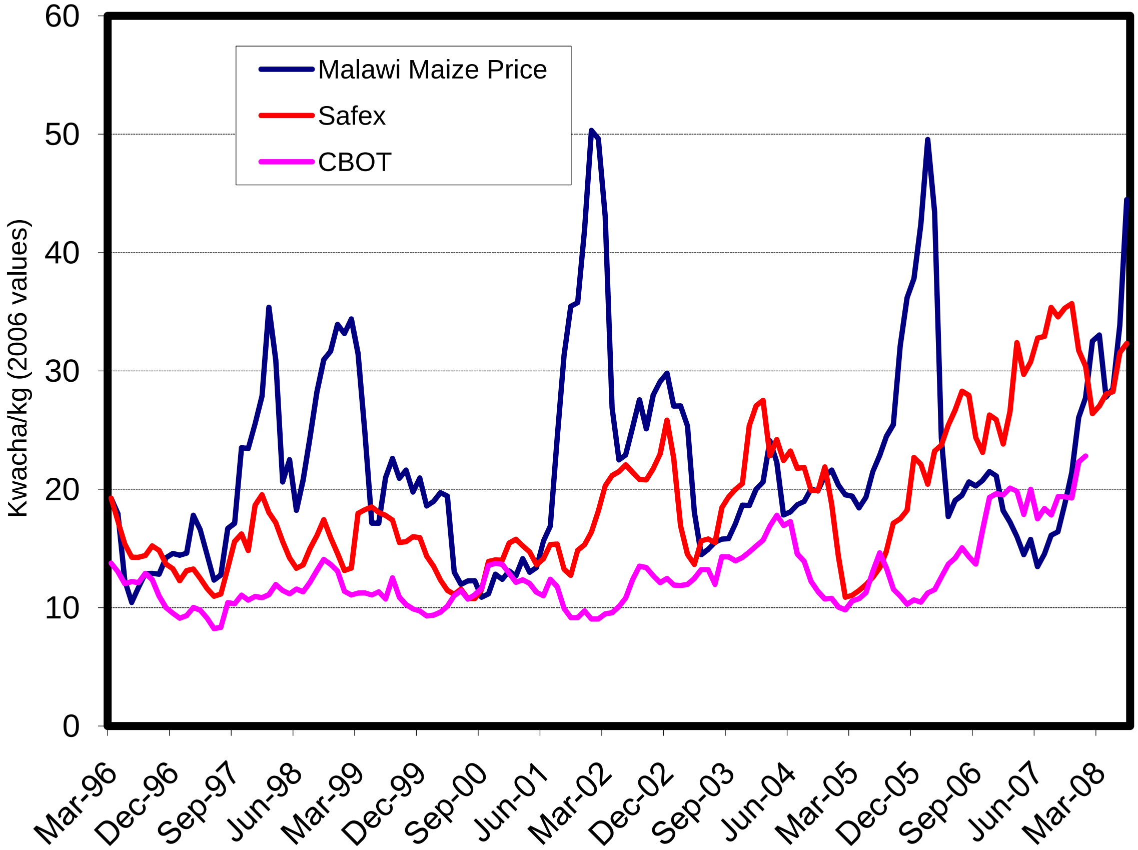
Source: Ministry of Agriculture and Food Security, Annual Crop Estimates.

Food prices

11. **Food prices in general and maize prices in particular are much higher and highly variable compared to the trends experienced in previous years.** Although the reasons for the high food prices are not fully understood, it appears that they are triggered partly by speculative behavior by traders and cautious response by farmers to the escalating commodity prices on the international market. As can be seen in Table 2, in February 2008, the price of maize had more than doubled from MWK21 per kg in the previous year (Feb 2007) to MWK43 per kg[4]. From January 2008 to March 2008, the price had increased by 10 percent, with March representing the peak of the lean season. The maize harvest period which started in March in some parts of the country did not result in the weakening of the prices, as expected. As such, maize prices have kept on an upward trend, currently reaching over MWK60 per kg. The high volatility of prices between the harvest (March – June) and lean season (October – February) is typical of thin maize markets (see Figure 4). Farmers are compelled to engage in distress selling at low prices during the harvest period, only to buy back the maize during the lean season at much higher prices during the lean season. Over 80% of the smallholder farmers end up being net food buyers. Except for the warehouses that belong to the Government parastatal, the Agricultural Development and Marketing Corporation (ADMARC), private warehousing is limited. Private sector investment is curtailed by Government interventions in the maize market.

[4] For most of this period, the exchange rate was fairly stable and the domestic inflation remained in single digit, as such, maize price increase is not attributed to domestic inflation.

Figure 4: Maize prices in Malawi

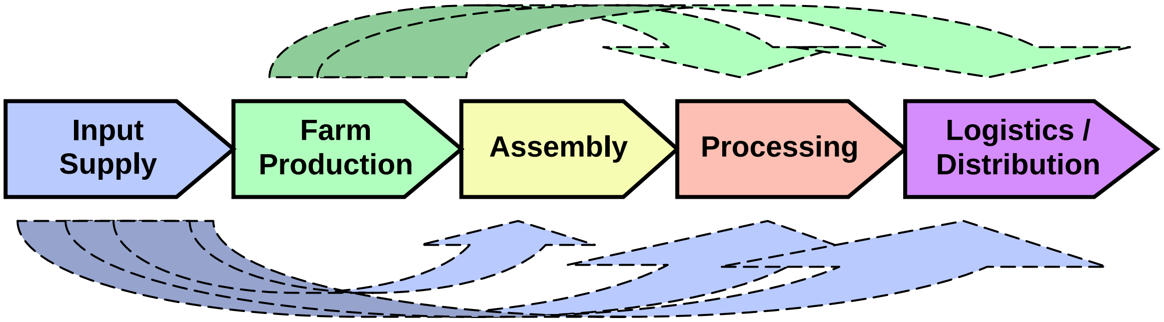


III. METHODOLOGY

12. Value chain analysis has gained considerable popularity in recent years. Although many definitions are applied, value chains essentially represent enterprises in which different producers and marketing companies work within their respective businesses to pursue one or more end-markets. Value chain participants sometimes cooperate to improve the overall competitiveness of the final product, but may also be completely unaware of the linkages between their operation and other upstream or downstream participants. Value chains therefore encompass all of the factors of production including land, labor, capital, technology, and inputs as well as all economic activities including input supply, production, transformation, handling, transport, marketing, and distribution necessary to create, sell, and deliver a product to a certain destination.

13. The main stages of an agricultural value chain are illustrated in Figure 4 below. In this diagram, dashed arrows flow from input supply to all other stages to show that this is a crosscutting function that affects all participants, not just at the farm level. Dashed arrows are also drawn from farm production to processing and distribution to show that some farmers may deliver their crop directly to a factory or, in the case of unprocessed goods, directly to the final market, thereby fulfilling the assembly and delivery function as well.

Figure 5: Stages of the Value Chain



14. In value chain analysis, all inputs and outputs carry forward their inherited value from the previous stage. This concept is important to stress in value chain analysis where the focus is on accumulated costs at different stages as a key determinant of trade competitiveness. The competitiveness of any domestic product depends on the efficiency of input supply, farm production, assembly, processing, and logistics up to final delivery point where the good competes internationally as an export or import substitute. By looking at the cost composition at each stage of the value chain and comparing these costs with world standards, the methodology not only shows if the country is internationally competitive, but also helps identify key stages where costs could most effectively be reduced as a strategy for sector growth.

A. Analytical Framework

15. Based on these guiding principles, the analysis of Malawi's agriculture competitiveness was prepared using a specific methodology developed for a recent study of Competitive Commercial Agriculture in Africa (CCAA).[5] The methodology is built around a set of interlinked Excel templates designed to calculate standard indicators of costs and profitability at each major stage of the production cycle. By filling in the elements of each template for individual commodities and farm systems, the methodology offers a practical way to establish benchmark prices that can be compared with international standards and identify specific areas where costs can most effectively be reduced through policy change or other types of investment.

16. According to the methodology, total costs are measured in terms of Domestic Value Added (DVA) and Shipment Value (SV), which constitute the main value chain indicators as follows.

Domestic Value Added (DVA) = Domestic costs and mark-ups [1]
+ Official duties and tax
+ Unofficial charges and extra costs

Shipment Value (SV) = Domestic Value Added [2]
+ Foreign components

17. Because countries mainly have influence over prices within their own borders, the methodology is particularly interested in the composition of DVA as a leverage point for

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[5] Keyser, John C (2006). Definition of Methodology and Presentation of Templates for Value Chain Analysis, Competitive Commercial Agriculture in Africa (CCAA), The World Bank, Environmental, Rural and Social Development Unit, Washington DC.

enhanced sector performance. These costs include legitimate business costs and mark-ups, official customs duties and taxes, and any number of unofficial payments and bribes that sometimes have to be made to facilitate a particular operation.[6] If some cost accounts for a large share of total value, or is significantly higher than an equivalent international benchmark, then new policies or investments focused on reducing that cost would likely be an effective strategy for improved competitiveness.

18. For cross-commodity and international comparisons, the final calculation of SV including foreign components is the most comprehensive measure of actual and potential competitiveness. For any given commodity, trade competitiveness is determined by comparing SV at the final market with an equivalent parity price (either a FOB price for exports or CIF price for import substitutes). By looking at the build-up of SV (and DVA) from stage to stage, the methodology therefore reveals the competitiveness of individual participants. If one stage accounts for a disproportionately large share of final shipment value, interventions focused on that part of the value chain likely also have a disproportionately large impact on the overall competitiveness of the chain.

19. A further advantage of the value chain methodology is that it allows for comparisons of production cost and other aspects of sector performance with the CCAA study countries for maize, cotton, rice and inputs. In Africa, the CCAA study was undertaken in Mozambique, Nigeria, and Zambia. To establish international benchmarks of successful development, a parallel analysis of value chain performance was also carried out for CCAA in Brazil and Thailand. Following the CCAA project, additional value chain research was undertaken in Cameroon covering maize and cotton and the data from this work are also available for comparison.[7] While this type of cross-country comparisons produces some interesting results that help better understand development opportunities in Malawi, differences in data collection and modeling mean that the results cannot be compared exactly.[8] Moreover the methodology cannot be used to say that farm production or assembly should cost a certain amount, or that one country is above the so-called benchmark, because conditions naturally vary between countries for many good and inherent reasons. This study therefore highlights these comparisons whenever they add value to the understanding of Malawi's growth opportunities, but does not consistently report the other countries' benchmark indicators for every value chain stage or process.

20. Another important distinction in the methodology is that agriculture commodities can take on different forms at each stage of the value chain. In the most basic sense, this can be the difference between a recently harvested farm product with high moisture content and one that has been assembled in a warehouse and dried for several months. Agriculture raw materials may also be processed into one or more finished goods. Seed cotton, for example, is processed into lint and seed while leaf tobacco must be threshed to remove the tips and stems before export. Similarly, paddy rice must be milled to produce polished grain. DVA and SV are therefore measured according to equations [1] and [2] on a per ton basis for the following product forms:

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[6] For Malawi, information on unofficial costs were unavailable and "domestic extras" were excluded from the analysis.

[7] World Bank (2008). Cameroon Agriculture Value Chain Competitiveness Study, Agriculture and Rural Development (AFTAR) Sustainable Development Network, Washington DC.

[8] For more details of the CCAA results (and discussion of the limitations of cross-country analysis) see Keyser, John C (2008). Competitive Commercial Agriculture in Africa (CCAA) Synthesis of Quantitative Results. The World Bank, Environmental, Rural and Social Development Unit, Washington DC.

Farm production	Farm gate product
Assembly	Assembled raw material
Processing	Processed raw material
International logistics	Traded commodity (Product 1, 2, 3)

21. Finally, the value chain analysis is also interested in the private costs and returns that accrue to individual participants. Agriculture production, processing, and marketing begins with the decisions private investors make and it is important to have a sense of the underlying financial costs and profitability of competing enterprises first to determine if the system is viable and second to identify opportunities for poverty reduction. Because the methodology is constructed around enterprise budgets, these measurements are easy to make. At the farm level, private costs and returns are measured in per hectare and per ton terms; at later stages, values are measured in per MT terms only. From these indicators, calculations showing the rate of return to variable and fixed expenditure, total investment requirements, demand for labor, and other components of private and social importance can be made.

B. Procedures and Assumptions

22. In preparing the analysis of Malawi's agriculture competitiveness, the approach was to provide an indicative picture of value chain costs and returns. All value chain participants naturally produce according to their own objectives and resource limitations. The analysis therefore cannot identify optimal cropping patterns or investment strategies for individuals, and is instead structured around a broad spectrum of management possibilities. This approach is most useful for understanding major trade-offs associated with different production decisions needed at the early stage of planning an agriculture investment program. The main procedures and assumptions used for this analysis are briefly described below.

23. **Data collection.** Data collection was carried out in Malawi from April to May 2008 and involved a brief literature review, key informant interviews, and sourcing of production information from crop research institutes, statistical abstracts and farmers' groups. Subsequent to the data collection and preliminary analysis, industry experts were consulted to validate the draft results and seek feedback on major bottlenecks and recommendations for improvement. The preliminary templates were then revised based on the feedback received to produce the final models whose results are discussed in this report.

24. **Farm management.** The analysis covers two levels of progressively intensive smallholder management. At the FAM-low level, farmers follow a fairly basic management regime and use only the most essential farm inputs. Some fertilizer is included at the FAM-low level, but producers otherwise make little use of purchased inputs and rely mainly on family labor. The FAM-high level, on the other hand, represents the type of improvements a small farmer could realistically make with improved access to inputs and marginally better management skill. Compared with FAM-low, therefore, FAM-high management is based on a modest increment in fertilizer, more intensive and better use of pesticides and/or agrichemicals as required for each crop, more timely planting, and better attention to weed control. It is further assumed that FAM-high producers make more intensive use of hired labor due to the additional management requirements and better timing of key tasks.

25. **Commodity coverage.** The analysis covers four important smallholder commodities selected because of their importance to poverty reduction, food security, and/or export growth. The full list of crops and farm systems covered is set out in the Table 2. Each farm variation

required a specific per hectare crop budget. Per ton budgets were then used to model the most relevant assembly, processing, and distribution arrangement for each commodity.

Table 2: List of crop commodities analyzed

	Rain-fed Crops		Irrigated Crops	
	FAM-low	FAM-high	FAM-low	FAM-high
Maize - OPV	X	X		
Maize - hybrid	X	X	X	X
Rice	X	X	X	X
Burley Tobacco	X	X		
Cotton	X	X		

26. **Agriculture prices.** Unless noted, all prices reported in this paper are for the 2007/08 agriculture season. Farm input and output prices include transport up to the farm gate or other place where the next participant in the value chain takes over responsibility for that commodity. Input prices and output prices for maize are based on information collected from primary informants and were chosen to represent the prices most producers in all parts of Malawi can expect to encounter. In the case of cotton, the government established minimum price for seed cotton was used to, and for rice, the farm gate price is the one paid by NASFAM. For burley tobacco, two price levels are considered based on average auction values for good and better quality tobacco grown at the FAM-low and FAM-high levels respectively.

27. **Crop yields.** Crop yields reflect a realistic expectation in a year with “normal” growing conditions using the inputs charged at each management level. Due to an almost limitless number of possible variations related to seasonal growing conditions, local soil type, farmer skill, seed quality, and many other factors, actual yields on individual farms can be quite different than shown here. Naturally, this can have a significant bearing on individual profits and total costs per ton.

28. **Family labor.** No charge is included for family labor in the calculation of a private costs and returns. This approach is necessary for the financial calculations because family labor is not paid for with an actual expenditure of cash. The use of family labor does, of course, have an opportunity cost, but by excluding this from the financial estimates, crop profits can easily be reinterpreted as returns to family labor and all other non-cash inputs used to produce and market that commodity. The benefit of this method is that it allows direct comparisons between enterprises without the risk of applying incorrect proxy values. This approach is also consistent with the standard definition of an opportunity cost which states that the value of family labor is the income foregone by not engaging in the next most profitable activity.

29. For the calculation of DVA and SV, however, a different approach is needed. At this level, the value chain analysis is interested in the total cost of all factors used in the production and marketing of each agricultural commodity. Because family labor often accounts for a large share of production costs in Malawi, some proxy value needed to be applied. For this reason, the approach taken was to apply a rule of thumb estimate to the value chain calculations by charging family labor at 60% of the rate for casual labor. FAM farmers rarely have the opportunity to sell

their labor at the full wage rate every day of the year and this approach is at least a clear and simple way to recognize the value of this input. Further analysis could always look at the effects of different family wage rate assumptions, but the basic outcome is easy to predict since labor costs and final estimated shipment values are directly related. In all cases, the quantity of family labor was estimated on the basis of a five member household with proportionate adjustments for tasks that must be carried out over a limited number of days, in which case hired labor must be used.

30. **Investment costs.** The annual per hectare (or per ton) cost of long term investments used at each stage of the value chain have been estimated using the *capital recovery cost* method. Specifically, this cost is the annual payment that will repay the cost of a fixed input over its useful life and provide an economic rate of return on the investment. This approach has the advantage over the simple division of an input's value by its useful life as it accounts for the fact that if the investor did not purchase the input, the money could have been invested in some other enterprise.[9]

31. **Domestic transportation.** For domestic routes, the transport cost estimate of MWK 18.00 per ton per kilometer (USD 0.129) has been assumed. This is the average cost reported during data collection by transport experts and private operators for the 2007/08 season. For cotton a premium of 30% premium was applied to account for the light/bulky nature of this good.

32. **International transport.** Because the value chain analysis is interested in comparing Malawi's final shipment value for each commodity with an international parity price, road and sea freight prices were also needed. In this case, the cost estimates were made from information provided by the Ministry of Transport as set out below. For maize, a price of USD 80 per MT was used to calculate freight costs from the SAFEX reference point at Randfontein to Harare plus USD 40 per MT for onward freight from Harare to Blantyre.

Table 3: Fixed transport rates for international routes

Fixed rates for International Routes (road, including port charges)

Container rates reported by Ministry of Tranport including land transport and port charges

	USD per 40' container (+/- 32 MT maximum load)	Per MT MWK	Per MT USD	Distance (Km)	MT per Km MWK	MT per Km USD
Beira - Blantyre	2,710	11,856	84.69	620	19.12	0.137
Beira - Lilongwe	2,850	12,469	89.06	931	13.39	0.096
Nacala - Blantyre	2,860	12,513	89.38	880	14.22	0.102
Nacala - Lilongwe	3,095	13,541	96.72	1,191	11.37	0.081
Durban - Blantyre	7,100	31,063	221.88	2,480	12.53	0.089
Durban - Lilongwe	7,200	31,500	225.00	2,730	11.54	0.082
Dar es Salaam - Lilongwe	4,560	19,950	142.50	1,720	11.60	0.083
Dar es Salaam - Blantyre	5,360	23,450	167.50	2,031	11.55	0.082

Port charges quoted at $750 for Beira and Nacala; $950 for Durban; and $360 for Dar es Salaam.

33. With respect to ocean freight, rule of thumb prices excluding port fees were used as follows:

- Fertilizer (ex Black Sea or Middle East) = USD 56.00 per MT to Beira.

[9] Annual cost per hectare (or per MT) = purchase price of implement * per hectare (or per MT) share of total use * capital recovery factor. CRF = ((1+i)^n)*i/(1+i)^n-1 where i = real interest on savings and n = number of years in the implement's useful life. See Monke and Pearson, 1989 for a detailed discussion of this methodology.

- Rice (ex Thailand) = USD 60.00 per MT to Durban + USD 40.00 to Beira
- Cotton (ex Far East, Cot look A-Index reference price) = USD 220 per MT to Nacala

IV. INPUT PRICE ANALYSIS

34. Agriculture value chain analysis begins at the input supply level. The efficiency of a country's input supply system has an obvious bearing on final SV not only in terms of the direct impact on unit prices, but also because of the influence on farmer decision making, optimal cropping patterns, choice of processing technology, and competitiveness of different transport arrangements. By looking at the composition of input prices at the place where each item is used, the quantitative methodology helps to identify areas where costs could realistically be reduced as a strategy for improved competitiveness. Further consideration of how the inputs are used in each value chain is needed to understand the relative importance of each item, but analysis of basic input prices is the first essential part of value chain assessment.

A. Fuel Price Build-up

35. Domestic transportation costs have an important bearing on the price of agriculture inputs and outputs and are therefore critical to the competitiveness analysis. A breakdown of Malawi's fuel price build-up is presented below and shows that 32.9% of the pump price (or total SV) is made up of foreign costs and that 83.2% of domestic costs are taxes.

Table 4: Build-up of domestic fuel prices (MWK per liter)

	Price Buil-up (per liter)		DVA			Foreign Costs	Total SV
	Tambala	MWK	Costs	Tax	Total DVA		
FOB	6,902.32	69.02			-	69.02	69.02
Ralilage	72.84	0.73			-	0.73	0.73
Road	1,222.14	12.22	6.11		6.11	6.11	12.22
Insurance/handling	85.37	0.85			-	0.85	0.85
Losses	52.91	0.53			-	0.53	0.53
IBLC (BT/LL)	**8,335.58**	**83.36**	**6.11**	**-**	**6.11**	**77.25**	**83.36**
MERA levy	37.00	0.37		0.37	0.37		0.37
Road levy	1,170.00	11.70		11.70	11.70		11.70
MBS cess	16.67	0.17		0.17	0.17		0.17
Enery fund	40.00	0.40		0.40	0.40		0.40
Price stablization fund	8,238.26	82.38		82.38	82.38		82.38
Duty free price	**17,837.51**	**178.38**	**6.11**	**95.02**	**101.13**	**77.25**	**178.38**
Duty	833.56	8.34		8.34	8.34		8.34
Excise duty	2,750.74	27.51		27.51	27.51		27.51
Duty paid price	**21,421.81**	**214.22**	**6.11**	**130.86**	**136.97**	**77.25**	**214.22**
Distribution margin	200.00	2.00	2.00		2.00		2.00
Gross margin	934.86	9.35	9.35		9.35		9.35
Wholesale price	**22,556.67**	**225.57**	**17.46**	**130.86**	**148.32**	**77.25**	**225.57**
Retail margin	893.33	8.93	8.93		8.93		8.93
PUMP PRICE	**23,450.00**	**234.50**	**26.39**	**130.86**	**157.25**	**77.25**	**234.50**

36. With a total estimated tax burden of MWK 130.86 (USD 0.94) per liter, these data show that Malawi has considerable scope to influence the price of domestic transportation. Based on the 2006 price build-up of fertilizer shown below, for example, it can be estimated that the farm gate price includes at least USD 32.14 (MWK 5,199) per MT for domestic transportation. Given the accumulated tax rate and foreign exchange percentage from Table 5 above, this works out to

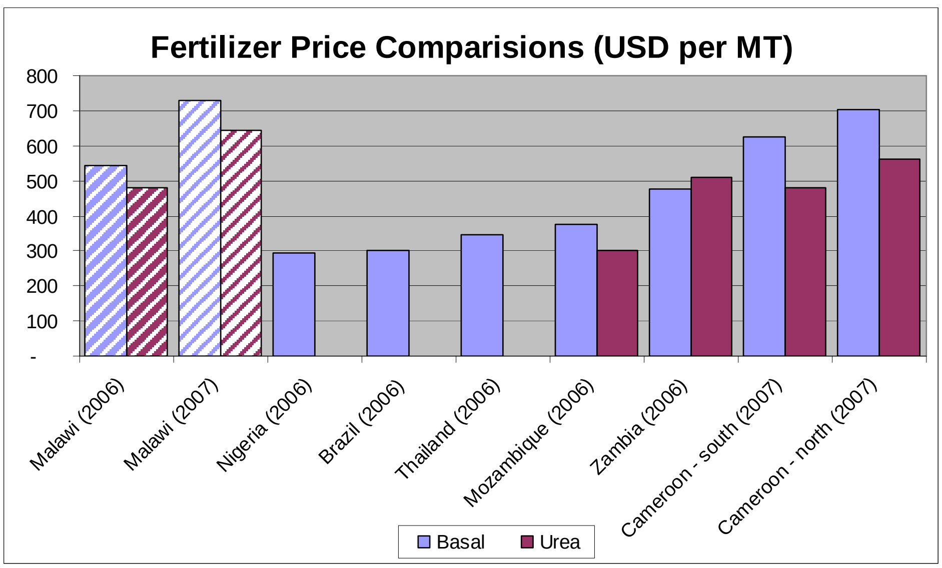
USD 20.73 (MWK 2,902) of fuel tax per MT fertilizer, which is equal to about 4% of a farmer's cost for this input.

37. Naturally, any change in fuel tax needs to be considered in the wider context of Malawi's overall fiscal policy, but these data do at least help illustrate the important link between transport costs and agriculture competitiveness. Fertilizer is just one agriculture input and any reduction in transport costs could be expected to trickle down to benefit other inputs as well.

B. Fertilizer

38. Fertilizer is a significant component of farm costs and domestic price levels have a major bearing on final competitiveness, not just in terms of accumulated SV at the point of final competition, but also in terms of the influence on farmer decision making and yield expectations. In this respect, one important finding of the input analysis is that fertilizer prices are relatively high in Malawi compared with regional neighbors and other international competitors (see Figure 6).

Figure 6: Fertilizer price comparison



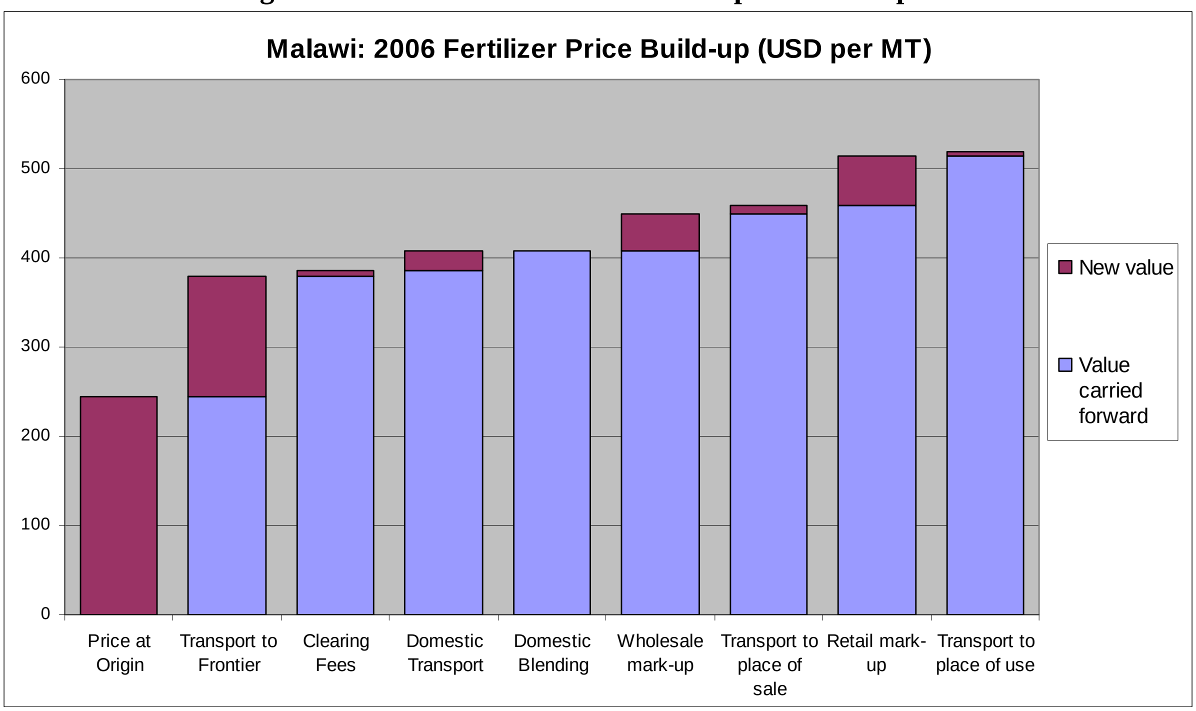
39. Table 5 shows the build-up of 2006 fertilizer prices in Malawi and Zambia. These data show that Malawi enjoys slightly lower foreign transportation costs to the frontier than Zambia, but generally pays a higher per MT price for fertilizer because of the lack of domestic blending capabilities. Not all fertilizer in Zambia is domestically blended, but where this takes place raw ingredients can be purchased for a lower price. Because of this savings, Zambia also enjoys lower dealer mark-ups (even at the same percentage) than Malawi. According to the estimates below, Zambia also enjoys slightly lower domestic transport costs, but even if the values were the same, the total price of fertilizer in Malawi would still be higher than in Zambia. Neither Zambia nor Malawi imposes customs duty, VAT, or other direct tax on fertilizer.

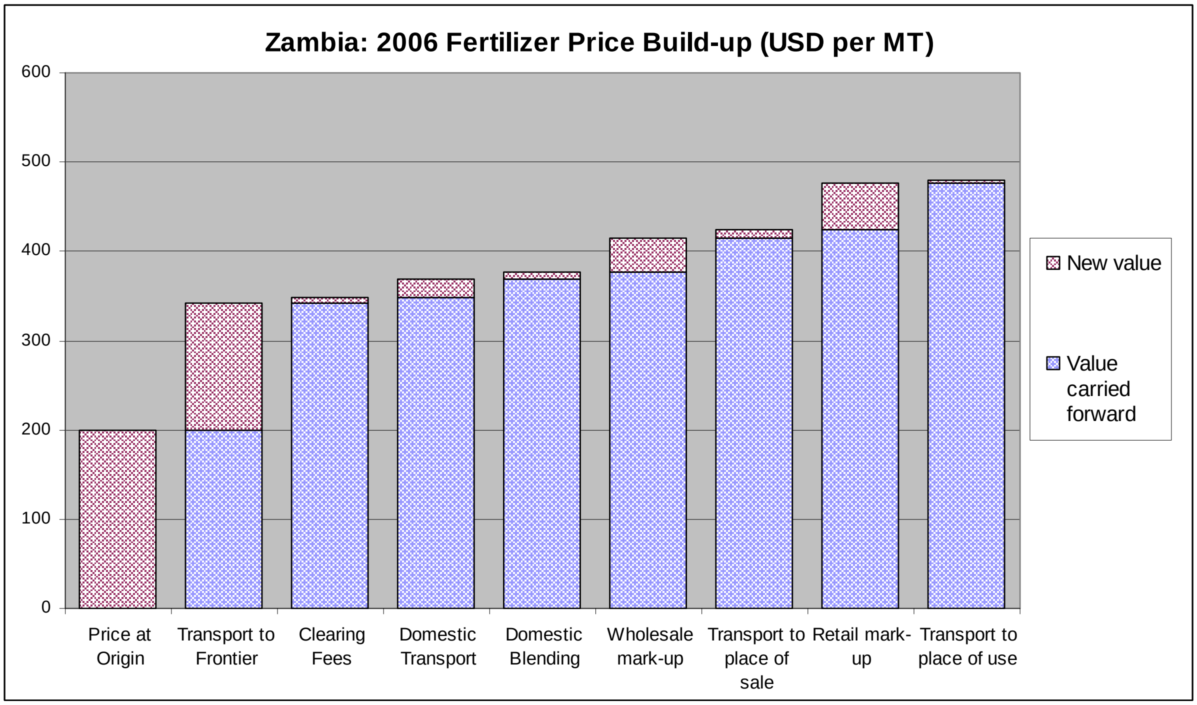
Table 5: 2006 Fertilizer Price Build-up, Comparison of Observed Prices in Malawi and Zambia (USD per MT)

	Malawi	Zambia
Price at origin	245.00	200.00
Transport to frontier	140.69	141.44
Customs duty & excise	-	-
VAT or other direct tax	-	-
Clearing fees	11.57	6.83
Domestic transport (200km)	21.43	20.00
Domestic blending	-	9.00
Wholesaler mark-up	41.87	37.73
Transport to place of sale (100km)	10.71	10.00
Retailer mark-up	56.55	42.50
Transport to place of use	5.00	3.75
Total (per MT)	**532.82**	**471.25**
Total per 50kg bag	26.64	23.56

40. The charts below provide a graphic illustration of the differences in fertilizer price build-up between Zambia and Malawi.

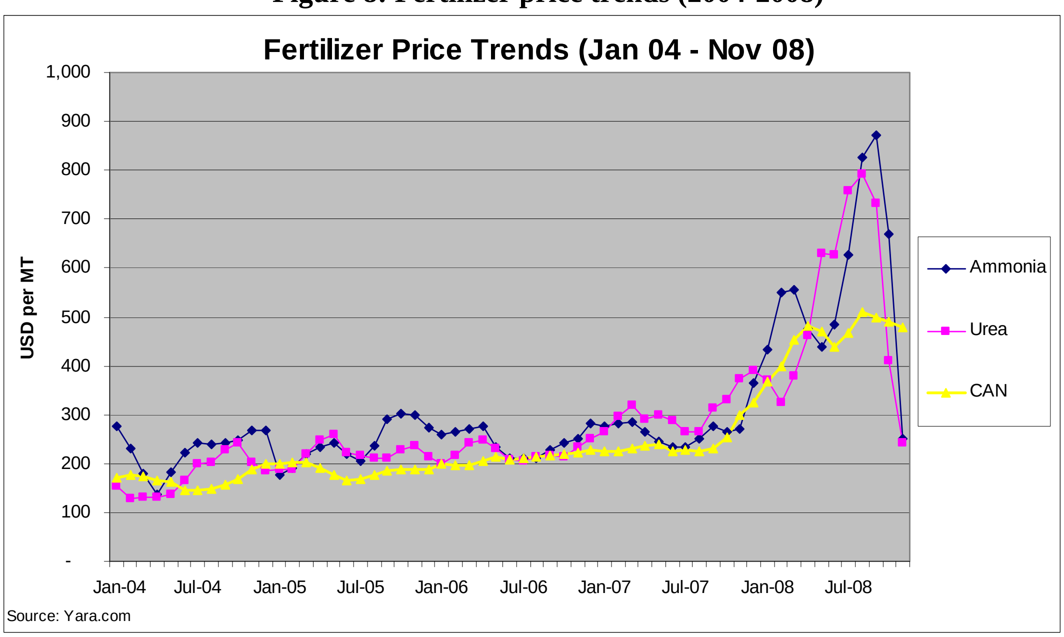
Figure 7: Malawi and Zambia fertilizer price build-up





41. In 2008 world fertilizer price spiked to unprecedented levels which had a major impact on domestic prices in 2008/09, not least of all because most domestic importers (including the government under its own fertilizer subsidy program) happen to make their purchases each year at almost the same time in the season when global prices were at their highest (see graph). Between 2007 and 2008, the typical retail price at the start of the agricultural season for a 50 bag of urea increased from MWK 3,800 (USD 27.14) to more than MWK 7,400 (USD 52.86).

Figure 8: Fertilizer price trends (2004-2008)

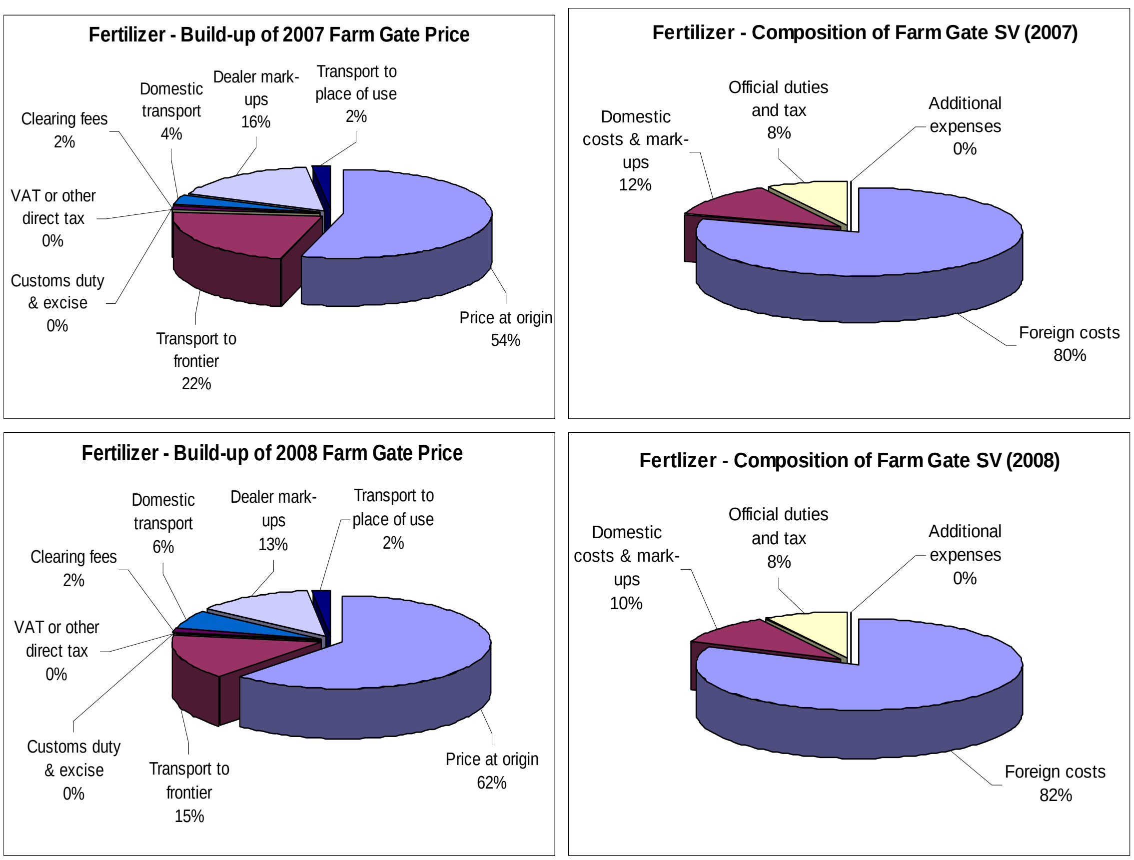


Ammonia, fob Black Sea; Urea, prilled bulk Black Sea; CAN, Calcium Ammonium Nitrate, bulk cif Germany.

42. The pie charts in Figure 9 show the differences in the composition of domestic fertilizer prices between 2007 and 2008. As shown, the price increase in 2008 meant that the price at origin increased from 54% of farm gate SV to 62%. Once all foreign costs, including international shipping and imported fuel for domestic transport for domestic transport are taken into account, the total foreign exchange component of fertilizer increased from 80% in 2007 to 82% in 2008. Other than negotiating for better international prices through forward contracts or other improved supply arrangements, therefore, these data show that Malawi has limited scope to influence the farm gate price of this important input. Investments in improved distribution networks for fertilizer and domestic blending could help, but compared to changes in foreign costs, these investments could only have limited impact on agriculture competitiveness.

43. Finally, one further important point to note from the pie charts below is that although Malawi does not impose any direct tax on fertilizer in the form of customs duty or VAT, the analysis reveals that domestic taxes still accounted for around 8% of total farm gate SV in 2007 and 2008. These taxes included VAT on clearing fees, fuel taxes, trading licenses, and profit tax charged on dealer mark-ups. As a strategy to improve agriculture competitiveness, therefore, there may be some scope for policymakers to reduce specific taxes that pertain to fertilizer imports and trade.

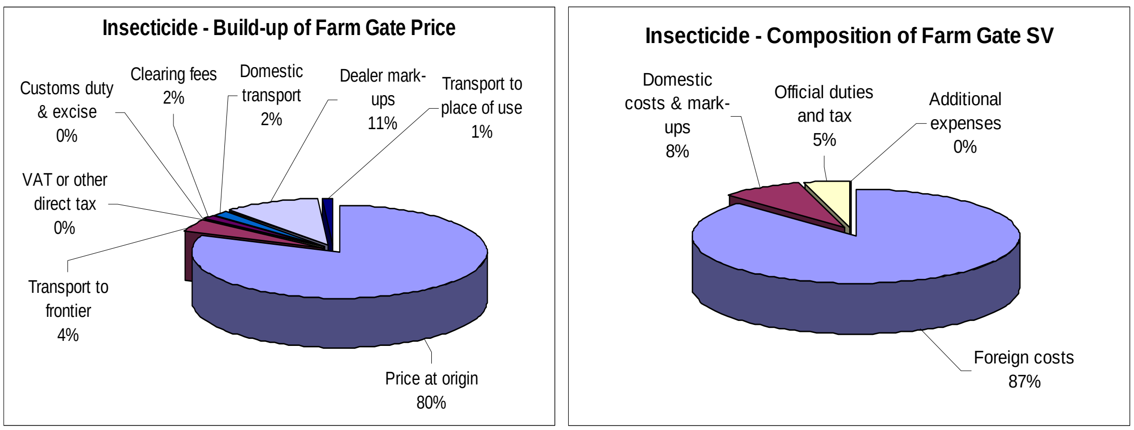
Figure 9: Composition of Value Chain Costs for Fertilizer in 2007 and 2008



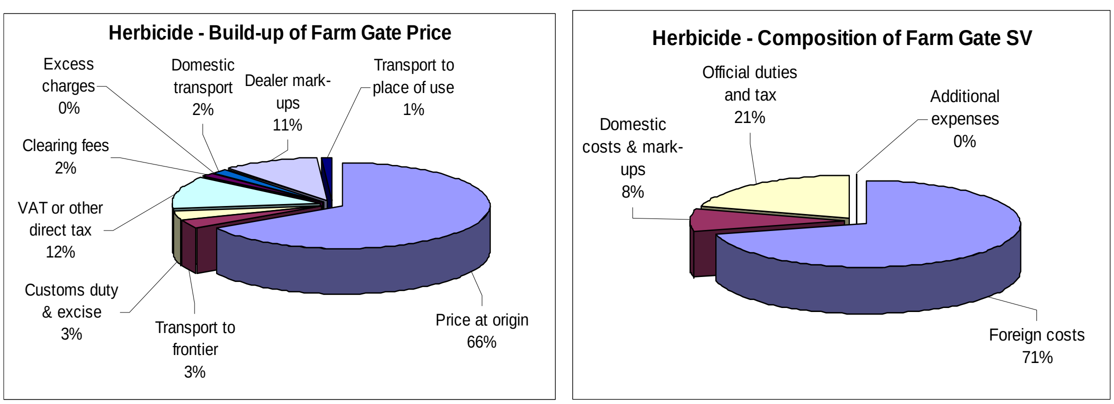
C. Agri-chemicals

44. The next set of charts in Figure 10 show the impact of different tax rates on agriculture prices by comparing the cost build-up of insecticides and herbicides. In this case, insecticides (which are important inputs for smallholder cotton and tobacco) do not attract import duty or VAT, whereas herbicides (which are not widely used by smallholders, but could substitute for labor spent on weeding) attract 17.5% VAT and 5% customs duty.[10] As shown below, this means that the final price composition of insecticides includes only 5% domestic tax compared to 21% for herbicides.

Figure 10: Composition of value chain costs for insecticides and herbicides, 2007/08



Herbicide



45. While the specific question of whether or not it would be an effective strategy for Malawi to reduce the tax rate on herbicides is beyond the scope of the present discussion, these data illustrate how different tax rates can affect farmer decision making and, ultimately, agriculture competitiveness. If an insecticide costs USD 1.00 in the place where it is produced, for example, the final farm gate SV would work out to USD 1.24. On the other hand, herbicide that cost USD 1.00 per unit in the foreign market would have a final SV of USD 1.52 as a result of the additional tax. In this simple example, therefore, the elimination of VAT and 5% import duty on herbicides could result in a 28% savings in unit costs for the farmer and may be a way to encourage growers to adopt this technology.

[10] In 2008, VAT was reduced to 16%.

D. Hybrid Maize Seed

46. The input analysis in Malawi also included an examination of farm and assembly-level costs of hybrid seed production. This work was undertaken to derive the conversion factors required by the spreadsheet methodology for the analysis of smallholder hybrid maize and is based on information supplied by one commercial seed company only. Given this limitation, the results should not be interpreted as a definitive picture of the costs and returns to seed multiplication, but only as a snapshot view of what one company is reporting.

47. Seed multiplication requires strict adherence to management guidelines and is therefore mainly undertaken by large and medium-scale estates with a commercial outlook rather than by smallholders. The company modeled here uses foundation seed imported from South Africa which is then multiplied on contract by farmers with the capacity to cultivate a minimum of 10 hectares. There is no provision for loans and most growers are within 200km of Lilongwe.

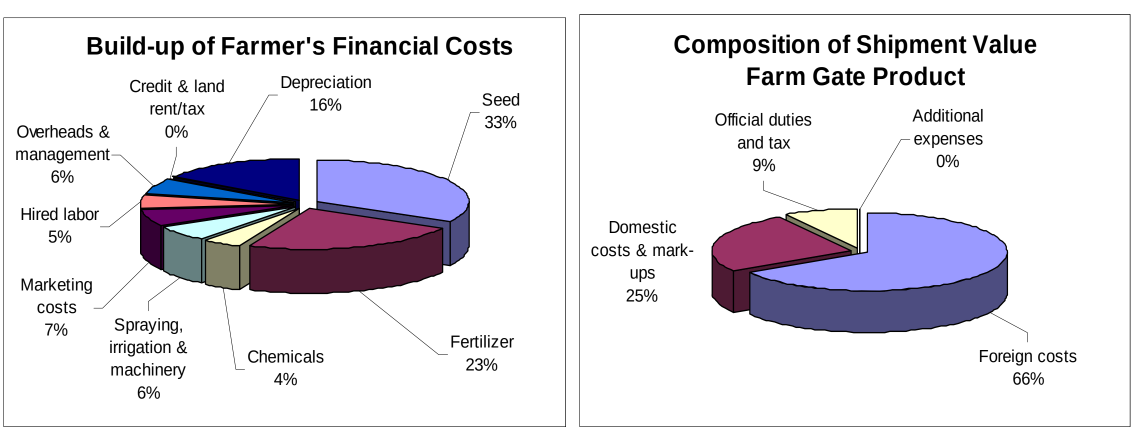
48. **Farm level analysis.** Farm-level data for the hybrid seed multiplication based on a yield of 7MT/ha and price to the farmer of MWK 49,350 (USD 352.50) per MT are set out below. As shown, the enterprise can be quite profitable, but also requires a large cash commitment. Over the 10ha minimum plot size, the grower's total variable costs work out to nearly USD 16,000 (MWK 2.24 million).

Table 6: Farm-level analysis of hybrid maize seed multiplication

FARM PRODUCTION LCF Hybrid Seed	Per Hectare		Per Ton	
	MWK	USD	MWK	USD
Gross revenue (yield * price)	**345,450**	**2,467.50**	**49,350**	**352.50**
Production costs				
Variable costs	223,250	1,594.64	31,893	227.81
Investment costs	41,258	294.70	5,894	42.10
Total costs	**264,508**	**1,889.34**	**37,787**	**269.91**
Farmer income				
Gross margin (revenue - var costs)	**122,200**	**872.86**	**17,457**	**124.69**
Net profit (gross margin - invest costs)	**80,942**	**578.16**	**11,563**	**82.59**

49. The charts in Figure 11 show the cost composition of farm-level costs for hybrid seed from the financial and value chain perspectives. As shown, imported seed and fertilizer account for a combined 56% of total costs. Once other foreign components are taken into account, around 2/3 of the farm gate value of domestically multiplied seed is foreign. As a mechanized operation, hired labor only accounts for an estimated 5% of farm-level SV.

Figure 11: Build-up of financial costs for maize seed multiplication



	MWK per MT	USD per MT	% of DVA	% of SV
Domestic costs	9,503	67.88	74%	25%
Duties and tax	3,299	23.56	26%	9%
Additional expenses	-	-	0%	0%
Total DVA	**12,802**	**91.44**	**100%**	**34%**
Foreign costs	24,985	178.46	195%	66%
Total SV	**37,787**	**269.91**	**295%**	**100%**

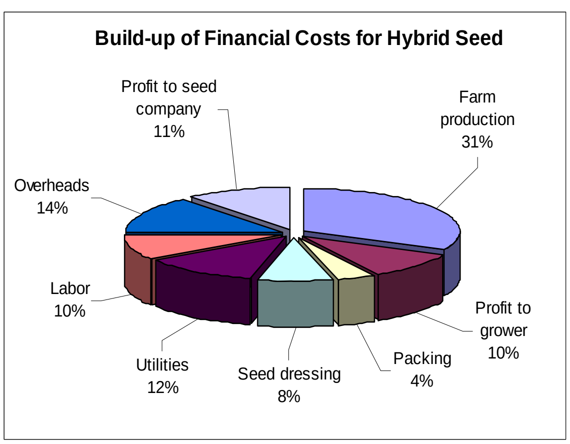
foreign conv factors (cf)		**domestic conv factors (cf)**	
% foreign	66.12%	tax as % DVA	0.258
foreign cf	1.107	extras	-

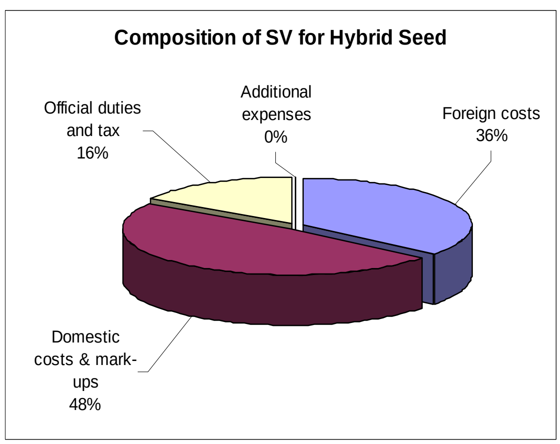
50. **Distribution Level (processing, packaging, and marketing).** The next set of tables and charts show the estimated ton costs and returns to the seed company. Once grading, seed dressing, packing, storage, and distribution costs to domestic retailers are taken into account, the data show that the company makes a net profit of around USD 17.14 (MWK 2,400) per MT. This is about 21% of the per MT profits received by farmers. Whereas a farmer who multiplies seed over 10ha can expect a total yield of around 70 MT, seed companies trade far greater volumes reaching into hundreds of thousands of tons per year.

Table 7: Analysis of hybrid seed costs at processing and distribution levels

HYBRID SEED	**Per Hectare**		**Per Ton**	
(Process and distribute)	**MWK**	**USD**	**MWK**	**USD**
Gross revenue (qty sold * price)	**840,000**	**6,000.00**	**120,000**	**857.14**
Production costs				
Crop purchases (payment to farmer)	345,450	2,467.50	49,350	352.50
Other variable costs	477,750	3,412.50	68,250	487.50
Investment costs	-	-	-	-
Total costs	**823,200**	**5,880.00**	**117,600**	**840.00**
Seed Company's Profit Margins				
Gross margin (revenue - total var costs)	**16,800**	**120.00**	**2,400**	**17.14**
Net profit (gross margin - invest costs)	**16,800**	**120.00**	**2,400**	**17.14**

51. As indicated by the charts below, the analysis found that operations after farm production add considerably to domestic costs. These costs include payment to the farmer, labor at the processing facility, and domestic utilities. Whereas the foreign share of total SV decreases from 66% to 36%, however, the overall tax burden on hybrid seed production nearly doubles from 9% to 16%.





	MWK per MT	USD per MT	% of DVA	% of SV
Domestic costs	56,682	404.87	75%	48%
Duties and tax	18,737	133.83	25%	16%
Additional expenses	-	-	0%	0%
Total DVA	**75,418**	**538.70**	**100%**	**64%**
Foreign costs	42,182	301.30	56%	36%
Total SV	**117,600**	**840.00**	**156%**	**100%**

foreign conv factors (cf)		**domestic conv factors (cf)**	
% foreign	35.87%	tax as % DVA	0.248
foreign cf	1.107	extras	-

52. **Value chain build-up.** Finally, the table below summarizes the build-up of value chain cost components for hybrid seed. The values for packed seed are measured at the factory gate before distribution to local retailers. As defined by the value chain methodology, values at this level include all costs carried forward from farm production plus farmer profits which are counted at the packed seed stage since this is a cost paid by the factory. As shown, actual farm gate costs only amount to 31% of total SV; farmer profits add a further 10% to total SV; and factory costs (including profit to the seed company) add a further 59% to total SV before retail distribution.

	FARM GATE PRODUCT		**PACKED SEED READY FOR USE**	
	MWK	USD	MWK	USD
Domestic Value Added				
Costs & mark-ups	8,183	58.45	57,306	409.33
Official duties & tax	4,797	34.27	18,726	133.76
Additional costs	-	-	-	-
Total DVA	**12,981**	**92.72**	**76,032**	**543.09**
Foreign costs	24,806	177.19	41,568	296.91
Total Shipment Value	**37,787**	**269.91**	**117,600**	**840.00**

53. As a strategy to reduce the cost of hybrid seed, some further examination of factory costs may be in order. Utility costs (including the cost of power disruptions), taxes on imported seed dressing, and taxes on other business operating expenses are areas where possible savings could be achieved. Rents (i.e. royalties) by the seed company on imported foundation seed also appear significant and could be an area where Malawi research institutes could play a more dynamic and active role in helping to bring down the cost of this important input.

V. MAIZE

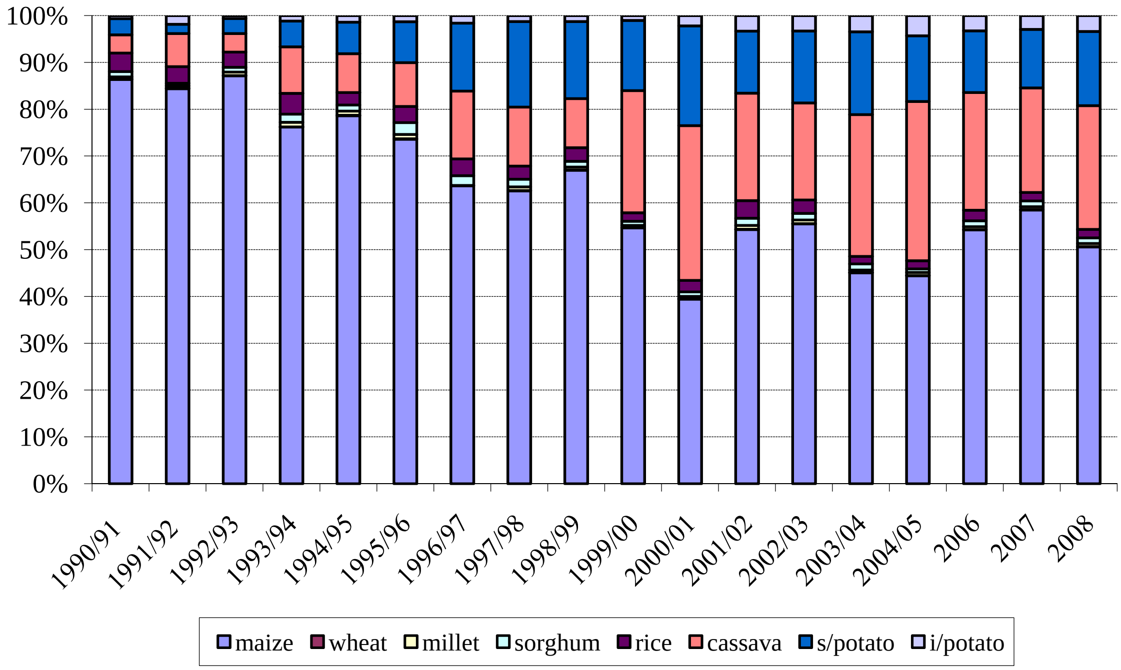
54. Maize is by far the most important food crop in Malawi and is grown on over 70% of land cultivated by small-scale farmers. Due to the dominance of the food self-sufficiency policy, coupled with weak and very thin maize markets, almost all smallholder farmers grow maize as a matter of precautionary principle. Moreover, maize is the dominant cereal in Malawi's food basket, both in terms of the area under food crops (where it takes up over 90 percent) and in cereal- based calories where it comprises over 90 percent (see Table 8). However, it is important to note that in terms of total calories produced roots and tubers (cassava and potatoes) have also become increasingly important, more especially after economic liberalization in the 1990s (see Figure 12). This notwithstanding, maize is still an important staple crop and the primary supplier of calories in many parts of Malawi and any major fluctuations in its production have always had significant implications on the country's food security.

Table 8: Importance of maize in Malawi's food basket

	Area (000 ha)			**Yield (kg/hectare)**			**Kcal/capita/day (Production)**		
	2006	**2007**	**2008**	**2006**	**2007**	**2008**	**2006**	**2007**	**2008**
Wheat	2	2	3	1 211	2 297	1 981	2	4	4
Maize	1 620	1 688	1 647	1 590	2 040	1 790	1433	1883	1427
Millet	41	45	44	658	719	758	22	26	24
Sorghum	71	74	75	769	859	847	44	51	45
Rice (Paddy)	53	53	53	1 743	1 743	1 743	50	49	44
Rice (Mill.) - imports	53	53	53	1 129	1 129	1 129	50	49	43
Total Cereals (coarse Grains + milled rice)	**1 733**	**1 807**	**1 766**	**1 534**	**1 959**	**1 724**	**1601**	**2062**	**1587**
Cassava	162	169	185	17,300	18,200	19,400	706	764	793
S. potatoes	130	142	159	13,400	14,500	15,900	370	428	475
I. potatoes	41	39	46	13,000	15,400	14,700	97	107	108
Total roots/tubers	333	350	390				1173	1299	1376
Total (Cereals + roots and tubers)	**2066**	**2157**	**2156**				**2874**	**3361**	**2963**
% maize in total cereals	**93.5**	**93.4**	**93.3**				**90**	**91**	**90**
% maize in total Calories	**78.4**	**78.3**	**76.4**				**52**	**56**	**48**

Note: Authors calculations based on FAO conversion factors (Kcal per kg): maize grain = 356; wheat=342; millet=342; sorghum=339; milled rice=350; cassava=140; s/potatoes=110; i/potatoes=90.

Figure 12: Malawi: Calorie composition (1990-2008)



Source: Authors calculations based on FAOSTAT (for production data) and FAO conversion factors.

56. The value chain analysis covers five levels of maize production differentiated on the basis of farm management, crop varieties, and irrigation. Farm level profits are based on selling to a small trader at roadside location somewhere near the farm. Assembly level costs then include storage, fumigation, and transportation of the maize over an indicative distance of 130km into a mill location where the accumulated SV can be compared with import parity. For export parity, further transport costs to Zimbabwe were taken into account as described in the discussion of Malawi's final trade competitiveness. Details of these value chain assumptions are set out in Table 9 below.

Table 9: Maize, value chain assumptions

Sector	Yield (MT/Ha)	Farm	Assembly
Rain-fed Maize			
FAM-OPV	1.1	35kg saved OPV seed, 1x1 fertilizer, no chemicals, ox cart to market, 85 days labor (58 days family)	Buy grain in small quantities at roadside from many farmers, provide bags, short-term storage and fumigation. Then 130km own transport into mill
FAM-low	1.50	25kg hybrid seed, 2x2 fertilizer, no chemicals, ox cart to market, 90 days labor (60 days family)	
FAM-high	2.50	25kg hybrid seed, 4x4 fertilizer, no chemicals, hired vehicle to market, 110 days labor (70 days family)	
Irrigated Maize			
FAM-low (irrig)	2.50	25kg hybrid seed, 2x1 fertilizer, no chemicals, pumping costs and WUA fee, ox cart to market, 100 days labor (68 days family)	Same as above, but assume less time to assemble a sufficient quantity to justify delivery due to higher yields and concentrated production.
FAM-high (irrig)	3.50	25kg hybrid seed, 4x4 fertilizer, no chemicals, pumping costs and WUA fee, ox cart to market, 115 days labor (73 days family)	

Fertilizer use expressed in 50kg bags basal (NPK) x 50kg bags top dressing (urea) per ha.

	MK per MT	USD per MT	Product Form	Location
Farm gate price	28,000	200.00	Loose grain	Roadside
Assembled raw material	45,000	321.43	Bagged grain	Into Mill

57 **Farm-level analysis.** Key data from the farm level analysis of maize are summarized in the table below. In interpreting these results, it should be kept in mind that most small farmers in Malawi cultivate less than a full hectare of maize. On a national basis, only around 0.8 ha are available per farm household of which some land is usually given to a cash crop like tobacco or cotton. Assuming that a "typical" household only cultivates maybe 0.5 ha of maize, therefore, the actual costs and profits would be half of what are shown below. Or, to be more specific, half of a hectare of high-input rain fed maize provides an annual net profit of just USD 35.19 (MWK4,926) compared with half a hectare of high-input irrigated maize which returns USD 119.12 (MWK 16,676) or about 47% of Malawi's 2007 per capita income.

Table 10: Maize, farm-level indicators

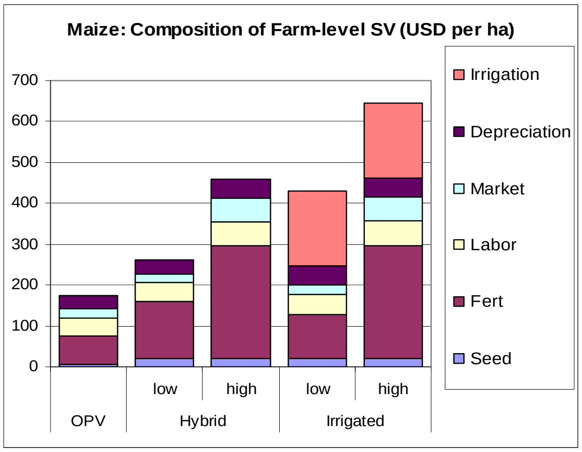
	% Foreign	Tax as % DVA	Variable Costs (USD/ha)	Net Profit (USD/ha)	Return to Variable Costs	Farm-gate SV (USD/MT)
Malawi (2007/08)						
Rainfed						
FAM-OPV	44%	14%	116.29	70.67	0.61	158.35
FAM-low	54%	19%	201.43	65.53	0.33	173.46
FAM-high	61%	28%	381.43	70.38	0.18	183.85
Irrigated						
FAM-low	44%	20%	200.23	250.38	1.25	171.72
FAM-high	54%	25%	413.57	238.23	0.58	183.88

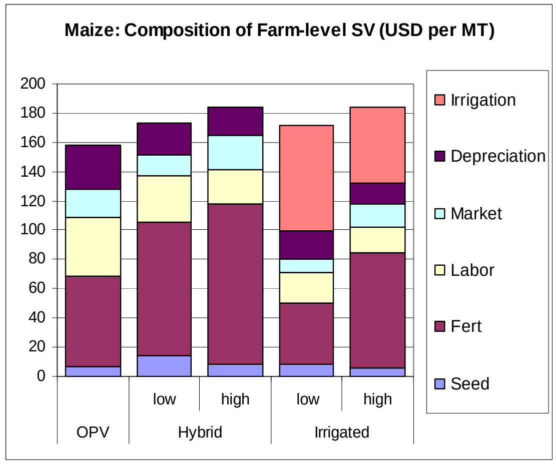
58. Several other points are worth noting from the farm-level indicators as follows.

- Irrigation can result in a significant improvement in farmer incomes, but does not contribute to improved trade competitiveness as measured by farm gate SV. Ton-for ton, in fact, open pollinated varieties (OPV) maize is the lowest cost product and therefore most competitive.
- With irrigation, low-input maize provides slightly more net profit and a far better rate of return than with high input management. Similarly, without irrigation, the rates of return to variable costs deteriorate at each level of higher input management.
- Taken together, these poor results for supposedly "improved" management suggest that Malawi is already at the point of diminishing marginal returns to fertilizer and other yield enhancing technologies. The high cost of fertilizer contributes to this poor result and the analysis shows that efforts to reduce this cost are not only important for income and trade competitiveness, but also for achieving higher yields and domestic food security.
- At 44-61%, the foreign exchange content of maize is largely accounted for by the imported costs of fertilizer. Tax as a share of DVA increases with higher input management as a result of incremental fertilizer use and, in the case of irrigated maize, because of pumping and foreign costs associated with irrigation development.

59. The chart in Figure 13 shows the per hectare cost components in more detail. As shown, farm costs increase significantly at each level of improved management in which fertilizer accounts for the majority of total expenditure. Although yields also increase with higher management, the additional expenditure on fertilizer and other inputs is likely to be difficult for poor households to afford without financial support. In the case of irrigated maize, the value in the top part of the bar for irrigation costs cover pumping and water user association (WUA) fees only. Depreciation on the irrigation infrastructure is assumed to be paid for by government and/or a donor funded projects and are not included as part of these financial calculations.

Figure 13: Maize, composition of farm-level SV



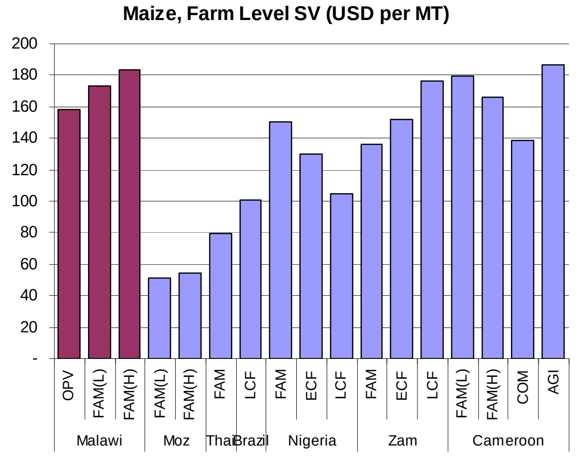


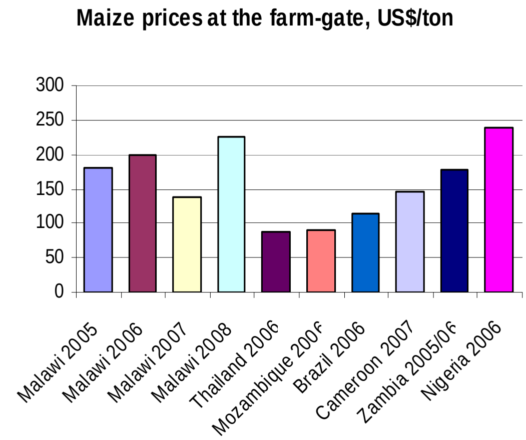
60. In terms of the per MT build-up of farm level SV, the data in Figure 13 show that the per MT shipment value increases with each level of management improvement, thus implying higher costs and lower overall competitiveness. Low-input irrigated maize has a slightly lower per MT SV than rain fed hybrid maize, but ton-for-ton high-input irrigated maize has the greatest total SV of all and is therefore the least competitive internationally. Although volume increases are also an important part of achieving improved competitiveness since this can help traders save on the time required to amass large enough quantities to justify transport to a storage shed, mill, or other assembly point, the data clearly indicate that more intensive management does not necessarily lead to improved trade competitiveness.

61. Figure 14 compares Malawi's farm gate SVs for maize with data from other countries where similar value chain analysis had been carried out. Although differences between years mean that the results cannot be compared exactly, the data reveal an important trend whereby Malawi appears to be a relatively high cost producer of maize at the farm level. Compared with neighboring Mozambique, for example, it costs more than three times as much to produce a ton of maize in Malawi. Similarly, compared with family and emerging commercial farmers in Zambia, Malawi also has higher costs. Only in the case of Cameroon, where the models were based on production in a remote inland area with high fertilizer costs, are the costs for family sector farmers similar to those in Malawi.

62. A second chart in Figure 14 compares Malawi domestic prices (at the farm-gate) with those of other countries. Although much of the discussion of agriculture policy revolves around how to increase farm gate prices, these data show that producer prices in Malawi are already relatively high. Naturally, this helps to make maize production a more profitable enterprise for the producer, but equally contributes to higher food costs for urban consumers and higher total shipment values for assembled grain. Although the question of what would be an *optimal* maize price is beyond the scope of this value chain analysis, high producer prices reduce the country's overall competitiveness, both in domestic markets for maize as an import substitute and in potential export markets as well.

Figure 14: Comparison of maize SV at farm level and parity prices (USD/ton)



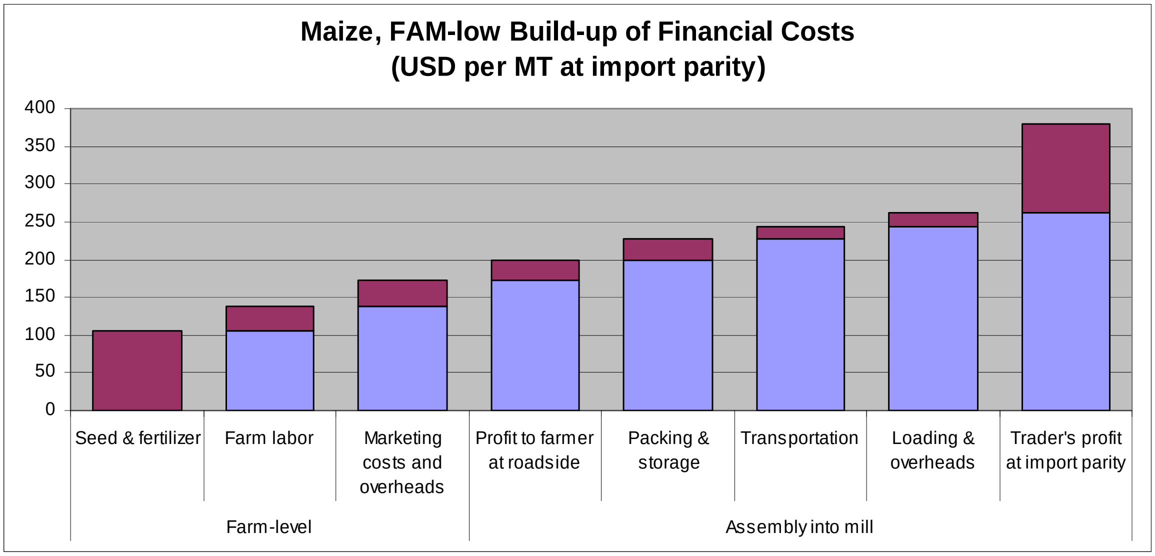


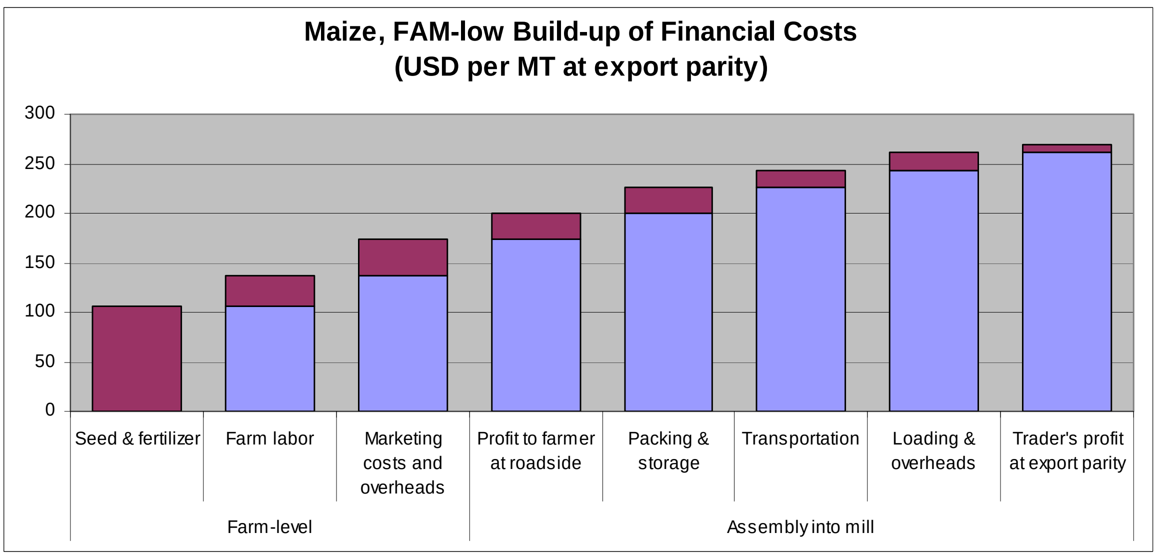
63. As shown in Figure 14, compared to other countries in the region and elsewhere, Malawi is a high cost producer of maize. Compared with neighboring Mozambique, for example, it costs more than three times as much to produce a ton of maize in Malawi. Similarly, compared with family and emerging commercial farmers in Zambia, Malawi also has higher costs. Only in the case of Cameroon, where the models were based on production in a remote inland area with high fertilizer costs, are the costs for family sector farmers similar to those in Malawi. *There are minimal benefits that may be obtained from use of open pollinated maize varieties (OPV) and small-scale irrigation.*

65. The next two charts in Figure 15 show the build- up of total SV for FAM-low maize at import and export parity prices including farm-level and into-mill assembly costs. In this case, the same overall pattern applies to OPV, FAM-high, and irrigated maize and these data are not needed to illustrate the value chain cost build-up.

66. In the first chart, trader profits are based on an import parity price of USD 379 per MT, the total profits paid to the trader with an import parity price amount to USD 117 (MWK 16,380) per MT. In actual fact, however, these profits are likely to be shared between multiple traders and are sometimes captured by farmers themselves to the extent individual producers are able to play an assembly roll by selling maize. The analysis also shows relatively high maize producer prices at the farm-gate (see Figure 14, second graph). At MWK45/kg and above, Malawi's maize producer price is higher than in most of the comparator countries and suggests that maize production may become a more profitable enterprise for the producer. But such high producer prices equally contribute to higher food costs for urban consumers, inflate the total SV for assembled grain, and ultimately dampen the prospects for trade competitiveness.

Figure 15: Maize, build-up of financial costs along the value





A. The Subsidy Program

67. The Malawi Government, through the Ministry of Agriculture has been implementing the Agricultural Input Subsidy Program since 2005/06.[11] These programs are meant to support farmers to afford fertilizer and improved seed and therefore secure improved maize output as a food security strategy. During the 2007/08 season, farmers received coupons for 2 bags of fertilizer (1 basal, 1 top dress) and free improved maize seed. By design, this was meant to be enough to cover 0.1 of a hectare. Only the subsistence poor farmers are eligible to benefit from the program. In the analysis, we examined the impact of the program on farm-level net profit and competitiveness. The amount of the subsidy in 2007/08 was equivalent to MWK800 (about USD 6) for a 50kg bag of basal and top-dressing fertilizer. Table 11 summarizes the financial results of the farm-level analysis between subsidized and unsubsidized production.

68. The results indicate considerable gains in farm-level net profits because the subsidy increases farmers' application of fertilizer and use of improved seed at a cheaper cost. All these invariably enhance net profits via reduction in production costs. Importantly, however, the input subsidy does not increase overall competitiveness of Malawi because the full input costs are still borne by the Government.

69. There are also other supply chain management interventions that could result in reducing the cost of agricultural inputs. For example, there is need to consider implementing some innovative approaches in the management of fertilizer and inputs supply chains such as timely procurement and bulk-buying arrangements with other countries in the region so as to be able to get lower prices at the origin.[12] Secondly, there is need to improve fertilizer use efficiency through the use of appropriate cropping practices such as conservation farming. Government also needs to consider reviewing the fertilizer formulations and blanket recommendations to ensure that they reflect area specific circumstances in terms of yield responses as well as the relative ratios of input and output prices.

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[11] Before then there were other variants of input support programs such as the Starter Pack in the late 1990s and early 2000s and the Targeted Inputs Program from 2003/04.

[12] IFDC, following the Africa Fertilizer Summit held in Abuja, Nigeria in June 2006, has been working on modalities of implementing regional bulk buying schemes, of which will involve Malawi, Mozambique, Zambia and Zimbabwe.

Table 11: Comparison of farm-level costs – subsidized and unsubsidized maize

FARM PRODUCTION Irrigated Maize (FAM-high)	Per Hectare		Per Ton	
	MWK	USD	MWK	USD
Gross revenue (yield * price)	**98,000**	**700.00**	**28,000**	**200.00**
Production costs				
Variable costs	57,900	413.57	16,543	118.16
Investment costs (ex. irrigation scheme)	6,747	48.19	1,928	13.77
Total costs	**64,647**	**461.77**	**18,471**	**131.93**
Farmer income				
Gross margin (revenue - var costs)	**40,100**	**286.43**	**11,457**	**81.84**
Net profit (gross margin - invest costs)	**33,353**	**238.23**	**9,529**	**68.07**

FARM PRODUCTION Hybrid Maize (FAM-high) - subsidy	Per Hectare		Per Ton	
	MWK	USD	MWK	USD
Gross revenue (yield * price)	**70,000**	**500.00**	**28,000**	**200.00**
Production costs				
Variable costs	22,200	158.57	8,880	63.43
Investment costs	6,747	48.19	2,699	19.28
Total costs	**28,947**	**206.77**	**11,579**	**82.71**
Farmer income				
Gross margin (revenue - var costs)	**47,800**	**341.43**	**19,120**	**136.57**
Net profit (gross margin - invest costs)	**41,053**	**293.23**	**16,421**	**117.29**

B. Maize Competitiveness

70. Next, Table 12 compares the accumulated SV for rain fed and irrigated maize at the assembly level with the most relevant import and export parity prices for Malawi. Based on 2007 prices, these data show that Malawi does enjoy a competitive advantage in maize as an import substitute, but not for export.. Given the much higher import parity price, Malawi would rather focus on domestic maize production for import substitution and should perhaps only target export markets where some specific opportunities emerge to exploit seasonal niche for regional trade. Improving the long-term competitiveness of maize as an export would likely require investments that reduce the underlying cost of fertilizer to the Malawi economy and not just financial prices to farmers as the input subsidy program set out to do.

Table 12: Maize parity price comparison

	Rain fed	Irrigated
Final SV	**USD 261 per ton** MWK 37 per kg	**USD 257 per ton** MWK 36 per kg
Import parity (RSA)	**USD 379 per ton** MWK 53 per kg	
Export parity (Zimbabwe)	**USD 269 per ton** MWK 37.6 per kg	

VI. RICE

71. Rice is another important smallholder crop in Malawi, grown mostly in areas along the lakeshore. Although the land area (only 3 percent of the area under food crops) and production volume (about 3.4 percent of total food production) are small compared to maize, it is widely perceived that Malawi has the potential to produce aromatic rice varieties such as Kilombero and Faya which can compete favorably with rice from major producing countries such as Thailand. Past studies that looked at the costs, profitability and efficiency of rice production have reported mixed results about Malawi's competitiveness in rice production (e.g. Nakhumwa et. al. 1999; Keyser et al. 1997). Currently, rice is considered by Government as one of the strategic crops to be promoted for import substitution and export.

72. The value chain analysis for rice covers four levels of production differentiated on the basis of rain-fed or irrigated system and farm-level management regimes as shown in Table 13. Assembly level costs are based on the cooperative model whereby paddy is transported from the farm-gate to the rural warehouse located 30 km away. Assembly costs include bags, storage costs, transport and overheads. Processing assumes a 60% out-turn from paddy to polished rice and a distance of about 300km from the rural warehouse/mill-gate to the consumer store.

Table 13: Rice assumptions

Sector	Yield (MT/Ha)	Farm	Assembly	Process	Distribute
Rain-fed Rice					
FAM-low	1.0	Seed, some insecticide, NSAFAM membership, hired ox cart to depot, 120 days labor (75 days family)	Cooperative marketing Co-op buys paddy at rural depot and transports 30km to own warehouse/mill. Costs include bags, storage, transport, overheads and depreciation.	60% outturn for polished rice packed for retail sale 35% outturn for rice bran (no value) 5% trash	200km from mill gate to store
FAM-high	2.3	Seed, 2x2 fertilizer, more insecticide, NASFAM membership, hired ox cart to depot, 150 days labor (85 days family)			
Irrigated Rice					
FAM-low (irrig)	2.0	Seed, 1x1 fertilizer, some insecticide, NASFAM membership, WUA fee, pumping costs, hired ox cart to depot, 150 days labor (80 days family)	Same as rain-fed	Same as rain-fed	Same as rain-fed
FAM-high (irrig)	3.0	Seed, 2x2 fertilizer, more insecticide, NASFAM membership, WUA fee, pumping costs, hired ox cart to depot, 160 days labor (85 days family)			

Fertilizer use expressed in 50kg bags basal (NPK) x 50kg bags top dressing (urea) per ha.

	MK per MT	USD per MT	Product Form	Location
Farm gate price	35,000	250.00	bagged paddy	Nkhotakota
Assembled raw material	38,860	277.57	bagged paddy	Regional warehouse
Ex-factory price				
Product 1	83,333	595.24	Polished rice (60%)	Lillongwe mill
Product 2	-	-	Rice bran (35%)	thrown away
Product 3	-	-	Trash (5%)	thrown away

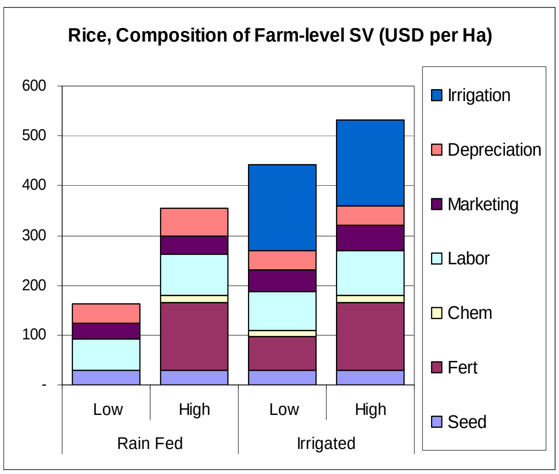
73. The farm-level indicators resulting from the analysis are shown in Table 14. These were obtained from the farmer groups that were visited by the study team. As we will see later, these yields are on average lower than those obtained in the other comparator countries such as Mozambique and Zambia.

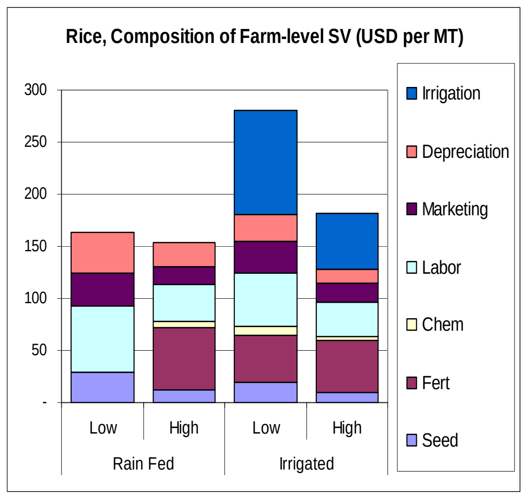
Table 14: Rice, farm-level indicators

	Yield (MT/ha)	Kg Fertilzer*	Price (USD/MT)	% Foreign	Tax as % DVA	Total SV (USD/MT)	Net Profit (USD/ha)
Malawi (2007/08)							
Rainfed							
FAM-low (rain)	1.00	0	250.00	16%	7%	163.10	119.05
FAM-high (rain)	2.30	200	250.00	45%	13%	153.87	257.53
Irrigated							
FAM-low (irrig)	2.00	100	250.00	36%	15%	222.71	239.40
FAM-high (irrig)	3.00	200	250.00	41%	15%	177.05	405.83

74. The per ton composition of rice production costs as shown in Figure 14, include fertilizer, labor, irrigation and marketing costs. Figure 16 further shows that unlike in maize, higher input levels are more profitable and improve competitiveness both under rainfed and irrigated conditions.

Figure 16: Rice, composition of farm-level SV





A. Rice Competitiveness

75. When we compare Malawi's total SV for paddy rice with other countries, Malawi's is not competitive except with Nigeria where prices are protected by trade policy (see Figures 15 and 16). Farm-gate price for paddy in Malawi is however higher (estimated at about USD250 per ton) compared to other countries except Nigeria. These high prices are a benefit to farmers, but eventually cause problems for trade competitiveness when the final SV for milled rice is compared with import parity. Given such high domestic price, there is little scope for further improvement in farm-gate price if Malawi is to achieve competitiveness in rice.

Figure 17: Comparison of paddy rice SV at farm level and parity prices (USD/ton)

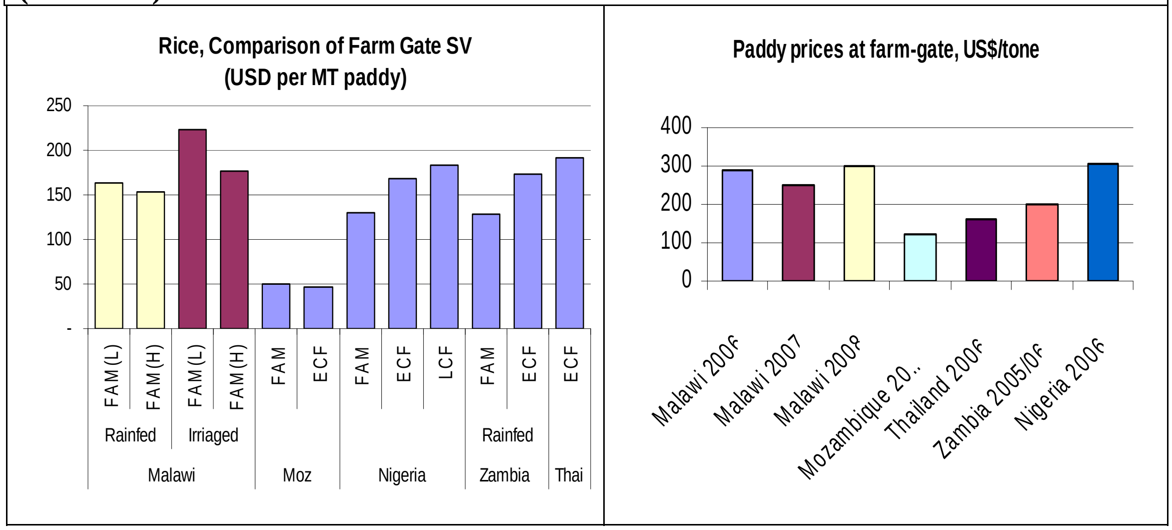
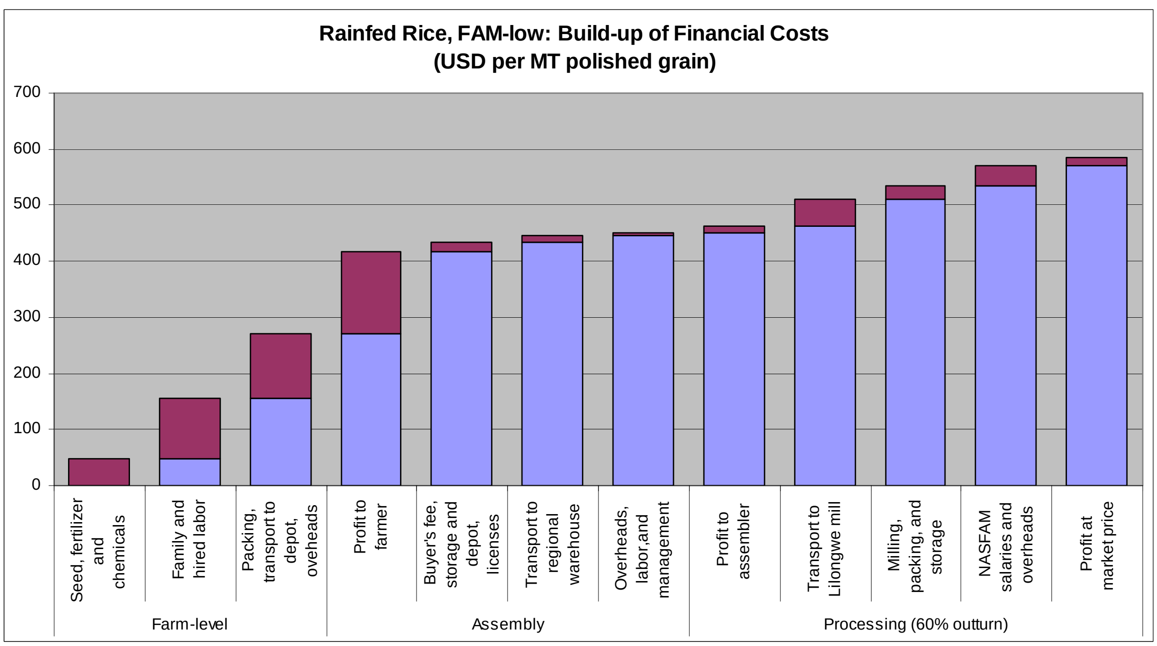
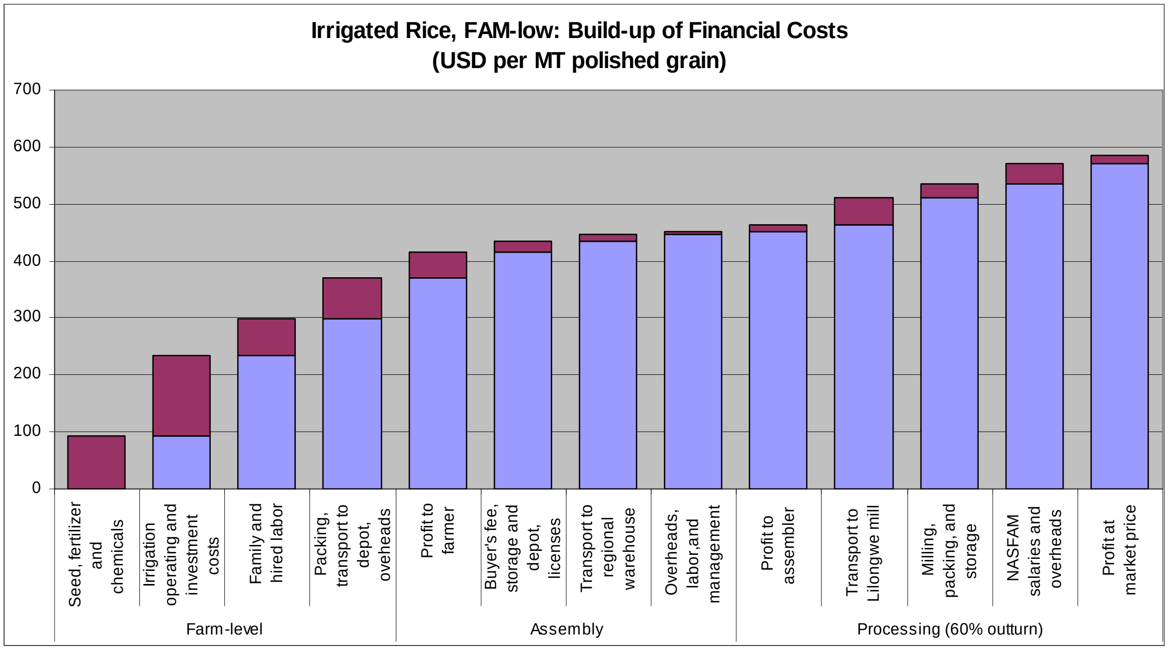


Figure 18: Rice, build-up of financial costs along the value chain





76. Table 15 shows that Malawi's polished rice is more costly to produce compared to Thai (import parity) or Zambian (export parity) rice. Based on 2007 prices, Malawi's production cost was estimated at about USD570 per ton while the import parity price for Thai rice was estimated at USD450 per ton and the export parity price for Zambian rice was estimated at USD480 per ton. This implies that Malawi should rather pursue rice production as an import substitution strategy, except when there are opportunities to exploit regional market niches. For instance, Malawi may specialize in producing special varieties such as *Kilombero and Faya* which are aromatic, long-grain and are likely to attract increased demand from millers and consumers compared to other varieties.

Table 15: Rice parity price comparison

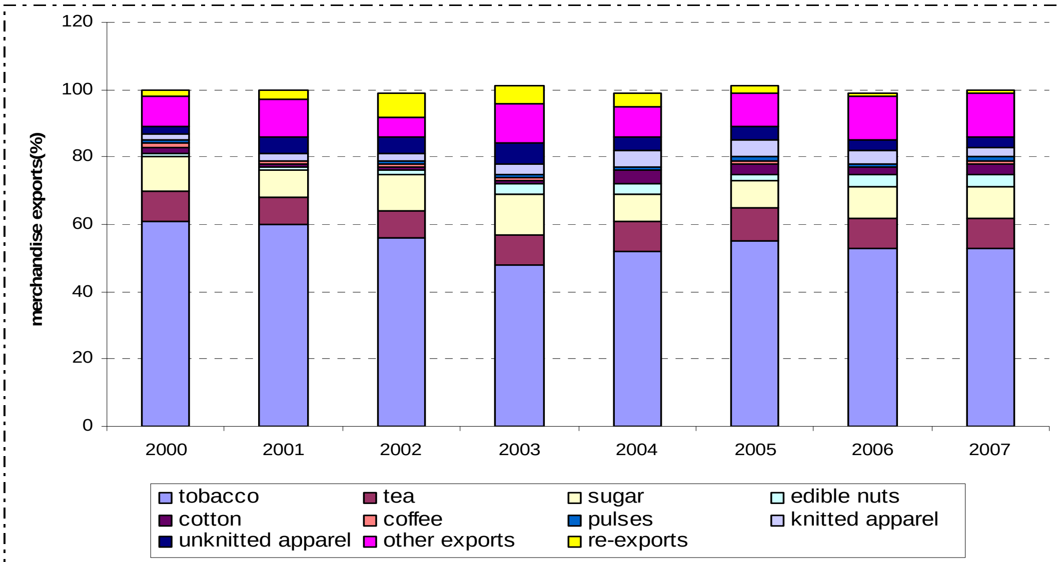
	Polished Rice
Final SV	**USD 570 per ton** MWK 79.8 per kg
Import parity (Thailand)	**USD 450 per ton** MWK 63.0 per kg
Export parity (Zambia)	**USD 480 per ton** MWK 67.2 per kg

VII. BURLEY TOBACCO

77. As can be seen in Figure 19, tobacco is the single most important export crop for Malawi, contributing over 65 percent in foreign earnings making Malawi one of the world's most tobacco reliant countries. Tobacco alone accounts for 43 percent of the agricultural GDP, 13 percent of overall GDP and 23 percent of the country's total tax revenue. Out of a total workforce of about 5 million people, over 600,000 people are employed in Malawi's tobacco sector. The crop occupies

122,000 hectares of the 4.6 million hectares under cultivation[13]. In 2007, tobacco contributed 53 percent to the volume of agricultural exports, compared to 9 percent each from sugar and tea, 3 percent from cotton, and 4 percent from edible nuts.

Figure 19: Agricultural Exports Composition in Malawi(2000-2007)



78. The analysis of the tobacco value chain covers two levels of burley production, differentiated on the basis of management levels. The low management scenario assumes low fertilizer application (4 bags each for basal and top-dressing) and low labor intensity on a per hectare basis. The high management scenario assumes high fertilizer application (8 bags each of basal and top-dressing) and high labor intensity (370 persondays). The assembly costs include curing and baling costs as well as levies and cesses at the Auction Floors. At the processing level, we assume a 55 percent conversion from dried leaf to tipped and threshed tobacco that is ready to be packed in boxes for delivery at the international market. The main assumptions for the burley tobacco farm models used in the analysis are shown in Tables 16 and 17.

Table 16: Burley tobacco assumptions

Sector	Yield (MT/Ha)	Key Inputs	Assembly	Process	Distribute
FAM-low	0.9	4x4 fertilizer on lands, some insecticide, hired sprayer, delivery to TAMA depot, 325 days labor (150 days family)	Transport to floor, deductions for TAMA, ARET, ATC, and AHL cesses and levies	Convert to tipped and threshed tobacco at 55%	Delivery boxed T&T tobacco to Europe
FAM-high	1.25	8x4 fertilizer on lands, more insecticide, own sprayer, delivery to TAMA depot, 370 days labor (175 days family)			

Fertilizer use expressed in 50kg bags basal (NPK) x 50kg bags top dressing (urea) per ha.

[13] Otanez, M.G. H. Mamudu and S.A. Glantz. Global Leaf Companies Control the Tobacco Market in Malawi. *Tob. Control 2007; 16: 261-269*

FAM-low (standard quality)

	MK per MT	USD per MT	Product Form	Location
Farm gate price	148,049	1,057.49	Baled tobacco	TAMA depot
Assembled raw material	164,450	1,174.64	Baled tobacco	Price at auction
Ex-factory price				
Product 1	385,545	2,753.90	Un-boxed T&T (55%)	Factory
Product 2	-	-	Trash	Factory
Final traded price				
Product 1	511,000	3,650.00	Boxed T&T Tobacco	cif Europe

FAM-high (better quality)

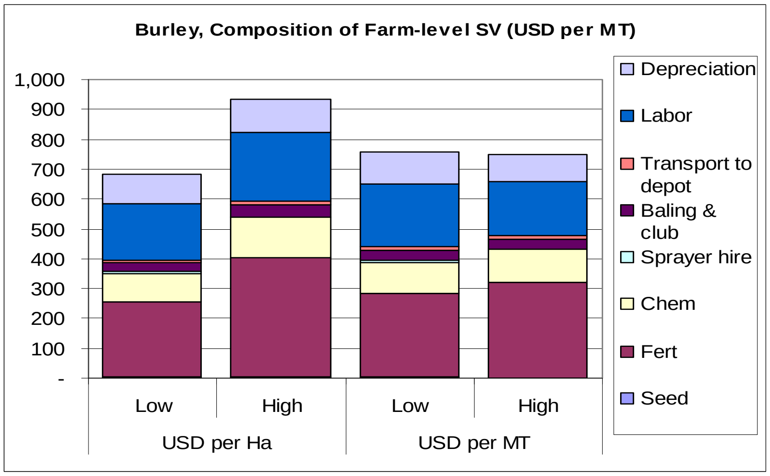
	MK per MT	USD per MT	Product Form	Location
Farm gate price	163,919	1,170.85	Baled tobacco	TAMA depot
Assembled raw material	180,895	1,292.11	Baled tobacco	Price at auction
Ex-factory price				
Product 1	415,445	2,967.47	Un-boxed T&T (55%)	Factory
Product 2	-	-	Trash	Factory
Final traded price				
Product 1	532,000	3,800.00	Boxed T&T Tobacco	cif Europe

Table 17: Summary of key data from the farm-level analysis of burley tobacco production

	Yield (MT/ha)	Kg Fertilizer*	USD per MT	% Foreign	Tax as % DVA	Total SV (USD/MT)	Net Profit (USD/ha)
Malawi (2007)							
FAM-low	0.90	400	1,057	50%	14%	759.05	332.89
FAM-high	1.25	600	1,171	55%	17%	736.65	617.75
Zambia (2006/07)							
FAM	1.25	600	1,200	41%	9%	975.16	443.28

79. As shown in Figure 20, key burley tobacco production costs at the farm-level include fertilizer, seed (mainly due to nursery establishment costs), chemicals and labor. Beyond the farm-gate, the major cost component is the foreign costs attributed to the high transport costs.

Figure 20: Burley, composition of farm-level SV

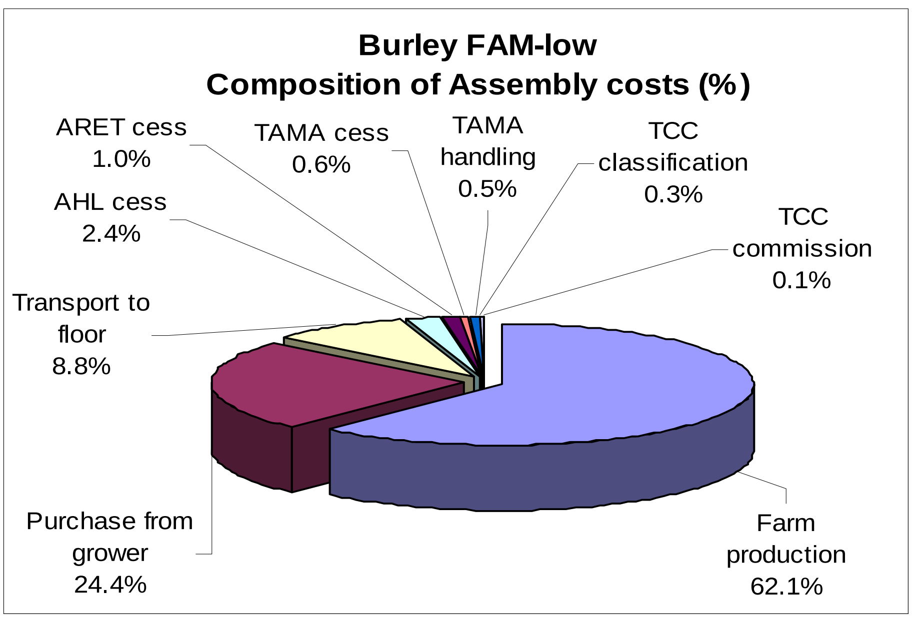


80. At the assembly level, the major costs that reduce producers' net profit include the high cost of transport and intermediation especially at the assembly level, including the Auction Floors. Transport costs to the floors constitute about 9 percent of the total proceeds (see Figure

21). Other intermediation costs that are levied against the producers' sales proceeds include Auction Holdings (AHL) cess (2.5 percent), Agricultural Research and Extension Trust (ARET) cess (1 percent), Tobacco Association of Malawi (TAMA) cess (0.6 percent), TAMA handling charges (0.5 percent) and Tobacco Control Commission re-classification and commission charges at 0.3 and 0.1 percent, respectively. Together these charges knock-off about 5 percent from the farmers' proceeds. At processing level, the key costs are overheads and investment (7 percent), labor and management (4 percent), repairs and maintenance (4 percent) and energy and machine maintenance (8 percent). At the final delivery of the tipped and threshed (T&T) leaf, the main costs comprise transport to the final delivery point (9 percent), administration and overheads (9 percent), interest charges (3 percent) and the cost of boxes that are used to pack the processed leaf.

81. In addition to these costs, there are other hidden costs that are not easy to quantify, but nonetheless reduce the net profit for the producers. Such charges include storage charges at the rural depots and the costs related to the long waiting time to off-load the tobacco at the floors. On average trucks have to wait on long queues for about 2-3 weeks at the floors to off-load. Although there is a booking-in system which is meant to reduce waiting time, the system is marred by irregularities and inefficiencies that undermine the principal of first in first out. Thirdly, the producers also have to wait for weeks before receiving their sales proceeds.

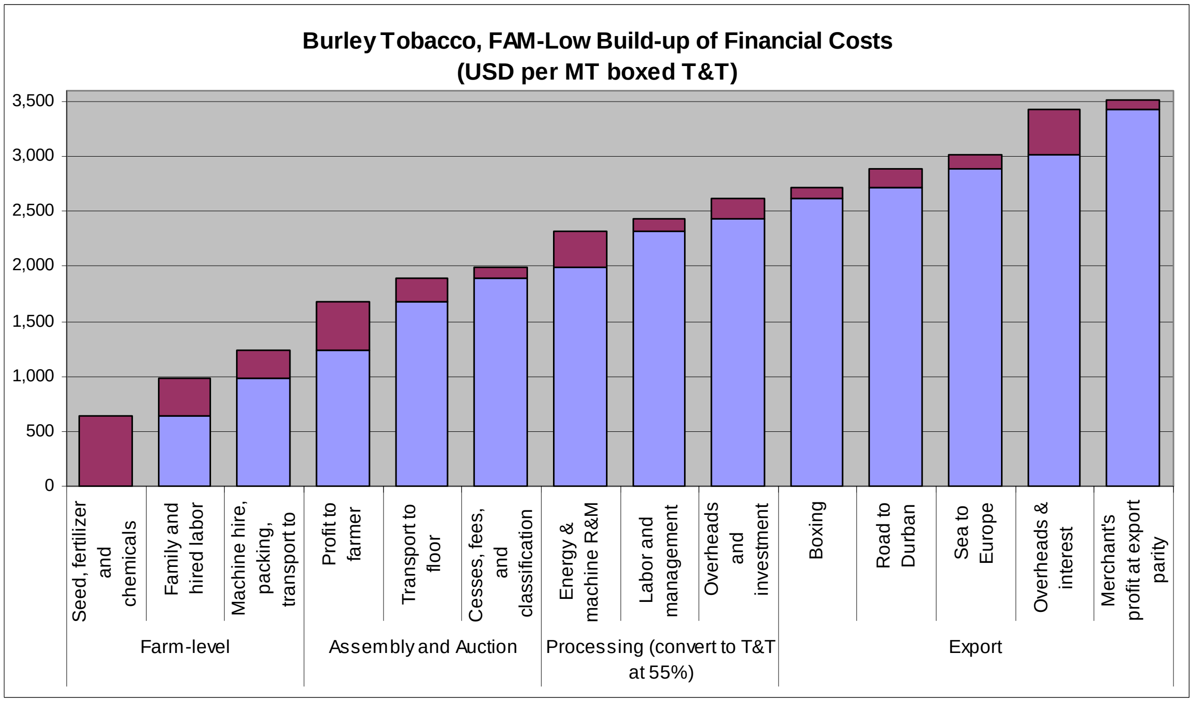
Figure 21: Burley, composition of assembly costs (%)

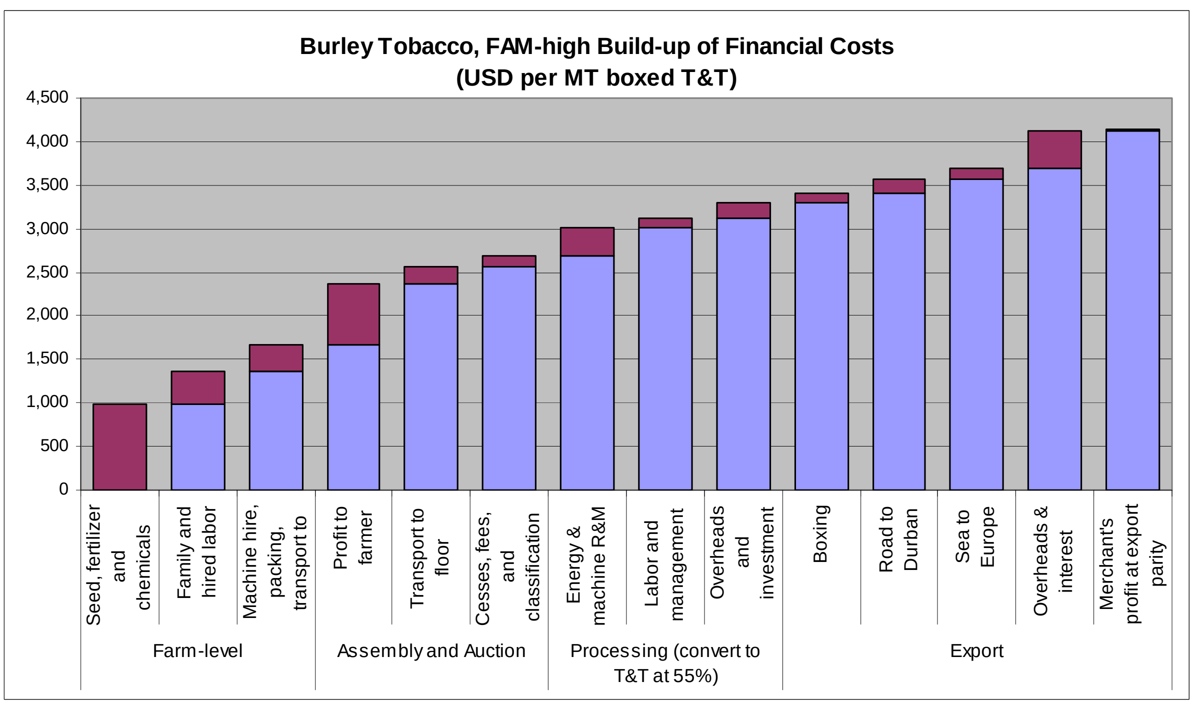


82. Figure 22 shows the build- up of the financial costs along the entire value chain from production to the international export market for processed leaf. This is a complex chain with costs at many levels and with very few obvious entry points for possible cost reductions. The costs related to cesses, levies and taxes were already substantially reduced following the Tobacco sector reforms undertaken in 2005 (Jaffe 2003; World Bank 2008). There is therefore little scope to further reduce these costs. The overhead costs at the processing and exportation levels are commensurate with the services provided, especially given the high cost of machine maintenance, fuel and electricity. This study has not done a detailed de-bundling of the overheads to be able to objectively suggest whether there may be scope in reducing these. The only cost element in which significant cost reduction may be possible is in the tobacco transport system. As seen from the

cost build up, transport cost is quite significant at all levels along the value chain. According to sector experts, the tobacco transport system is the most costly mainly due to inefficiencies in the tobacco marketing system.

Figure 22: Burley tobacco, build-up of financial costs along the value chain





A. Burley Tobacco Competitiveness

83. In spite of the high costs along the tobacco value chain, Malawi's burley tobacco is still internationally competitive. As shown in Table 18, the final SV for both FAM-low and FAM-high value chains is lower than the export parity (cif Northern Europe). *However, the competitive edge is now quite narrow.* It needs to be consolidated by adopting the improvements suggested above, and by helping farmers to adopt improved management systems so as to improve the productivity which is still low compared to other countries such as Zambia. The Government, the tobacco growers associations, and the private sector need to consider necessary reform and investment required to enhance more competitive/streamlined tobacco marketing and transport system.

Table 18: Burley tobacco parity price comparison

	FAM-low	FAM-high
Final SV (boxed T&T tobacco)	**USD 3,573 per ton** MWK 500.2 per kg	**USD 3,786 per ton** MWK 530.4 per kg
Export Parity (cif Northern Europe)	**USD 3,650** MWK 511.0 per kg	**USD 3,800** MWK 532.0 per kg

84. In order to consolidate the competitive edge in burley tobacco, there is need to help farmers adopt improved management through institutional innovations such as contract farming which have proven to work elsewhere. There is also need for interventions aimed at improving the tobacco marketing system so as to roll back some of the efficiency gains to producers.

85. Through discussions with some tobacco sector stakeholders, a number of suggestions on cost cutting measures were explored to improve the tobacco marketing system. *First is the need for Government to consider opening up to competition in the auctioning of tobacco.* This would entail making provisions for the entry of other auctioneers. Currently, there is already demand among private sectors players who are interested to provide alternative tobacco auction services. However, this would entail the review of the Tobacco Act CAP 65:02 and the Control of Tobacco and Auction Floors Act CAP 65:03. Government, with support from the World Bank, had already initiated such reforms in 2007, but the Ministry of Agriculture in coordination with the Ministry of Justice is yet to prepare the draft bills for legislation.

Secondly, there is need to increase tobacco contract farming and marketing arrangements. Highly innovative contract farming schemes have already emerged in the sector and are discussed further in chapter 6 of the Agriculture Background Paper (one of the background papers produced for the Country Economic Memorandum). Adopting them more broadly would reduce the volume of auctioned tobacco since contracted tobacco is sold directly to the contractors (though it still passes through the auction floors), but in principle by-passes the auctioning system. Although, Government, through TCC started to implement the contracting system (and already allocated a quota of over 40 million kg in 2007/08), the system has now been suspended.

Thirdly, there are suggestions to introduce more rural satellite auction markets which will invariably reduce the congestion at the three main auction markets in Lilongwe, Mzuzu and Limbe. Currently, there are 4 satellite markets that have been in operation for the past 2 years. There is need to increase the number, but this requires collateral investments by the private sector players, through some form of private-public partnerships.

VIII. COTTON

86. Cotton is one of the Government of Malawi's declared strategic crops. Government aims to promote cotton production as a way of broadening its agricultural export base. Prospects in cotton production have for the past decade been hampered by poor incentives on the market in terms of low prices and limited profits, mainly due to fewer ginners on the market[14]. The cotton sector has about 120,000 smallholder farmers, three ginning companies and three main input providers. Up until 2003/04, cotton yields averaged about 600 kg/ha, but since then, through a number of emerging cotton development initiatives and the slight increase in the ginners, average yield has improved to about 900 kg/ha and production has considerably increased to about 50,000 MT in 2007/08 season (see Table 18).

87. The increased production response after 2003/04 was as a result of the establishment of the Cotton Development Association (CDA) involving the major ginners. The CDA provided treated seed and pesticides to cotton farmers under contract farming arrangements. A further important change was the improved ginning out turn (GoT) up from 33% to 38%, which improves the overall crop value as lint is significantly more valuable than seed. Due to these positive developments, Cotton is now the fourth biggest crop by value. There is also realistic potential to double the volume and value in the coming years, through the initiatives to improve cotton seed, adoption of Bt-cotton (after the initial trials) and ensure fairness and transparency in setting prices. Partly, the bright prospects are also a result of the improvements in the cotton price on the international market (see Table 20) and the favorable incentives being provided by the ginners that ensure that increase in international prices is passed through to the cotton producers.

Table 19: Malawi cotton production (metric tons)

	2002-03	2003-04	2004-05	2005-06	2006-07 Final	2007-08 Estimate
Seed cotton	14,700	33,000	45,000	46,000	43,000	50,000
Lint (avg. 38%)	5,600	12,540	17,100	19,760	16,340	19,500
Cottonseed (avg. 57%)	9,100	18,810	25,650	29,640	24,510	28,000

Source: Kadale Consultants, 2007

[14] From 2007/08 season, Government started to intervene in cotton markets by setting minimum prices (at a level higher than parity).

Table 20: International cotton prices

	USD			MWK		
	Dec 06	Oct 07	June 08	Dec 06	Oct 07	June 08
Cotlook Index A (per lb)	0.59	0.68	0.78	83	95	109
Conversion to metric tons	**1,309.18**	**1,492.11**	**1,719.12**	**183,285**	**208,895**	**240,677**
Less sea freight to Nacala (per MT)	210.00	220.00	230.00	29,400	30,800	32,200
Less road freight to Blantyre (per MT)	68.00	85.00	96.00	9,520	11,900	13,440
Less road freight to Gin (per MT)	19.20	24.00	32.00	2,688	3,360	4,480
Malaw gin gate lint revenue (fob per MT)	**1,011.98**	**1,163.11**	**1,361.12**	**141,677**	**162,835**	**190,557**

Domestic road freight = MWK 12 per km in 2006; MWK 15 per km in 2007; 20 per km in 2008.

88. In analyzing the cotton value chain, we considered two production levels differentiated on the basis of low and high management as shown in Table 21. Low management implies use of un-treated seed, no application of fertilizer and limited use of pesticides. High management implies use of treated seed and application of fertilizer and chemicals at the recommended rates. In both scenarios, both hired and family labor is used since almost all the cotton in Malawi is produced by smallholder farmers. The analysis assumes a ginning-out-turn (GOT) of 38.5%.

89. The farm-level cost elements for cotton include labor, fertilizer (for high management), chemicals, marketing costs and depreciation of the capital equipment such as sprayers. At the high input level, it is assumed that the ginner makes an additional investment in improved extension and other out-grower services beyond the very basic types of support offered now. Specifically, it was assumed that at the (current) low-input level, the ginner spends only USD 1.02 per hectare (equal to MWK 239 or USD 1.71 per MT seed cotton) whereas at the improved, high-input level the ginner invests and estimated USD 5.53 per hectare (equal to MWK 861 or USD 6.15 per ha per MT seed cotton) on farmer extension and other out-grower services.

Table 21: Cotton assumptions

Sector	Yield (MT/Ha)	Farm	Assembly	Process
FAM-low	0.6	Fuzzy seed, no fertilizer, limited pesticides with hired sprayer, 118 days labor (93 days family)	50km from rural depot to ginnery	38.5% GOT
FAM-high	0.9	Treated seed, 1x1 fertilizer, recommended pesticides, own sprayer, 123 days labor (83 days family)	(vertically integrated operation managed by ginner/outgrower company)	(parity price comparison for lint at gin gate, excluding revenue from seed)

Fertilizer use expressed in 50kg bags basal (NPK) x 50kg bags top dressing (urea) per ha.

	MK per MT	USD per MT	Product Form	Location
Farm gate price	63,830	455.93	Baled seed cotton	Farm depot
Assembled raw material	65,469	467.64	Baled seed cotton	Into ginnery
Ex-factory price				
Lint	162,835	1,163.11	Lint (38.5%)	ex Ginnery
Seed	10,500	75.00	Seed (57%)	ex Ginnery
Trash	-	-	Trash (4.5%)	ex Ginnery

90. The analysis also took into account the Government of Malawi (GOM) minimum seed cotton price in 2007/08 which was set at MWK 65 per kg with 2-3% deduction from gross sales

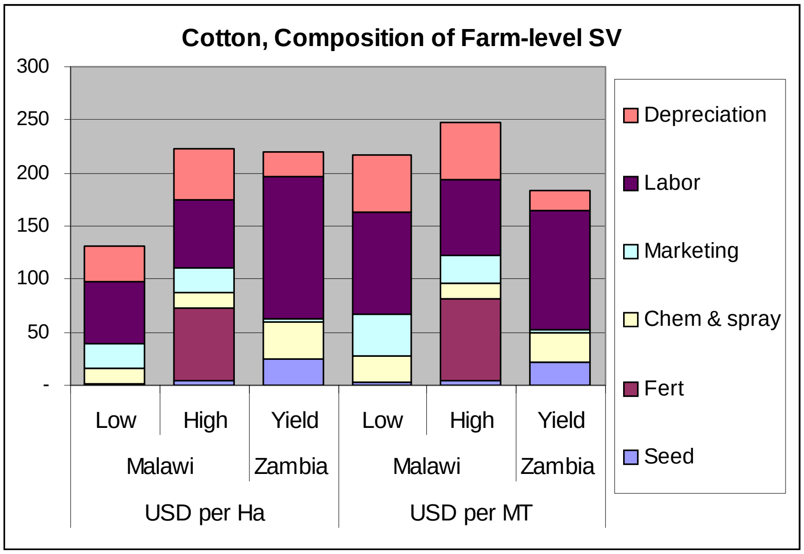
for outgower costs (in the analysis we have assumed 2% deduction). At the assembly level, because of vertical integration, price was set equal to total accumulated costs (i.e. calculate total profits at processing stage only). Table 22 compares Malawi's farm-gate indicators to those of other countries.

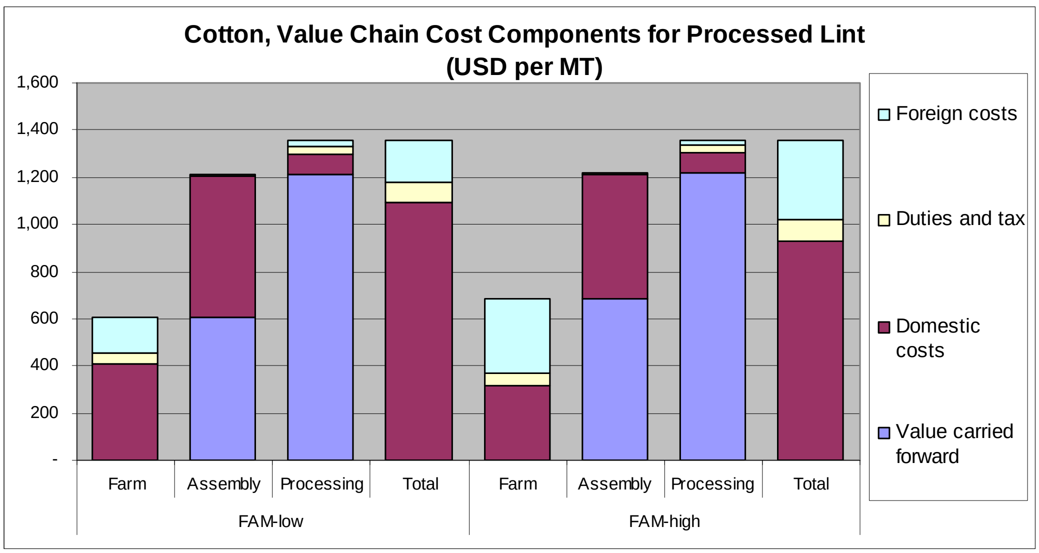
Table 22: Values at farm gate (un-ginned seed cotton)

	% Foreign	Tax as % DVA	Total SV (USD/MT)	Net Profit (USD/ha)
Malawi (2007/08)				
FAM-low	25%	11%	232.69	173.80
FAM-high	46%	15%	262.68	209.55
Cameroon (2007)				
FAM-low	21%	10%	477.78	85.28
FAM-high	28%	13%	384.56	93.61
Mozambique (2006/07)				
FAM	17%	1.6%	120.44	76.67
ECF	27%	2.4%	83.60	121.44
Nigeria (2006)				
FAM	n/a	n/a	255.00	63.33
Zambia (2005/06)				
FAM	25%	6%	181.75	148.00
ECF	27%	4%	234.17	152.33
Zambia (2006/07)				
FAM-low	24%	9%	277.24	56.41
FAM-high	36%	10%	286.28	37.84
Yield program	21%	9%	183.62	163.66
Brazil (2006)				
LCF	20%	27%	447.23	145.55

91. The cost composition of cotton at the farm, assembly and processing levels are as shown in Figure 23. The farm-level cost elements for cotton include labor, fertilizer (for high management), chemicals, marketing costs and depreciation of the capital equipment such as sprayers. At the high input level, it is assumed that the ginner makes an additional investment in improved extension and other out-grower services beyond the very basic types of support offered now. Specifically, the ginner is assumed to spend USD 2.67 per hectare or USD 3.36 total per hectare (equal to MWK 574 or USD 4.10 per MT seed cotton) in out-grower services. As shown, this table also includes data from an analysis of the so-called "yield program" operated by Dunavant Cotton in the Eastern Province of Zambia just across the border from Malawi. Unlike the high-input model in Malawi, which relies on fertilizer to achieve high yield results, the Zambia "yield program" is based primarily on farmer extension to help growers understand the importance of panting date and to carry out pest scouting to achieve the maximum benefit from expensive insecticides.

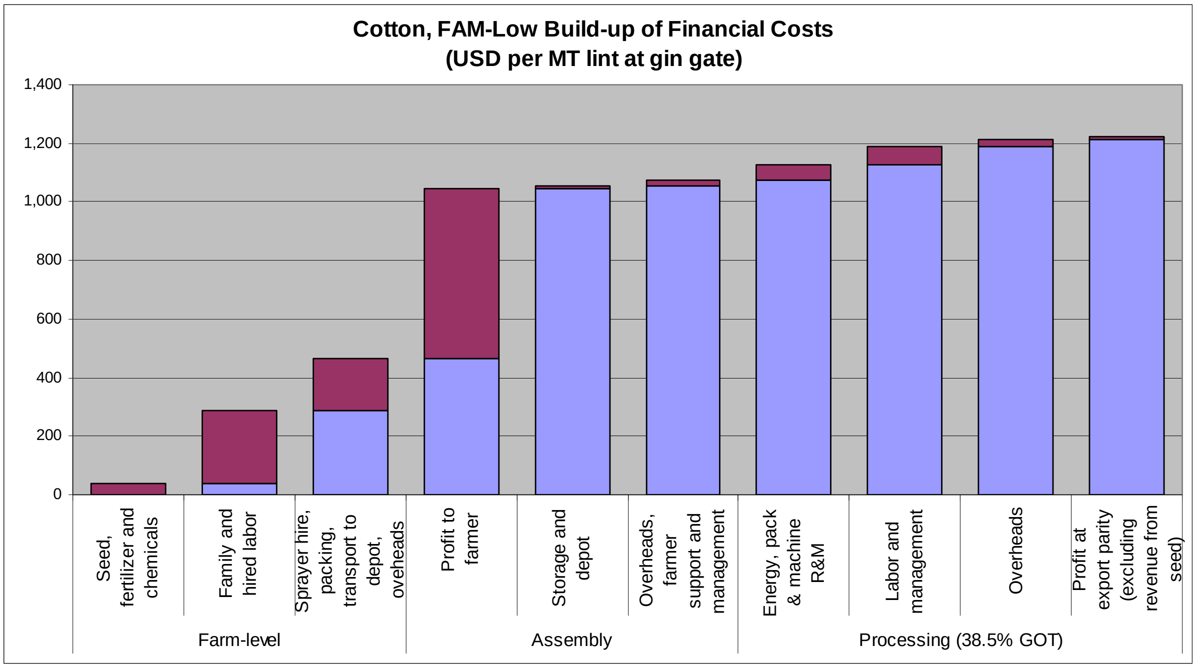
Figure 23: Cotton, composition of farm-level, assembly and processing costs

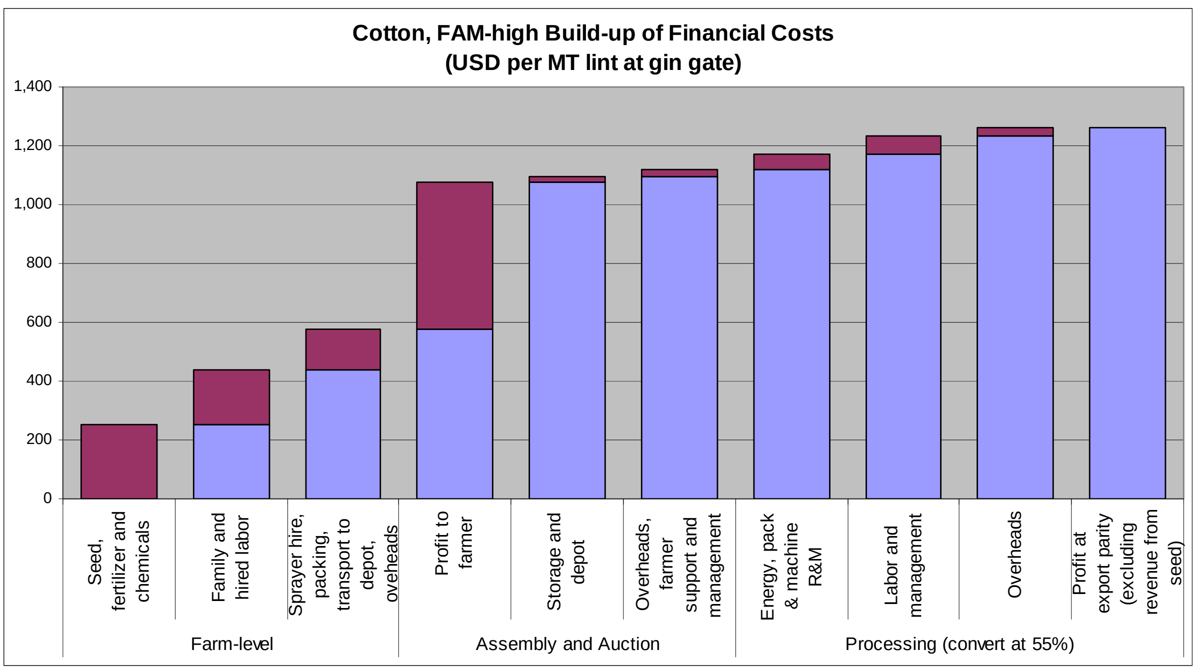




92. As shown in Figure 24, however, the ginner's additional spending on extension results in the loss of nearly all net profit at the processing stage when producers are paid the GOM minimum price. This begs the important question of whether a better policy option would be to allow ginners to pay a lower price and use the savings to invest in farmer extension and other out-grower services that could improve long-term competitiveness.

Figure 24: Cotton, build-up of financial costs along the value chain



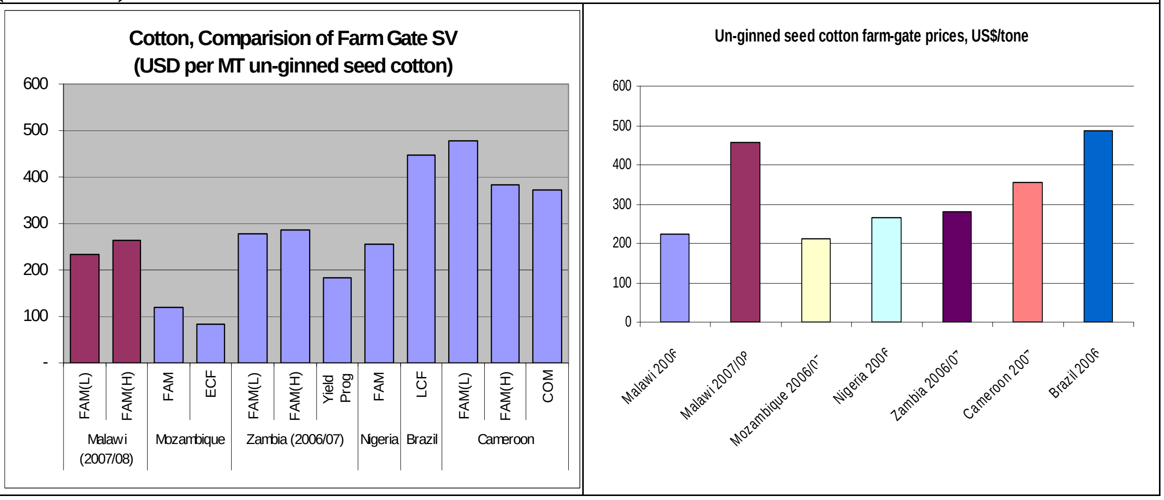


A. Cotton Competitiveness

93. The estimated SV for un-ginned seed cotton for Malawi is lower than other countries except Mozambique and Nigeria as shown in Figure 25. This implies that Malawi has some competitive edge against its neighbors in the production of cotton, and subsequently the exportation of lint. However, the competitive edge would still be much stronger if the domestic price for un-ginned cotton was not very high (at MWK65/kg as per the Government set minimum

price). In the value chain analysis, this high price is compensated for by reducing the ginner's investment in out-grower extension and other services, thereby threatening the sustainability of high quality and productivity in the cotton sub-sector.

Figure 25: Comparison of un-ginned cotton SV at farm level and parity prices (USD/ton)



94. When we compare the total SV against the export parity, as shown in Table 23, Malawi's competitive edge is very narrow. In fact the results indicate that in 2006 and 2007, ginners may have been uncompetitive. Among other reasons, this is due to the high producer price and the low ginning-out-turn (GOT).

Table 23: Comparison of final cotton SV and parity prices

	Final SV	Export Parity			Competitiveness Gap/Edge		
		Dec 06	Oct 07	June 08	Dec 06	Oct 07	June 08
FAM-low	1,353	1,011.98	1,163.11	1,361.12	(341.30)	(190.16)	7.85
FAM-high	1,360				(347.66)	(196.53)	1.48

95. As shown in Table 24, one of the ways to consolidate and sustain competitiveness in cotton is to improve the ginning out turn (GOT). A 1% improvement in the GOT substantially lowers per unit ginning costs and thus enhances the ginners' profit. This is an area that provides the greatest scope in terms of improving the ginner's profit which could then be rolled-back to the net farmer profit through investment in services required to improve the quality and yield of seed cotton and lint. GOT may easily be improved at the farm-level through the use of treated seed, improving the use of chemicals through appropriate scouting for pests so as to ensure timely application of chemicals, avoiding contamination of the seed cotton at picking, sorting, baling as well as transportation to the ginnery. At the gin-gate, GOT may be improved by use of better gins and avoiding contamination through better grading and handling techniques. With the GOM's current pricing policy whereby nearly all profits in the cotton value chain accrue to farmers, however, there is little scope for ginners to invest in improved farmer extension or upgrading of ginning facilities.

Table 24: Improvement in GOT and returns to cotton

Ginning Outturn (% lint)	Ginner's Profit (USD per MT seed cotton)	
	FAM-low	FAM-high
38.0%	(3.78)	(6.23)
38.5%	3.02	0.57
39.0%	9.83	7.38
39.5%	16.63	14.18
40.0%	23.44	20.99

IX. REVIEW OF OTHER VALUE CHAINS AND RELATED STUDIES

96. For the sake of completeness, we reviewed a number of value chain studies undertaken in Malawi during the last five years. We reviewed studies on completed value chains for dairy, poultry, tea, sugar, fish farming, cassava, coffee and horticultural products, especially paprika (see Koester et. al 2004; RATES 2003; Agar et al. 2007; 2008; GoM 2008; World Bank 2008). There are important variations in most of these studies in terms of scope and methodologies. For example, while our methodology considers the entire length of the chain from input supply to distribution of the final processed (or semi-processed) commodity, most of the studies reviewed only concentrate on some parts of the value chain. Most studies focus on the mapping of supply chains and describe the costs along the chain, but do not benchmark the domestic costs with parity prices. As a result most of the studies do not assess competitiveness. The results from these studies are summarized in Table 25[15].

97. However, notwithstanding these differences, most studies arrive at similar conclusions in terms of the key factors that affect Malawi's agricultural trade performance. Cost of inputs, transport and trader margins feature highly. Apart from tobacco, the other value chains that have promising prospects include sugar, dairy and poultry (for import substitution) and horticulture.

Table 25: Summary findings of main value chain studies in Malawi

Study	Commodity assessed	Year completed	Main conclusions
Market Survey – Dairy Processors Association Final Report	Dairy	2008	Domestic production still low (at only 60% of demand) and uncompetitive. As such Malawi makes up through imports of UHT and powdered milk. To promote local production, there is need improve animal husbandry techniques, improve access to feed and artificial insemination. There is also need to promote hygiene and cooling facilities at milk bulking group level.
Cassava Value Chains in Nkhotakota, Salima and Lilongwe	Cassava	2008	Cassava production is less costly and competitive than maize. Due to shorter shelf life, net farm profit increases if farmers produce for processing into starch and other adhesives. There is need to formalize standards with the Malawi

[15] See Koester et al. (2004); RATES, (2003); Kadale Consultants, (2007); (2008), MoAFS (2008/09).

			Bureau of Standards in order to access regional and international markets
Adaptation Strategy for Malawian Sugar Industry in Response to the Reform of the European Union Sugar Regime	Sugar	2006	Malawi's sugar is among the most competitive in the region. Since there is an increasing number of small producers through out-grower schemes, there is need to enhance extension services to ensure compliance to EU standards, which is the major export market for Malawi's sugar.
Tea Sector Finance Study for Food Security	Tea	2007	Not so competitive due to low yields from old Indian plantations. There is need to promote replanting with high yielding clonal varieties at both the smallholder and estate levels.
Coffee Sector Finance Study	Coffee	2007	This study used the coffee value chain to gain a better understanding of how the commercial growers/processors and smallholder coffee growers are currently financing their activities. Production levels are currently low and being threatened by lack of capital.
Horticultural Marketing and Food Processing in Malawi Final Report	Horticultural products	2008	Lack of processing capacity, direct flights and high cost of air freightare some of the major set-backs to promotion of horticulture in Malawi. This results in lack of organized and reliable markets.
Groundnut Value Chain Study	Groundnuts	2008	Prospects for groundnuts as a tradable crop have been affected by lack of high yielding and rosette resistant varieties. Sector prospects are likely to improve with the release of a new variety that has right kernel sizes and is resistant to diseases.
Final Evaluation of the STABEX Funded Programme in Malawi	Paprika, Coffee and Tea	2007	Same as for coffee, tea and horticulture.
Review of the Poultry Industry in Malawi	Broilers and layers	2007	Many informal small sector players who face high costs of production due to the increase in feed costs. The ban on imports due to avian flu has also exacerbated the increases in the domestic price of chicken meat and eggs thereby making it uncompetitive. There is need to promote medium and large scale production systems.
Status and prospects of Malawi's tobacco industry: a value chain analysis	Tobacco	2004	Malawi enjoys competitiveness in tobacco but there is need to improve the efficiency of its marketing system so as to consolidate its competitiveness

Cotton textile apparel value chain report	Cotton	2003	Malawi's cotton was not competitive due to the low ginning out-turn (GOT) estimated at 33-35%; and high polypropylene contamination which reduced Malawi's cotton lint on the international market

Source: Ministry of Agriculture and Food Security, various reports.

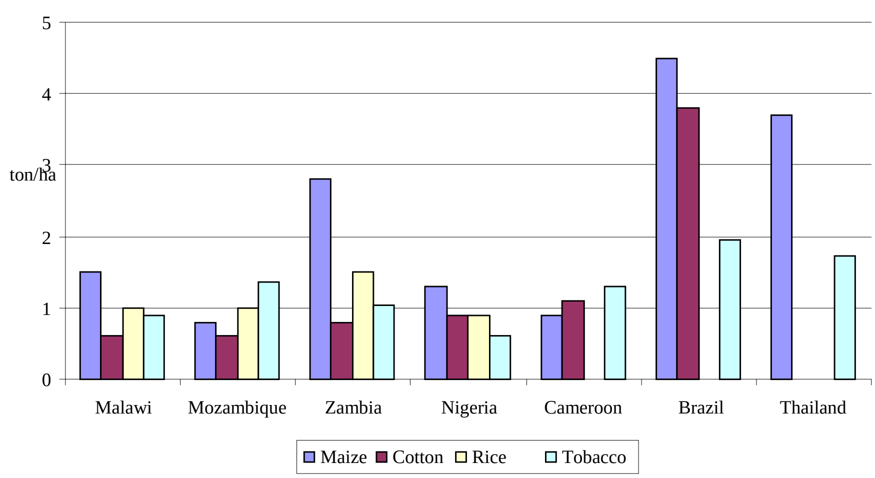
X. KEY FACTORS AFFECTING AGRICULTURAL COMPETITIVENESS

98. There are four main factors that seem to explain Malawi's narrow range of competitiveness against other countries: These include: (i) low productivity, (ii) high cost of agricultural inputs, (iii) high cost of transport and (iv) high trader margins at the assembly level. In the following sub-sections, we provide detailed evidence from the analysis on each of these factors.

Low productivity

99. In general, crop yields in Malawi are lower than in other comparator countries. The yield gap against other countries is more significant in maize, rice and tobacco as can be seen in Figure 26. For example, Malawi's maize yield at smallholder level is only comparable to Mozambique, Nigeria and Cameroon, but is only half as much compared to Zambia, Brazil and Thailand. In cotton, available data indicates that Malawi's yield is quite comparable against other countries, with the exception of Cameroon and Brazil, where the yield is higher. Similarly, rice yield is only comparable to Nigeria and to some limited extent Zambia, but in general lower than all the other countries including Mozambique. Smallholder burley tobacco yield for Malawi is only better than that of Nigeria. Malawi's agro-climatic conditions are less similar with countries such as Brazil, Cameroon, Thailand and Nigeria. The analysis assumes similar levels of crop management and agro-climatic conditions, more especially for Zambia and Mozambique where agro-climatic conditions are not markedly different from those of Malawi.

Figure 26: Comparison of crop yields across countries (t/ha), 2007/08



Source: FAOSTAT

100. We however attribute the low crop yields to the low levels of fertilizer intensity and use of low yielding crop varieties, mostly as a result of the high cost of agricultural inputs in Malawi compared to other countries. In land abundant countries such as Mozambique, the yield difference could also be attributed to differences in the natural fertility of the soils.

High cost of agricultural inputs

101. Malawi is a relatively high cost country in terms of agricultural inputs. As shown in Table 26, Malawi's costs for fertilizer and other agricultural inputs are generally higher than most comparator countries. Malawi's cost advantage lies only in the cheaper labor. *Clearly Malawi can only compete based on its labor cost advantage, and this has been confirmed in almost all the value chains analyzed.*

Table 26: Comparison of input price build-up between Malawi and other countries

	Basal Fertilizer	General Herbicide	General Insecticide	Casual Labor	Road Freight
	MT	*Liter*	*1ha cotton*	*1 day FAM*	*1MT per Km*
Malawi (2006)	532.82	-	-	-	-
Malawi (2007)	728.57	7.14	14.29	0.71	0.129
Mozambique (2006)	377.60	5.00	25.02	0.48	0.070
Zambia (2007)	540.00	5.00	29.28	1.25	0.100
Nigeria (2006)	295.45	5.15	8.56	2.65	0.053
Cameroon (north) (2007)	702.19	7.00	45.83	3.13	0.115
Brazil (2006)	301.40	3.49	30.18	20.88	0.064
Thailand (2006)	346.60	3.59	n/a	n/a	0.027

Notes: Fertilizer price for most common blend in each country; Herbicide price for paraquat, round-up or similar product used for general weed burn-down.
Insecticides for cotton = 1ha FAM-high in Malawi and Cameroon; 1ha FAM in Nigeria; 1ha ECF in Mozambique, and Zambia; and 1ha LCF in Brazil. Actual quantities of insecticide will vary.
Transport costs in Cameroon for direct shipping method (can go to USD 0.54 per MT per km if use informal roadside freight). Slightly lower rates prevail in southern Cameroon because of proximity to refinery.
Input prices in Cameroon are 10-15% higher in north than in the south due to transport costs and other fees.

102. Fertilizer is the single most important cost component in the production of most arable crops. The analysis shows that it accounts for 20 – 50 percent of the farm-level costs of production for all crops considered in the analysis. In 2007, Malawi's fertilizer cost, estimated at USD 728.57 per ton, was almost twice as expensive compared to Mozambique, Nigeria, Brazil and Thailand (see Figure 8). The cost of herbicide and insecticides was also equally high (although the insecticide cost is not so high).

103. Malawi imports all its fertilizer and other agricultural inputs. Domestic blending and/or production capacity is very limited. As such, the high cost of fertilizer is mainly due to the high international and domestic transports costs, estimated at 22 percent and 4 percent, respectively. Furthermore, domestic dealer mark-ups are also quite high in Malawi, estimated at 16 percent compared to 5 percent or less in Zambia and Mozambique. Given that fertilizer is a major component of farm costs, the domestic price levels have a major bearing on final competitiveness, not just in terms of accumulated SV at the point of final competition, but also in terms of the influence on farmer decision making and yield expectation.

104. As shown in section III on input analysis, the major cost element that inflates the domestic price of agricultural inputs is the high international and domestic transport cost. As seen in Table 6, in 2006/07 season, transport cost alone (both international and domestic) contributed over 33 percent to the fertilizer price build-up. The wholesaler and retailer mark-ups together contributed nearly 20 percent to the fertilizer price build-up. *Transport cost is therefore a key determinant of Malawi's agricultural competitiveness, given that most agricultural commodities are primary or semi-processed and are therefore bulky and attract high transport costs, on average.*

105. We further analyzed the differences in the composition of domestic fertilizer prices between 2007 and 2008. In 2008 world fertilizer price spiked to unprecedented levels which had a major impact on domestic prices in the 2008/09 agricultural season, not least of all because most domestic importers (including the government under its own fertilizer subsidy program) happen to make their purchases each year at almost the same time in the season when global prices were at their highest. Between 2007 and 2008, the typical retail price at the start of the agricultural season for a 50 bag of urea increased from MWK 3,800 (USD 27.14) to more than MWK 7,400 (USD 52.86).

106. The price increase in 2008 meant that the price at origin increased from 54% to 62% of the farm gate SV. Apart from negotiating for better international prices through forward contracts or other improved supply arrangements, including early procurement, Malawi has very limited scope to influence the farm gate price of its agricultural inputs, more especially inorganic fertilizer. Investments in improved distribution networks for fertilizer and domestic blending could help, but compared to changes in foreign costs, these investments could only have limited impact on agriculture competitiveness.

107. Although Malawi does not impose any direct tax on fertilizer in the form of customs duty or VAT, the analysis reveals that domestic taxes still accounted for around 8% of total farm gate SV. Specifically, these taxes include VAT on clearing fees, fuel taxes, trading licenses, and profit tax charged on dealer mark-ups. As a strategy to improve agriculture competitiveness, therefore, there may be some scope to reduce these specific charges pertaining to fertilizer import and trade.

108. We also examined the cost of improved seed, more especially the farm and assembly-level costs of hybrid seed production. This was primarily undertaken to derive the conversion factors required by the spreadsheet methodology for the analysis of smallholder hybrid maize. Information on this specialized activity is based on a simple average from models provided by two major commercial seed companies. Given this limitation, the results should not be interpreted as a definitive picture of the costs and returns to seed multiplication, but only as a snapshot view of structural composition of the main costs in seed multiplication.

109. Seed multiplication in Malawi, as elsewhere, requires strict adherence to management guidelines and is therefore mainly undertaken by large and medium-scale estates with a commercial outlook rather than by smallholders. In the analysis, we modeled two companies that use imported foundation (mainly from South Africa) which is then multiplied on contract by farmers with the capacity to cultivate a minimum of 10 hectares. There is no provision for loans and most growers are within 200km of Lilongwe. Farm-level data for the hybrid seed multiplication model is based on an average yield of 7MT/ha and price to the farmer of MWK 49,350 (USD 352.50) per MT. The results show that on a 10ha minimum plot size, the grower's total variable costs work out to nearly USD 16,000 (MWK 2.24 million). Table 27 shows that the total SV for packed seed ready to use is USD840 per ton (equivalent to nearly MWK120/kg). Given that mark-ups, domestic duties and taxes constitute a considerable portion of the domestic

costs, some further examination of factory costs, utility costs (including the cost of power disruptions), taxes on imported seed dressing, and taxes on other business operating are areas where possible savings could be achieved. Rents by the seed companies on imported foundation seed also appear significant and could be an area where Malawi research institutes could play a more dynamic and active role in helping to bring down the cost of such important agricultural inputs.

Table 27: Indicative costs of hybrid seed multiplication in Malawi

	FARM GATE PRODUCT		PACKED SEED READY FOR USE	
	MWK	USD	MWK	USD
Domestic Value Added				
Costs & mark-ups	8,183	58.45	57,306	409.33
Official duties & tax	4,797	34.27	18,726	133.76
Additional costs	-	-	-	-
Total DVA	**12,981**	**92.72**	**76,032**	**543.09**
Foreign costs	24,806	177.19	41,568	296.91
Total Shipment Value	**37,787**	**269.91**	**117,600**	**840.00**

High transport costs

110. Given the importance of transport cost element in all the value chains analyzed, we examined in detail the major causes of high transport costs in Malawi, compared to other countries in similar situations. One of the key causes of high transport costs to and within Malawi is the high cost of fuel relative to other countries. As shown in Table 8, the retail price of petrol was MWK251/litre (equivalent to USD1.50/liter) which is very high compared to Botswana (also a landlocked country) whose petrol price on February 2, 2009 was Pula 4.35/liter or equivalent to USD0.58/ liter. This implies that even with the reduced price of MWK213/liter (prices were reduced in February 2009 following a public outcry), Malawi's petrol price is 3 times higher than that of Botswana, a country with a per capita income which is about 23 times higher than that of Malawi.

111. The factors contributing to the high fuel price in Malawi include the multiple levels of levies and surcharges imposed by various agencies including Malawi Energy Regulatory Authority, Road Fund Administration, Bureau of Standard, etc., on the FOB price of fuel (see Table 28). These levies constitute about 40 percent of the retail pump price. The second and the third major factors are the taxes and duties collected by Ministry of Finance, as well as the profit margin of wholesale and retailers, representing about 13 percent and 12 percent of the retail price, respectively. The insurance and handling charges only add up to about 6 percent of the retail pump price. *Thus, a rationalization of the levies and taxes on fuel are likely to lead into significant reductions in transport costs, which is likely to improve trade competitiveness in general, and agricultural competitiveness in particular.*

Table 28: Petroleum product price build-up in Malawi - Kwacha/liter (effective December 1, 2008)

	Petrol	**Diesel**	**Paraffin**
FOB price	**64.31**	**69.02**	**71.34**
Railage (10 days)	0.72	0.73	1.76
Road freight (4-5 days)	12.71	12.22	10.36
INS/ handling	0.88	0.85	0.59
Losses	0.51	0.53	0.49
IBLC (BT/LL)	**79.12**	**83.36**	**84.54**
Energy Regulatory Levy (MERA collection)	0.41	0.37	0.29
Road Levy (Road Fund collection)	13.70	11.70	--
Safety Net Levy	7.00	7.00	4.00
MBS CESS (Bureau of Standard collection)	0.16	0.17	0.17
Energy Fund (Min. Energy and Natural Resources collection)	0.50	0.40	0.40
Price stabilization fund (MERA collection)	86.20	70.50	38.26
PRICE AFTER LEVIES but BEFORE DUTY	**187.09**	**173.50**	**127.66**
Duty	7.91	8.34	4.23
Excise duty	25.24	27.51	13.31
PRICE INCLUDING DUTY	**220.24**	**209.34**	**145.21**
Distribution Margin	2.33	2.33	2.33
Gross Margin	16.55	11.55	9.81
WHOLESALE PRICE	**239.12**	**223.22**	**157.35**
Retail Margin	12.08	11.28	7.95
PUMP PRICE (Kwacha per liter)	**251.20**	**234.50**	**165.30**

Source: Malawi Energy Regulatory Authority, 2008.

High trader margins

112. Findings from the analysis suggest proportionately high margins that accrue to traders at the assembly level, especially in maize, rice and tobacco. For maize and rice, there are high margins at the assembly and processors/millers, respectively. For tobacco, there are high transport costs at assembly level which emanate primarily from a somewhat less efficient marketing system. For illustrative purposes, we have chosen to use the findings for maize where trader margins and other marketing costs along the chain are very high proportional to the volume of grain handled by traders relative to producers.

113. We examined maize traders' profit margin (per metric ton) at import parity and found that it is very high compared to the profit that accrues to the producer. Given that on average traders handle more volume that producers, the traders' margin is quite high.

114. The higher trader margins are attributed to the thin maize markets, resulting mainly from the high transaction risks in the remote areas that often limit competition. As such only few traders with transport facilities are able to reach remote areas where they reap monopolistic rents. Through appropriate interventions that improve the development of private traders, thereby enhancing the structure of maize and rice markets, it is possible that some of the margins that are captured by the traders could be passed on to the producers thereby improving the farm-gate prices.

How to improve agricultural competitiveness and producer's net profit

115. On the basis of the four key constraints to agricultural competitiveness, the analysis suggests several interventions that may improve competitiveness and producer's net profit, especially at the smallholder level. The suggested interventions derive from an assessment of the estimated impact of a number of simulations on competitiveness and farmers' net profits. Table 29 shows how these simulations are implemented within the analytical framework and the results are summarized in Box 1.

Table 29: Simulations and how they are implemented

Simulation	How it is implemented
Technological improvements	10% increase in yield for all crops 1% improvement in GOT in cotton
Reduction in farm-level input costs (through the subsidy program)	Use the subsidized price of fertilizer and no cost for improved seed (for the low management scenario)
Trader margins and transport costs	Stepwise reduction in fuel costs and trader margins by 5% (directly applied on the farm-gate price)

Box 1: Three ways to improve farm-level returns: A simulation

The impact of three simulations of changes in key factors affecting Malawi's agricultural competiveness are evaluated. These are (i) a technological improvement leading to a 10 percent increase in yield and a percent improvement in GOT in cotton; (ii) a reduction in farm-level input costs through a 5 percent change in face value of the fertilizer and seed voucher; and a reduction in trader margins and marketing cost through a five percent stepwise reduction in transport cost and trader margins.

The impact of yield improvements. The impact of yield increases as a result of technological improvements on producers' net profit and farm-level competitiveness are shown in Table 1. The results generally indicate that, other things being equal, a 10 percent improvement in yield results in raising producers' net profit by as much as 35-55 percent in hybrid maize, about 25 percent in cotton, 10 percent in rice and between 13-17 percent in burley tobacco. The yield improvements also result in an improvement in farm-level competitiveness ranging from 9 to 22 percent. These results come from simple simulations that assume linearity and do not consider the general equilibrium effects of yield changes on output prices. Perhaps, if such market effects were considered through general equilibrium analysis, the magnitude of the positive impacts would somehow be reduced. However, the results imply that one way to improve farm profits and competitiveness is via technological improvements that improve crop yields.

Impact of agricultural input subsidy. This particular simulation is implemented only on the crops that have been included in the current input subsidy program i.e. low input maize, low input burley tobacco and low input cotton. The cost of fertilizer and seed are changed to reflect the value of the subsidy voucher i.e. market price of fertilizer and seed minus the amount paid by the farmer to redeem the voucher. This year, this amount is equivalent to MWK800 (about USD 6) for a 50kg bag of basal and top-dressing fertilizer and zero in the case of hybrid maize and cotton seed. The results shown in Table 1 indicate considerably high gains in farm-level net profits and competitiveness because the subsidy increases farmers' application of fertilizer and use of improved seed at a cheaper cost. All these invariably enhance profits and private competitiveness via reduction in the costs. Of course they do not increase the competitiveness of Malawi as a whole because the costs are still borne by the government.

Impact of a reduction in transport costs and trader margins. Trader margins are costs that are incurred mostly at the assembly level. As such, we assume a direct pass-through of the gains in transport cost and trader margin reductions to the farm-gate prices. This implies that if we assume a percentage reduction in the trader margins, such a change is applied directly on the farm-gate price. However, since the transport cost is incurred directly by the farmer, the cost reduction is applied directly to the transport parameter in the farm-level crop budget. The results are as shown in Table 1. Reduction in trader margins considerably increases the producer net profit because it raises the producer price. The impact is directly proportional to the importance of the trader margin in the marketing of respective crops. Where the trader margin is quite high as a proportion of the producer price, as in the case of maize, the impact on producer net profit is also very high. Similarly, a reduction in transport costs improves competitiveness more particularly in commodities that have to be transported from the farm to the market such as cotton and tobacco.

Table 30: Impact of various key cost factors on farmers' net profit and shipment value

crop	Impact on producer's net profit (% from base)				Impact on farm-level shipment value (% from base)			
	Base level	Yield improvement	Increased subsidy	Reduced margins	Base level	Yield improvement	Increased subsidy	Reduced margins
Maize								
FAM-LOW	65.53	55	17	23	158.35	9	-43	n/a
FAM-HIGH		35		37	183.9	5		-0.3
Cotton								
FAM-LOW	173.80	25	3	11	232.69	13	-2	-0.8
FAM-HIGH		14		18	247.7	8		-0.5
Rice								
FAM-LOW	119.1	10		19	163.1	17		n/a
FAM-HIGH	112.0	13		12	153.9	12		n/a
Tobacco								
FAM-LOW	369.9	17	60	14	759.1	22	-29	-3.1
FAM-HIGH		13		12	736.7	15		-2.3

XI. SUMMARY AND CONCLUSIONS

116. The main findings from this analysis are that Malawi has indicatively some competitive advantage in the production and exportation of tobacco and cotton, and that this mostly derives from its low labor cost advantage.

117. Secondly, based on current prices and cost structure, the country does not have competitive edge in producing maize and rice for export. Malawi would better pursue an import substitution strategy in these cereals, and perhaps only aim at the export market when regional market opportunities arise. However, export possibilities for rice may be contingent upon a number of strategies such as focusing on aromatic varieties targeting niche markets in the region as well as improvement in productivity and efficiency of the value chains especially at the assembly and processing levels.

118. The key factors that underpin Malawi’s narrow competitiveness, and the lack of it in some crops include high cost of inorganic fertilizer and other inputs, low productivity and the higher trader margins and intermediation costs along the value chains. Inorganic fertilizer and other agricultural inputs are costly mainly due to high international and domestic transport costs as well as high trader margins as a result of high transaction risks associated with agricultural input trading. The high cost of inputs further leads to low uptake of fertilizer and improved seed. Overtime, low uptake of improved technology results in under-capitalization in the sector which tends to arrest any more technological and institutional innovations. The majority of Malawi’s smallholder farmers are trapped in this situation, in which as a result of risk aversion, they choose to operate at a sub-optimal subsistence level.

119. The analysis shows that farm gate prices in Malawi, contrary to popular opinion, are often higher than in other countries, and there is little scope for further increases via minimum prices. Improvement in total farm income would rather come from productivity improvements and a lowering of the production costs. Interventions that aim at setting minimum prices may be counter-productive in the long-run because they threaten the provision of important services that are provided by players within the value chain. The case of minimum producer prices for seed cotton is a good example of this whereby the analysis shows that the GOM pricing policy has left ginning companies with very little profit to invest in farmer extension, new processing technologies, and other competitiveness improvements that would benefit small farmers and sector performance overall.

120. This analysis suggests a number of interventions aimed at improving agricultural competitiveness as a basis for improving farmer returns. First is the need to improve productivity through proven technological and institutional innovations that provide an incentive for private and public sector investments in agricultural research and development. Secondly, for such innovations to benefit farmers, they have to be made accessible to them in a cost-effective way. Contract farming arrangements have proven to be effective in bringing technology to farmers while at the same time providing better incentives for continued investments.

121. While productivity gains are probably more important than other cost savings along the value chain, there are also other gains to be had through interventions aimed at reducing the cost of fertilizer, seed and other agricultural inputs. First, interventions aimed at reducing the transport costs, such as for example, rationalization of levies on fuel, reduction in domestic taxes and duties, are critical to reducing fertilizer costs in Malawi, thereby raising competitiveness. Secondly, there is need to consider implementing some innovative approaches in the management

of fertilizer and inputs supply chains such as timely procurement and bulk-buying arrangements with other countries in the region so as to be able to get lower prices at the origin. Thirdly, there is need for appropriate interventions to improve the development of private traders, thereby enhancing the structure of commodity markets, to ensure that some of the margins that are captured by the traders, in both the input and output market, could be passed on to the producers thereby improving the farm-gate prices.

122. Finally, it is important to note that consolidation of Malawi's agricultural competitiveness hinges on its ability to meet international commodity standards. The analysis assumes that Malawi's agricultural commodities are purely tradable and are near perfect substitutes for internationally traded goods from competing countries. This assumption can grossly be violated if Malawi's agricultural commodities do not meet international standards, more especially for bulky commodities such as maize, rice and cotton.

123. The following are the key messages from the value chain analysis:

- Malawi has a fairly good competitive edge in burley tobacco and cotton.
- Malawi does not have competitive advantage in maize and rice. The country would better promote maize and rice production as an import substitution strategy, except when there are opportunities to exploit regional market niches.
- Malawi's competitive advantage in tobacco and cotton invariably derives from its low relative labor costs, which reinforces the argument in favor of smallholder agriculture.
- Competitiveness in all crops is dampened by low productivity on the one hand and high input costs, high transport costs and trader margins, on the other.
- High transport costs and trader margins contribute a significant proportion of total shipment value for all value chains. Since most agricultural inputs are imported, foreign costs are a high component of the total final costs. Moreover, taxation of fuels and other aspects of the transport sector greatly affect agricultural competitiveness.
- Contrary to popular opinion, producer prices for cotton, maize and to some extent rice are higher than regional averages. In cotton and maize, this is as a result of the minimum prices set by the Government. While the minimum prices do benefit the producers, they inflate the total shipment values and thus reduce trade competitiveness.
- Furthermore, high minimum producer prices undercut the margins for other chain players such as contractors, ginners and processors. This implies that some contractual services such as extension, transport and others may not be provided. This has long-term implications on agricultural performance.
- In order to improve and sustain the competitive edge, there is need for more rapid technology transformation targeting productivity growth. Secondly, there is need for interventions to reduce transport costs and improve efficiency at the assembly level.

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