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**COMPARATIVE ANALYSIS OF ORGANIZATION AND
PERFORMANCE OF AFRICAN COTTON SECTORS:
LEARNING FROM EXPERIENCE OF COTTON SECTOR REFORM
IN AFRICA**

Draft Final Report

By

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FOREWORD

Cotton is a major source of foreign exchange earnings in more than 15 countries across all regions of Sub-Saharan African (SSA) countries and a crucial source of cash income for millions of rural people in these countries. The crop is therefore critical in the fight against rural poverty. The World Bank and other development institutions have been and are currently assisting many cotton exporting countries of SSA improve their cotton sector performances through projects supporting investment, as well as policy and institutional reforms.

Many SSA countries have been implementing, or are considering implementing, reforms of their cotton industries. The ultimate objective of the reform programs is to strengthen the competitiveness of cotton production, processing, and exports in an increasingly demanding world market and to ensure long-term sustainable and equitable growth for these major sectors of many African economies. The reform programs generally entail redefining the role of the state, facilitating greater involvement of the private sector and farmer organizations, ensuring greater competition in input and output markets, improving productivity through R&D, extension, and technology dissemination, and seeking value addition through market development and processing of cotton lint and by-products.

This study was undertaken by the ESSD Department of the Africa Region of the World Bank to fill a perceived gap in knowledge on the lessons to be drawn from nearly two decades of cotton sector reforms in SSA. Recent experience in policy dialogue, particularly with West African countries, shows that very often the analytical points of reference are limited to neighboring countries. At a time when the design of cotton sector reform programs has become extremely complex and potentially risky, stronger and broader analysis, drawing on a broader array of empirical evidence and reflecting strategically on potential options, would be very useful for policy makers. The lack of such analysis, especially of the reform options available and of their possible implications, partly explains the reluctance of many governments to engage in ambitious restructuring of their cotton sectors. Therefore, the main objective of this study is to provide an in-depth and comparative analysis of the reforms that have been implemented by SSA cotton sectors over the last two decades, and from there, to try to establish linkages between reforms and observable outcomes.

The state of implementation of cotton reforms varies widely from country to country. Serious structural reform of cotton sectors in East and Southern Africa (ESA) began 12 to 15 years ago. Reform in West and Central Africa (WCA) has been slower, for a complex set of reasons related to both domestic and international concerns; among the latter, the case submitted to the World Trade Organization (WTO) by the Cotton-4 countries regarding market distortions caused by subsidies in Organization of Economic Cooperation and Development (OECD) countries has given a political dimension to the issues in the sector, and figures prominently among the reasons for resistance to reform in some countries.

Resistance is also due to the perception—genuine or not—that the impact of reforms on sector performance, and especially on small farmers, has been at best mixed. A number of West African leaders and policy makers strongly feel that the reforms are likely to create major social problems, and the results in countries that have implemented reforms, particularly in ESA, do not

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make a strong case for privatization and liberalization of the cotton sectors. Given the complexities of reform programs and the uncertainties and fluctuations in the world cotton market, it is also difficult to establish clear causal linkages between structural changes, risks faced by cotton companies after liberalization, and outcomes at the farm and sector level.

An abundant literature has been produced in recent years on cotton policies in Africa. However, there has been little comparative analysis of the actual outcomes of cotton sector reforms in terms of growth and poverty reduction, and what are the main lessons to be drawn to inform future reform processes. Also, only limited attempts have been made to bring together, compare, and assess reform experience from WCA and ESA. Bridging these knowledge gaps, in an effort to better advise governments on cotton sector reform programs and policies, provide the fundamental rationale for this study.

A number of SSA cotton sectors, especially in WCA, are currently facing serious short-term financial difficulties. It is important to clarify that the purpose of this report is *not* to provide quick solutions to these short-run problems. Rather, it is to step back, build-up a reliable broad assessment of cotton sector performance from detailed empirical information, and thereby provide guidance for the design of strategies that will address the long-term challenges of cotton production and marketing in Africa.

Finally, to avoid even the appearance of ideological bias, the authorship of this study has been entrusted to a diverse and independent team of researchers and experts in the field of cotton. Evidence from the analysis is reported whether it confirms or not previous theories and hypotheses. Interpretations are suggested, but never imposed, and some care is taken to identify assumptions which drive the analysis. For this reason, the authors, and neither the World Bank nor the bilateral donors mentioned above, bear individually the full and final responsibility for the content of this report.

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Preliminary desk reviews of country cases were carried out in September and October 2006 and discussed at a workshop held in Washington in November 2006. The second phase of the study took place between January and June 2007 and entailed field visits in most of the countries in the sample. A second workshop was held in Washington in April 2007 to share the findings of the field work, country case study analysis and emerging findings from the comparative analysis.

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ACRONYMS

ACP	Africa, Caribbean and Pacific Countries
AFCOT	Association Française Cotonnière
AFTPI	Infrastructure Unit, Sustainable Development Department, Africa Region, World Bank
AFTS4	West Africa Unit, Sustainable Development Department, Africa Region, World Bank
AFTSD	Sustainable Development Department, Africa Region, World Bank
AIC	<i>Association Interprofessionnelle du Coton</i>
AMA	Agricultural Marketing Authority
APEP	Agricultural Productivity Enhancement Project
ARD	Agriculture and Rural Development Group of the World Bank
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BNPP	Bank Netherlands Partnership Program
BPRP	Belgian Poverty Reduction Program
CCC	Chipata Cotton Company
CDF	Cotton Development Fund
CDO	Cotton Development Organization
CFAF	CFA Franc
CFDT	<i>Compagnie Française de Développement des Fibres Textiles</i>
CFR	Cost and freight
CIF	Cost, Insurance, and Freight
CIRAD	Centre International de Recherche Agronomique pour le Développement
CMB	Cotton Marketing Board
CMDT	<i>Compagnie Malienne de Développement des Fibres Textiles</i>
C.N.A.	<i>Companhia Nacional de Algodão (Mozambique)</i>
CORAF	Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles
CRMG	Commodity Risk Management Group
DAGRIS	Développement des Agro-Industries du Sud
DEC	Development Economics Vice-presidency of the World Bank
€	Euros
ECSSD	Environmentally and Socially Sustainable Department, Europe and Central Asia Region
ELS	Extra long staple
ESA	East and Southern Africa
ESSD	Environmentally and Socially Sustainable Development
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FACO COTON	Cotton Company of Burkina Faso
FF	French franc
FOB	Free on Board
FOT	Free on Truck
FUPRO	Fédération des Unions de Producteurs
GDP	Gross Domestic Product
GLCC	Great Lakes Cotton Company

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GM	Genetically modified
GOR	Ginning outturn ratio
GPC	<i>Groupements de Producteurs Cotonniers</i>
ha	hectare
HUICOMA	Huileries Cotonnières du Mali
ICA	International Cotton Association
ICAC	International Cotton Advisory Council
IER	Institut d’Economie Rurale
IPC	Inter-professional committee
IPM	Integrated pest management
IRCT	Institut de Recherches sur le Coton et les Textiles.
JVC	Joint Venture Companies
Kg	kilogram
mm	millimeter
MSU	Michigan State University
mt	Metric ton
ODI	Overseas Development Institute
OECD	Organization of Economic Cooperation and Development
OPCC	Organisation des Producteurs de Coton du Cameroun
PRA	Participatory Rural Appraisal
PREM	Poverty Reduction and Economic Management Group of the World Bank
RCI	République de Côte d’Ivoire
SD	Sustainable Development
Sh	Shilling
SITC	Standardized Instrument for Testing Cotton
SN SITEC	Société Nouvelle SITEC
SSA	Sub-Saharan Africa
TANU	Tanganyika African National Union
Tsh	Tanzanian Shilling
UCGEA	Uganda Cotton Ginners and Exporters Association
UNPCB	<i>Union Nationale des Producteurs de Coton au Burkina</i>
US	United States
US\$	U.S. dollar
Ush	Ugandan shilling
WCA	West and Central Africa
WECARD	West and Central African Council for Agricultural Research and Development
WTO	World Trade Organization
Zmk	Zambian kwacha
Z\$	Zimbabwe dollar

EXECUTIVE SUMMARY

ES1. The story of cotton in Africa is a contrasted one. On the one hand, the performance of SSA exporters has been remarkable at a time of globalization of markets: while the continent's share of world agricultural trade fell by half from 1980 to 2000, its share of cotton trade rose by 30 percent. On the other hand, a number of cotton sectors in Western Africa are facing severe financial crises and are anxious about their survival. In any case, cotton is a major source of foreign exchange earnings in more than 15 countries across the continent and is a crucial source of cash income for millions of rural people. In some countries, especially in the Sahel, there is no short- to medium-term substitute to cotton's income generating potential for small farmers. Clearly, the profitability of cotton production and processing has large and widespread impacts on rural growth and poverty in the continent.

ES2. This comparative study is based on detailed case studies in nine of the main cotton producing countries: Benin, Burkina Faso, Cameroon, and Mali in West and Central Africa (WCA); and Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe in Eastern and Southern Africa (ESA). Cotton sectors in these countries show great diversity in their historical and current structure, behavior, and performance. During the last twenty years, most ESA countries have carried out structural reforms of their cotton sectors; while WCA countries have also tried to adapt to the new challenges by building on previous success. The purpose of the study is to draw practical insights from this diversity of experiences, so that policy makers can ground their decisions in a solid understanding of the key strengths and weaknesses of the sectors in which they operate, of the likely effects of specific types of change, and of the possible ways forward.

The Global Cotton Market Context

ES3. Three groups of exporters—the United States, Central Asia, and Francophone Africa—account for more than two-thirds of global cotton exports. SSA's share in world cotton trade has increased from 7 percent in 1960 to 15 percent in 2006, driven entirely by growth in WCA; ESA's world market share declined from 6 to 4 percent during the same period, although it has risen since liberalisation in the mid-1990s.

ES4. Driven by annual average yield gains of 1.8%, real prices of cotton on the world market declined 55 percent between 1960-64 and 1999-2003, similar to declines in other major export commodities. Patterns of price variability are also comparable to other commodities. Cotton has not, however, participated in the commodity price boom that began in mid-2004, despite record consumption of cotton worldwide. Reasons for this include increased worldwide cotton subsidies, reduction in costs of production stemming from the rapid advance of genetically modified (GM) cotton, and continuing competition from man-made fibres.

ES5. In contrast to trends in several other major commodities, changes in processing (i.e. spinning) technology have driven increasing demand for quality in cotton lint, with a parallel sharp increase in the penalty for cotton contaminated with non-organic matter. Intrinsic characteristics of African cotton typically place it above the A Index in quality; the fact that nearly all African cotton is hand picked helps preserve these intrinsic qualities. However, an inability to control contamination has led to a situation where hand-picked African cotton now

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trades at a discount to machine-picked cotton. Reducing contamination in African cottons could bring price premiums as high as US\$0.10 per pound over the Cotlook A Index, or about 20 percent at typical world price levels. Capturing this premium requires effective coordination throughout the local supply chain, and the ability to achieve such coordination depends crucially on sector structure and governance.

ES6. A major factor affecting the competitiveness of cotton production in WCA is the CFA Franc – US dollar exchange rate. After depreciating from 1995 (following the devaluation) to about 2001, this exchange rate has appreciated dramatically since 2002, reducing the price that companies can afford to pay cotton producers. The importance of exchange rate management to cotton sector performance has also been seen clearly in recent years in Zimbabwe and Zambia, with large fluctuations in real exchange rates complicating pricing decisions, leading to mistrust between producers and companies and encouraging new entry into both sectors.

Historical Background

ES7. Cotton cultivation was introduced in Francophone WCA during the colonial period, and strongly supported by post colonial governments; roughly the same organizational model was implemented in the various countries: a national parastatal cotton company integrating all critical services (extension, input supply, credit, and to some extent infrastructure). During 1960-1990, cotton development in the region was widely regarded as a success, having generated impressive growth and widespread benefits in terms of farm modernization and improved farmer livelihoods; cotton truly was the engine of rural growth in WCA during this period. From the mid 1980s, however, stagnating productivity and rising costs began to generate recurrent financial crises for many cotton companies. The model may have become a victim of its own success: the cotton sector's huge size in national economies led to political interference and rent seeking, cotton companies failed to put in place the management tools required for such large enterprises¹, and governments failed to exert their responsibilities as main shareholders.

ES8. Despite these problems, the scope of reforms was limited by the consensus among actors that the single channel system should be preserved by all means to avoid collapse in the delivery of critical services to farmers (input credit and extension). All sectors have, however, implemented substantial incremental change: farmer associations are increasingly involved in the delivery of critical services, private investors entered ginning and/or input supply activities in Benin, Côte d'Ivoire, and Burkina Faso; and inter-professional committees have taken on sectoral management responsibilities in Burkina and Benin. Governments, however, have been slow to change their roles and reforms of producer price setting mechanisms are recent. WCA sectors are not financially sustainable at current world lint prices and exchange rates, given farmer price expectations and cost structure of cotton company operations.

ES9. In contrast to WCA, where governments placed cotton at the center of their development efforts, cotton cultivation in ESA typically had its origins in commercial or missionary activity. During 1960-1990, countries achieving independence transferred more control over the sector to the state. At the same time, performance declined sharply in all countries except Zimbabwe: production collapsed in Uganda and Mozambique in the mid-1970s, while in Tanzania and

¹ The cotton companies of Mali and Burkina are among the largest in the world.

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Zambia, state mismanagement led to mounting debts and eventually to delayed payments to farmers. Zimbabwe's good performance during this period was built initially on large-scale commercial farmers.

ES10. Mozambique was the first country in ESA to thoroughly reform its sector, establishing mixed public-private local monopolies in the late 1980s. The other four ESA countries in the study (Zambia, Zimbabwe, Tanzania, Uganda) liberalized during 1994/95, when world prices were near an all-time high. The initial structure of the liberalized sectors mirrored their pre-liberalization organization: highly competitive sectors emerged out of Uganda and Tanzania's decentralized cooperative systems, while Zambia and Zimbabwe's single channel systems gave way to duopolies.

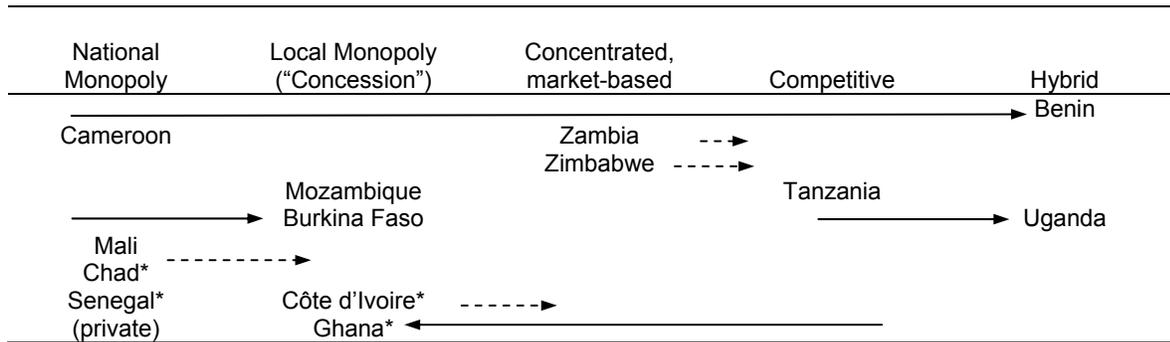
ES11. The challenges of increasing productivity and production (and maintaining quality) in a sector with numerous small-medium ginners have encouraged multi-stakeholder collaboration in Uganda and Tanzania, though of very different kinds and with uneven results. Meanwhile, Zimbabwe's sectoral organization has changed dramatically since 2001 with the entry of several new ginning companies, and a similar change may also be occurring in Zambia. The overall effect of these changes is still to be determined, but it is clear that Zimbabwe now faces similar challenges on quality control, input supply, and extension provision as experienced by Tanzania and Uganda.

Conceptual Framework

ES12. In order to carry out a comparative analysis of the cotton sectors and draw lessons and insights for the future, the study proposes a typology of cotton sectors in SSA based on the structure of the market for seed cotton and of the regulatory framework in which firms operate. The five types are represented in the figure below, along with each country's current location in the typology, as well as their evolution; (i) national monopolies, (ii) local monopolies, (iii) concentrated, (iv) competitive and (v) hybrid.

ES13. Central to the typology is the idea that in the real world of imperfectly competitive markets, some trade-off between competition and coordination exists. Competitive systems have high incentives for efficiency and may be expected to deliver high seed cotton prices to producers, but are likely to find it difficult to achieve coordination across firms to ensure input credit, extension, and lint quality. Single channel systems solve the coordination problem by consolidating most downstream activities in a single firm; this solution comes at the cost of potentially very low incentives for efficiency. Concentrated systems and local monopolies are likely to lie towards the middle in each dimension. Hybrid systems borrow features from various models and their performance tends to be affected by the strengths and drawbacks of these various systems.

Location of Cotton Sectors within African Cotton Sector Typology



Note: * Not included in this study

ES14. Performance of cotton sectors can be assessed in terms of delivery of core activities and services to farmers (seed cotton pricing, provision of input credit and extension, quality control, valorization of by-products and investment in cotton research) and in terms of outcomes such as yields, returns to farmers, efficiency and competitiveness and contribution to the national economy. In this report the former are measured by “process indicators”, the latter by “outcome indicators” more closely related to the objectives of poverty reduction and economic growth. Based on an analysis of past evolution, this typology generates clear predictions as to how different sectoral types can be expected to perform with respect to many of these indicators. Therefore this conceptual framework aims at linking sector type and performance in the comparative analysis of SSA cotton sectors.

Comparative Analysis: Core Activities And Service Delivery

Pricing Systems

ES15. Pricing mechanisms in WCA have a remarkably similar historical background across all countries; prices are fixed, panterritorial and panseasonal, and announced prior to planting. Another key feature is the guarantee of purchase by the cotton company of all quantities of seed cotton offered at the official price. In recent years, in order to bring flexibility and reduce financial risks, most WCA countries have reformed their pricing systems with a two-tier payment linked to world prices: a base price negotiated at the beginning of the cropping season and a price complement calculated on the actual value of lint sales to be paid at the end of the season.

ES16. Approaches to price-setting in ESA have been as diverse as their sectoral and regulatory structures. However, no country in the region operates a stabilization fund, and no cotton sector has generated deficits that government had to cover. Prices paid to farmers throughout the region are linked to world prices, though the way in which this happens varies greatly.

ES17. Pricing performance can be assessed by the percent of the export price (FOT) paid to farmers. Expectations by sector type are largely confirmed outside the WCA monopoly sectors. Considering the past decade, Tanzania and Uganda (competitive sectors) have clearly paid the highest share in ESA (68%-70%). Price shares in Zimbabwe and Zambia (concentrated sectors)

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were high in the five years following reform (63-69%), but dropped sharply during 2000 to 2005 (49-55%). Thus, while farmers can receive reasonable prices under concentrated systems, in the absence of appropriate regulation they are vulnerable to changes in the conduct of the dominant firms. Prices in Mozambique (ESA's only monopoly sector) were the lowest in the region throughout the period (50%).

ES18. Price shares in WCA were also very low during 1995-99 (52-62%), but rose sharply during 2000-05 (71-76%), reflecting the greater role of farmer organizations, as well as political pressures, in the price setting process. Clearly, however, these relatively high prices are not sustainable, as evidenced by the huge sectoral deficits that have been generated in every country except Cameroon.

Input Credit and Extension

ES19. One of the major arguments against liberalization of cotton sectors is that it would lead to the collapse of the input credit systems that have largely contributed to the growth of production and yields in WCA countries. As part of the traditional WCA single-channel system, all cotton farmers are supplied on credit terms with an intensive input package (fertilizer and pesticides). In ESA, the input package is more variable across countries and across farmers within a country. Input consumption is also much lower in ESA countries, partly because of natural conditions (more fertile lands, lower pest pressure), and partly because of the institutional system.

ES20. In effect, the highly competitive post-reform structures in Tanzania and Uganda led to the collapse of input and extension systems. To remedy this situation, Uganda eliminated competition in the output market to facilitate input supply and extension assistance by ginners, while Tanzania has maintained a vigorously competitive output market and used innovative approaches (such as the passbook system) to provide some minimal level of inputs to farmers. The two concentrated sectors, Zambia and Zimbabwe, have performed much better than Tanzania and Uganda on input provision and cotton quality. However, each has faced substantial structural instability that has threatened input credit supply. This has been most pronounced in Zimbabwe since 2003, with the dramatic increase in the number of seed cotton buyers; a similar phenomenon occurred in Zambia in the late 1990s and is now recurring.

ES21. The country case-studies confirm the general hypothesis set forth in the typology, that monopoly and concentrated sectors are best able to ensure provision of inputs on credit and also to provide some level of extension advice, while both of these tend to be undermined by side selling in more competitive sectors. However the quality of extension services within monopoly systems also appears to have gone down in the last 20 years.

Institutional Arrangements for Quality Control

ES22. Estimated average export price differentials across the nine countries range from - US\$0.02/lb (Mozambique) to + US\$0.05/lb (Zambia) with respect to the Cotlook A Index. Compared with the mid-90s, export differentials relative to the A Index improved in Zambia and Cameroon thanks to reduced contamination, and, to a lesser extent, in Burkina Faso and Mozambique. On the contrary price differentials declined in five countries. The declines reflect increased competition between ginners in Tanzania, Uganda and Zimbabwe, and lax seed cotton

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grading and increased contamination in Benin and Mali. Overall, predictions from the typology are largely confirmed, with quality performance best in concentrated, market-based sectors and lowest in competitive settings. Performance varies across national and local monopolies, depending on other factors such as management culture and regulatory effectiveness.

Processing and Marketing of By-Products

ES23. The value of lint obtained from processing a ton of seed cotton is three to four times the combined value of the oil and cake. For this reason, oil and cake markets are often neglected in the analysis of African cotton sectors. As margins in lint production get tighter, however, and with world market demand for vegetable oil and protein possibly on the rise, the importance of the markets for by-products is growing.

ES24. WCA single channel systems, where the oil processing industry was originally created by parastatals, show a significant lower value for by-products than market based systems (US\$0.05 to US\$0.09 \$/kg of lint in the former, compared to US\$0.08 to US\$0.16 \$/kg of lint in the latter). The market based systems' advantage in this regard is likely due to a combination of factors: smaller-scale industries with lower investments, overheads and processing costs; more competition among seed processors; and cotton seed's smaller share in the total domestic oil market in these countries.

Cotton Research

ES25. Farm-level productivity gains are critical for Africa's cotton sectors to improve international competitiveness and contribute to poverty reduction. Unfortunately, African sectors seem to be lagging behind many of their major global competitors in this critical area. Research system performance has the weakest links to the typology, with all sector types revealing a fairly poorly articulated demand for research, weak internal and external linkages of cotton research, lack of vibrant public/private partnerships, lack of incentives and weak or non-existent regulatory frameworks.

ES26. Two new technologies could potentially address the needs of resource-constrained cotton growers in Africa over the near to medium term: (i) genetically modified (Bt) cotton and (ii) low-volume herbicides. Bt cotton has arguably been the major source of yield gains and cost reductions in rainfed cotton in India and China over the past five years. While the technical, organizational and public policy challenges to introduction of Br cotton are real, there is no reason to believe that such varieties could not generate similar productivity gains in Africa.

Comparative Analysis: Global Performance

Farm-level yields and productivity trends

ES27. Yield performance has been highly variable over time and across the two regions. Rapid yield growth in WCA during the 1970s and 1980s was linked to increased fertilizer use. Yields have stagnated since that time, however, largely as a result of reduced fertilizer use and a focus within varietal breeding work on increasing ginning out-turn. Meanwhile, worldwide rainfed yields have risen by 3.9% per year. As a result, WCA yields are now about equal to worldwide

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rained yields. Yields in ESA have grown 1.8% per year, less than half world growth rates in rainfed yields, and remain little more than half those in WCA.

ES28. Overall, results confirm that performance on yield levels is strongly related to expectations for input provision and extension, but also heavily influenced by past investments. Yield performance in ESA is correlated with sector organization, with more concentrated systems (Zambia and Zimbabwe) achieving higher yields than the more competitive models (Tanzania and Uganda). Poor performance in the latter is linked to their inability to deliver the inputs and extension needed to raise yields.

Crop Budgets and Returns to Farmers

ES29. An analysis carried out across three- to four groups of farmers in each country, based on their cotton yields and total production levels, shows that a much higher proportion of cotton producing households are found in the higher producing groups in WCA than in ESA. This difference reflects investments made over the years promoting animal traction and use of fertilizer. Because of the greater use of animal traction for both ploughing and weeding, labor use is lower in WCA than in ESA. Meanwhile, weighted average returns to both family labor and to all labor are higher in WCA than in ESA. This finding holds true even if we use “break even” prices in place of the unsustainable producer prices paid in the WCA region in recent years. Zimbabwe is the best performer in ESA from a farmer’s perspective. Although competitive sectors within ESA have outperformed more coordinated ones on seed cotton pricing, from a farmer’s perspective they have not done so to such an extent as to outweigh their disadvantages in terms of service provision.

ES30. A stark finding from the farm-level analysis is that between 25% and 75% of cotton producing households (depending on the country) would be better off hiring out their labor than applying it to their own cotton plots. In WCA countries, these households persist in producing cotton because it is often their only option for cash crops, and because it is the only way to get inputs on credit. In ESA countries, cotton fits into a livelihood strategy whereby the poorer farmers prioritize the hiring out of their labor, then cultivate their own cotton fields when not working elsewhere; this practice comes at a high price in cotton yield. Better-off farmers use animal traction or, more commonly, hire labor to perform their operations in a timely fashion and thus achieve much higher yields.

Cost Efficiency of Cotton Companies, Overall Competitiveness, and Macro Impact

ES31. Ginning costs are sharply lower in market based systems (Zambia, Zimbabwe, Tanzania) than in monopoly or hybrid systems (WCA, Mozambique, and Uganda). Notably, ginning costs in Mozambique and Uganda are comparable to WCA only because these two countries operate at about 20% of capacity. Total net cost from farmgate to FOT are also lower in market based systems, be they competitive or concentrated, due to lower ginning costs, lower overhead, lower financial costs, and higher sales value of seeds. The WCA monopolies thus perform especially poorly in terms of company efficiency.

ES32. Due to these high costs, and to only average performance on quality, the WCA sectors are also the least competitive, either barely breaking even (Cameroon) or generating large deficits

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(Mali and Burkina Faso). All the ESA sectors appear to be highly competitive in world markets. In Mozambique, however, a key reason for this result is the exceptionally low prices paid to farmers.

ES33. At farm level, value added per hectare is higher in WCA sectors than in ESA. However, value added per kilogram of lint is as high or higher in ESA, reflecting generally more favourable soil fertility conditions. This is reinforced at ginning level, where WCA sectors currently add little value (US\$-0.04 to 0.14 per kilogram of lint compared with US\$0.24 to 0.41 per kg in ESA sectors), due to a combination of high seed cotton prices and high costs of ginning operations.

ES34. At national level, total value added per capita shows no clear pattern by sector type: concentrated systems in ESA are clearly best in that region, with Zambia and Zimbabwe generating about US\$6 per capita, but are not better than most WCA countries. Burkina Faso is the highest of all at US\$9.15 per capita, driven by the very large share of the rural population that grows cotton. Uganda and Mozambique are the lowest due to low production.

ES35. WCA's recent good performance on value added per capita comes at a very high cost to the national budget and the existence of fiscal liabilities for the state budgets: the Mali government made net transfers of US\$2.47 per capita to the cotton sector in 2006, while Burkina paid US\$0.81. Sectors in Cameroon, Mozambique, and Uganda made positive but small contributions to the national budget (US\$0.02-0.08), while the market based sectors (Tanzania, Zimbabwe, Zambia) all made positive contributions of US\$0.14-0.18 per capita through taxes and levies.

Conclusion

Opportunities and Challenges for African Cotton

ES36. This comparative analysis needs to be placed in the perspective of the globalized cotton market and challenges that are common to all African cotton sectors. Despite the dire financial crisis facing a number of cotton sectors in WCA in the short-term, experts predict that there is an important growth potential for African cotton on the world market in the long run. However, remaining competitive and increasing market share will require considerable efforts geared at narrowing existing gaps (productivity, quality management, etc) and building more than in the past on comparative advantages.

ES37. The three major objectives for African cotton sectors are: (1) achieving greater value through improved quality, marketing, and valorization of by-products. (2) bridging performance and competitiveness gaps through farm-level productivity and ginning efficiency, and (3) improving the sector's sustainability through institutional development and capacity-building of stakeholders, as well as strengthening of governance structures and management systems. These objectives are important, notwithstanding factors that are beyond the direct control of SSA governments and stakeholders such as the evolution of the euro/\$ exchange rate and slow progress in reducing market distortions due to OECD subsidies.

Lessons from Reform Experience

ES38. This study performed a rigorous analysis on cotton sector structure and situations in the sample of countries, without initial bias. The analysis has revealed strengths and weaknesses in various systems, particularly when one looks at them over a long time period. Two main conclusions have come out: (i) no one model has proven superior to all others in all respects over time, and (ii) none of the systems under review offers a fully satisfactory and sustainable response to the challenges of future competition in the world cotton market. Nevertheless the analysis has also demonstrated that key outcomes are dependent upon - and can be predicted by - the type of sector organization. The proposed typology offers a fairly strong and reliable framework to provide insights about possible evolutions of African cotton sectors.

Summary of Expected and Realized Performance across Key Indicators

ES39. Summarizing across sector types, we find that the WCA national monopoly model has generated strong returns to very large numbers of farmers, but that poor cost efficiency has undermined these sectors' competitiveness, even if they were to pay prices more in line with the market-based systems of ESA. Substantial cost reductions are needed throughout the WCA region, and these seem unlikely to come without fundamental change in the systems.

ES40. Competitive sectors are cost efficient and pay attractive prices to farmers, but their inability to provide input credit and extension, or to raise quality, means that they are unlikely to make substantial contributions to poverty reduction as long as input and credit market failure remain prominent features of rural Africa. It also seems likely that Tanzania's competitive system has been able to perform as well as it has due in part to favorable agro-ecological and population settlement characteristics; we expect that the performance of a competitive model would be significantly poorer in less well endowed areas such as WCA.

ES41. Concentrated sectors have performed well in quality and service delivery (input and extension), have been more efficient than the monopolies, and have also generated attractive value added per capita while making the highest contributions to state budgets. Yet since 2000 their performance on seed cotton pricing has been disappointing. These systems may also be inherently unstable; their future prosperity is likely to require a supportive approach to regulation that has yet to be achieved within an African cotton sector.

Final Reflections on Sector Types and Looking Ahead

ES42. This comparative analysis helped derive detailed conclusions on the possible way forward for particular sector types and key factors that need to be taken into account. Clearly "reform" does not imply a movement from one stable set of rules of the game to another stable set. Also, sector structure heavily influences the types of challenges a cotton sector has most difficulty facing. The conclusions and recommendations by sector type are presented in the last chapter of the report.

ES43. In the short to medium term, the most likely structural change within African cotton systems is an increase in the number of local monopoly systems. Decisions in Burkina and Mali support this conclusion. Moving quickly to a fully privatized market that allows competition among companies, even if the market is initially very concentrated, is a risky proposition for

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WCA countries, for two reasons: the instability of concentrated systems, and the likelihood that highly competitive systems would perform poorly under WCA's agro-ecological conditions. If, instead, they can use the local monopoly approach to build up the operational capacity of farmer organizations, concentrated and eventually even competitive systems could perform well. Thus, over time, local monopolies could be a transition towards market-based sector types such as concentrated and competitive systems. If so, the most desirable type initially is probably a concentrated system, if the regulatory challenges can be overcome to make such a system more stable.

ES44. More competitive systems are probably part of the long-term future. However, there is a need both for stronger farmer associations to take over some critical functions (e.g. extension) and for improvements in rural input and financial markets before competitive systems can support genuinely high performing cotton sectors in most African countries.

ES45. Finally, one may expect to see some degree of convergence in the forms of cotton sector organization in Sub-Saharan Africa over the next decade, with emphasis on a degree of private sector competition, an important role for farmer associations, and a multi-stakeholder approach to sector regulation. This should be accompanied by policies and programs aiming, across sector types, at improving the quality and marketing of cotton lint, and improving research and research-extension linkages to close the productivity gap.

SECTION I: INTRODUCTION AND MARKET CONTEXT

CHAPTER 1: INTRODUCTION

1. The story of cotton in Sub-Saharan Africa is a contrasted one. While the continent's share of world agricultural trade fell by half from 1980 to 2000, its share of cotton trade rose by 30 percent (FAO 2002), and predictions are that its share will continue to grow (FAO 2004). Production grew three times more rapidly in SSA over the period than it did in the rest of the world. Cotton is predominantly a smallholder crop, with over 2,000,000 poor rural households in SSA depending on it as their main source of cash income. Among export crops with substantial smallholder farmer involvement in SSA, cotton ranks second in value only to cocoa, and its production is spread more widely across the continent. The profitability of cotton production and processing in Africa has large and widespread impacts on rural growth and poverty in the continent and as a result the challenges faced by the sector are serious.

2. Unusual for African export crops, cotton is produced in several countries of the developed world and China. Large subsidies to cotton farmers in many of these countries, combined with the obvious role that cotton plays in the livelihoods of millions of poor African farmers, has helped make the crop a major issue in world trade negotiations. The Overseas Development Institute (ODI) (2004) shows that subsidies to cotton farmers in the US during 2001/02 were equivalent to about 50 percent of the world price; in China and EU, these figures were about 25 percent and 100 percent, respectively. The total value of subsidies is highest in the US, where about 25,000 cotton farmers received an average of about US\$2 billion per year between 2001 and 2003, equal to about 60 percent of the national GDP of both Mali and Burkina Faso.

3. Formal complaints under the World Trade Organization (WTO) about these subsidies began in 2003 with Brazil, which challenged US subsidies and won its case in 2004. Also in 2003, Burkina Faso presented WTO with a cotton proposal on behalf of Mali, Benin, and Chad calling for the eventual elimination of all developed country cotton subsidies, coupled with financial compensation for cotton farmers in Least Developed Countries. Within Africa, the focus of the public debate about subsidies has been almost entirely on these four West African countries, known as the "C4" (Cotton-4).

4. Predating this trade and subsidies debate has been another debate, now lasting more than two decades, on whether the highly integrated approach to cotton supply chain development in countries of WCA needed to be reformed. This approach, which typically featured "single channel" systems built around public monopoly cotton companies, has driven tremendous growth in cotton production in the region; the International Cotton Advisory Council (ICAC) data indicate that total lint production in the "Franc Zone" rose from 50,000 tons in 1960 to about 220,000 tons in 1980 to an average of about 1.1 million tons in 2004 and 2005. The crop has also played a major role in rural development, facilitating input supply for other crops in cotton zones and helping farmers invest in animal traction and other equipment that improved overall farm productivity and incomes.

5. However these single channel systems have also suffered from serious and perhaps growing problems. During the years immediately following the devaluation of the CFAF in 1994 (Pursell 1999; Badiane et al. 2002), WCA was seen to pay lower prices to farmers than in sectors with "more competitive" arrangements. Many studies commented on the stagnation of farm yields starting around 1990, although these yields remained higher than in most other areas of Africa.

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The parastatal ginning companies were also seen to be increasingly inefficient and opaque in their operations (Pursell 1999; Badiane et al. 2002; World Bank 2006). In Mali, farmers boycotted the crop in 2000/01 due to low prices and perceived corruption within *Compagnie Malienne de Développement des Fibres Textiles* (CMDT), and top managers in CMDT were eventually sent to jail for financial mismanagement.

6. In a world market where real prices have fallen by about half since 1980², the problems described above can threaten the survival of cotton production, processing, and trade. These concerns have come acutely to the fore over the past two years, as high prices to farmers, combined with high operating costs of the ginning companies and stagnant farm yields, have led to massive sectoral deficits in most countries. In Burkina Faso and perhaps others, these deficits threaten the country's macroeconomic stability. Meanwhile, farmers continue to complain that prices are too low.

7. The debate about how to deal with these problems is rooted in several factors at the intersection of characteristics of cotton as a crop and the rural setting in much of SSA. First is the widely appreciated fact that cotton production requires substantial use of external inputs, specifically treated seed and insecticides.³ A second factor is that markets in SSA for input and, especially, credit for inputs, frequently fail for smallholder farmers. While seed and fertilizer for a crop like maize may be relatively available in markets and frequently purchased by smallholder farmers, specialized insecticides and seed treatments for cotton are less likely to be available, and credit is almost never accessible for unorganized smallholders. Additionally, because cotton is produced in a highly competitive export market, efficiency is paramount throughout the chain. At the farm level, farmers must use the right input in the right way if they are to earn reasonable returns from the crop, and if they are to produce enough products to sustain the ginning companies. Control over the input mix, and extension assistance to ensure proper use are issues of vested interest to the ginner. Bundling inputs and extension into a package creates efficiencies for the distributor and as a result, most approaches to the input credit problem have featured *interlocked transactions*, in which a ginning firm wishing to purchase the farm output provides some level of extension advice along with input to farmers on credit, and attempts to recover the credit upon purchase of the product.

8. Such arrangements, which are referred to as *contract farming* or *outgrower schemes*, such arrangements have governed production of a wide range of cash crops throughout the developing world for many decades.⁴ When effective, they allow smallholder farmers to profit from a crop they might ordinarily not be able to plant and allow processors to benefit from low costs of production.⁵ Yet the conditions under which interlocked transactions can be expected to emerge and persist are relatively restrictive (Delgado 1999; Benfica and Tschirley 2002)⁶. Numerous

² See Chapter 2 on cotton's market context for more detail.

³ While some might argue that Tanzania is an exception, the persistent and very serious efforts by government and private stakeholders to resolve the input supply problem in the sector suggest that external input is considered critical.

⁴ See Glover (1990) for a review of experience in eastern and southern Africa through the late 1980s.

⁵ These low costs of production are related primarily to the very low price at which many smallholder farmers are willing to "sell" their labor in production of the crop, and to the low supervisory costs inherent in using primarily family labor. See Binswanger and McIntire (1987).

⁶ See Jaffee (1994), however, for an empirical review of the widely varying circumstances under which contract farming has emerged, and examples of failure where external conditions seemed favorable.

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examples exist of failed efforts, primarily related to the inability of processors to recover input credit (Stringfellow 1996; Glover 1990). Though the structure of the cotton market lends itself to contract farming operations, it too has frequently been threatened by acute credit default crises since in addition to the credit exposure, cotton companies are exposed to price and exchange rate volatility, which create high levels of financial risk. Additionally, over the longer term, cotton systems can be undermined by the inability of participants in the supply chain to agree on and develop financing mechanisms for investments in research, extension, risk management, and quality control.

9. The performance of cotton input credit and extension systems in SSA is strongly influenced by the structure and behavior of the market for seed cotton. Because changes in the structure of the output market are central to any sectoral reform, they have the potential to dramatically affect input/credit/extension systems. It should not be surprising, therefore, that proposed reforms have engendered great concern about possible unanticipated negative effects on these systems. As early as 1988, a major comparative review of cotton sector performance in Anglophone and Francophone countries of SSA concluded that, in West Africa's single channel systems (which to that time had been far more successful than systems in Anglophone countries), "privatization of input distribution ... should be considered only with the greatest caution, due to the need to link distribution with credit and output marketing." (Lele, Van de Walle, and Gbetiobou 1989). It further cautioned about the potential "collapse of the cotton industry in francophone Africa" if research and extension were moved out of existing single channel systems without viable alternative institutional approaches to ensure the continuity of these activities. Within Francophone African countries, one important basis for opposition to reform has been fears that input credit and extension would be undermined.

10. In both the subsidies debate and the debate on structural reform of cotton sectors, little attention has been paid to ESA. Yet production in the region has been growing steadily, and reached nearly half a million tons of lint in 2004/05. Serious structural reform of cotton sectors in ESA, including the elimination of existing single channel systems, began 12 to 15 years ago, and much has been learned about the process. Reform in West Africa has been slower, for a number of reasons: the single channel systems were very strongly established in many countries, stakeholders could point to substantial successes in addition to clear and mounting problems, and the sheer number of farmers involved—and the size of the public companies serving them—made reform difficult from political, social, and commercial perspectives. The developed world subsidies referred to above also fueled internal resistance to reform. Yet nearly all countries in WCA have made substantial incremental changes in their systems, and some have undertaken (or will soon undertake) structural reforms. To date, no attempt has been made systematically to bring together and assess reform experience from both regions of the continent. This analytical gap, and the potential benefits from such an exercise, provides the fundamental rationale for this study.

11. This comparative report is based on detailed case studies in nine countries of ESA and WCA: Benin, Burkina Faso, Cameroon, and Mali in WCA; and Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe in ESA (Figure 1). In 2005/06, the nine countries in the sample together produced over one million tons of cotton lint, the majority of which was exported. This represents 60 percent of total African production and 68 percent of SSA production. Within our sample, the four WCA countries accounted for 70 percent of total production in 2005/06.

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12. Each case study involved a literature review plus a two-week visit to the country by researchers who already had several years of experience in the sector. In addition to compiling standard information on the historical background, recent changes, and current organization of the sector in each country, the case studies share three key characteristics that heavily influence the content of this comparative report. First, each provides a detailed overview of the institutional arrangements in place for key sector services such as input credit, research and extension, lint marketing and quality maintenance, and seed cotton pricing. Especially in ESA, the diversity of approaches to these challenges provides great scope for learning. Second, each study developed disaggregated budgets for representative ginners, allowing this report to conduct a detailed comparison of the level and structure of ginning costs in each country. Third, each study used a comparable focus group approach to develop detailed farm-level budgets for a range of cotton farmer types. Focusing on the diversity of farm-types, behavior and performance at the farm level allows important insights into cotton's contribution to poverty reduction, about the differential effects of pricing policy, and about the nature and scope of the productivity challenges the sector faces.

13. The term “reform” is widely used but seldom defined in development literature. This report understands reform to be consciously chosen change in the fundamental organization of a sector and related changes in the “rules of the game” under which stakeholders operate. Under this definition, every country in ESA reformed its cotton sector in the early- to mid-1990s, either eliminating single channel parastatals (Zimbabwe and Zambia) or privatizing cooperative ginners (Uganda and Tanzania).⁷ In the sample WCA countries, only Benin and, to a lesser degree, Burkina Faso have reformed their cotton sectors under this definition.

14. Yet a key theme that emerges from this research is that “reform” does not imply a movement from one stable set of rules of the game to another stable set. The reforms of the 1990s in ESA have been followed by continuous and sometimes dramatic change in every country. Even countries in WCA that have not reformed under this definition have effected substantial incremental change in how they carry out critical sector activities. An important contribution of this research will be to show how the details of institutional design matter, to provide a rich sense of the diversity of approaches that have emerged to deal with common challenges, and to provide insight into the factors that influence which approach might be chosen under different circumstances.

⁷ Mozambique is a special case to be discussed later.

Figure 1: Map of Africa Highlighting Study Countries of WCA and ESA



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15. The report is organized in five sections. The next chapter in Section I present key elements of the current world market setting. Section II provides historical background, outlines the typology of cotton sectors that is used to form hypotheses regarding sector performance, and presents a conceptual framework for analyzing sector organization and linking it to outcomes.

16. Sections III and IV provide a detailed comparative description and performance assessment of nine systems around a set of key themes. Section II focuses on processes, functions and services that are most directly under the control of cotton companies, namely:

- pricing systems and prices paid to farmers
- institutional arrangements for input credit and extension
- quality control and lint marketing strategies
- valorization of cotton seed by-products
- institutional arrangements for research

17. Section III will assess overall performance of the nine sectors on the basis of outcome indicators that have a bearing on the sector's contribution to national poverty reduction objectives. Section IV focuses on yield performance and returns to farmers, on competitiveness at ginning level and value addition and on macro-impacts.

18. Section V closes by summarizing performance across countries and sector types and suggesting key issues to be taken into account in policy discussions regarding continued efforts to strengthen cotton sectors in the continent.

CHAPTER 2: MARKET CONTEXT

2.1. The Supply Side: Expanding Production and Exports

19. About three-quarters of cotton is produced by developing countries. During the last four decades, world cotton production has grown at an annual rate of almost 2 percent to reach 25 million tons of lint in 2006, up from 10.2 million tons in 1960. Most of this growth came from China and India, whose production quadrupled during that period. Today these two countries account for almost 45 percent of world cotton production and more than half of global consumption. Other countries that significantly increased their shares during this period were Greece, Pakistan, and Turkey (see Table 1). Some “new entrants” also contributed to this growth. Australia, for example, which produced only 2,000 tons of cotton in 1960, currently averages 0.5 million tons per year. Francophone Africa produced less than 100,000 tons in the 1960s and now produces 10 times as much. The US and the Central Asian republics, two of the four dominant cotton producers during the 1960s, have maintained their production at about the same levels, effectively halving their market shares. A number of Central American countries that accounted for 250,000 tons during the 1970s now produce virtually no cotton at all.

20. About one-third of cotton production is traded internationally. The three dominant exporters—the US, Central Asia, and Francophone Africa—account for more than two-thirds of global exports. Most of the rest is exported by SSA, which increased its share in world cotton trade from 7 percent in 1960 to 15 percent in 2006. However, the export performance between WCA and ESA differs considerably; in 1960, WCA accounted for a little more than 1 percent of global exports while today it accounts for more than 11 percent. Exports from ESA, however, have declined from 6 percent in 1960 to 4 percent today.

21. World prices for cotton have been declining partly as a result of competition on the supply side, driving production costs down. Reductions in production costs have been associated primarily with technological improvements resulting in yield increases from 300 kilograms per hectare in the early 1960s to about 700 kilograms per hectare in 2005 (world average). This yield increase reflects the introduction of improved varieties and increased use of irrigation and chemical fertilizers. Furthermore, the spread of genetically modified seed technology in developing countries and precision farming in developed countries is expected to reduce the costs of production even further.

22. More than one-quarter of the area allocated to cotton is currently produced under genetically modified (GM) varieties, accounting for almost 40 percent of world production. GM cotton in the US—where it was first introduced in 1996—currently accounts for about 80 percent of the area allocated to cotton. Other major GM cotton producers are Argentina (70 percent of the cotton area), Australia (80 percent), China (60 percent), Colombia (35 percent), India (10 percent), Mexico (40 percent), and South Africa (90 percent).⁸ Countries that are at a trial stage include Brazil, Burkina Faso (the only SSA country), Israel, Pakistan, and Turkey (I.C.A.C. Cotton Outlook 2005).

⁸ Although India’s area allocated to GM cotton (10 percent) is small compared to other countries, its share in worldwide GM cotton production is high, because the total cotton area in India is high and GM yields are well above mean yields in the country.

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23. Although the last decade has witnessed the expansion of the organic movement in other commodities, cotton has not enjoyed much success. Organic cotton production was introduced in the US in 1990, when 330 tons were produced. Following a peak of 7,425 tons in 1995, the US now produces less than 2,000 tons. Currently, the world's two major organic cotton producers are India and Turkey, which together account for two-thirds of global organic cotton production. In total, global organic cotton production during 2004 was 25,400 tons, only about 0.1 percent of world cotton production.

Table 1: Global Balance of the Cotton Market (in thousand mt)

	1960	1970	1980	1990	2000	2002	2004	2006
PRODUCTION								
China	1,372	1,995	2,707	4,508	4,417	4,916	6,320	6,729
US	3,147	2,219	2,422	3,376	3,818	3,747	5,062	4,731
India	1,012	909	1,322	1,989	2,380	2,312	4,080	4,590
Pakistan	306	543	714	1,638	1,816	1,736	2,482	2,115
Central Asia	1,491	2,342	2,661	2,593	1,412	1,509	1,737	1,719
Brazil	425	549	623	717	939	848	1,318	1,381
Francophone Africa	63	140	224	562	728	952	1,135	888
Turkey	192	400	500	655	880	900	900	850
Australia	2	19	99	433	804	386	624	253
Greece	63	110	115	213	421	375	390	300
World	10,201	11,740	13,831	18,970	19,437	19,437	26,193	25,312
EXPORTS								
US	1,444	848	1,290	1,697	1,472	2,591	3,000	3,048
Central Asia	381	553	876	1,835	1,203	1,172	1,251	1,467
India	53	34	140	255	24	17	175	1,050
Francophone Africa	48	137	185	498	767	833	952	928
Australia	0	4	53	329	849	575	420	483
Brazil	152	220	21	167	68	170	360	300
Greece	33	0	13	86	244	275	263	243
Syria	97	134	71	91	212	120	152	100
Egypt	346	304	162	18	79	150	140	100
World	3,667	3,875	4,414	5,081	5,857	6,618	7,542	8,270

Source: International Cotton Advisory Committee, *Cotton: Review of the World Situation*, various issues

Note: Bangladesh is included in Pakistan prior to (and including) 1970. Francophone Africa includes Benin, Burkina Faso, Cameroon, Central Africa Republic, Chad, Côte d'Ivoire, Guinea, Madagascar, Mali, Niger, Senegal, and Togo. Central Asia includes Uzbekistan, Turkmenistan, Tajikistan, Kazakhstan, Azerbaijan, and Kyrgyzstan. Years refer to marketing seasons, for example, 2006 is 2006/07 (Aug-Jul).

2.2. The Demand Side: Changing Focus of Demand and Competition with Synthetic Fibers

24. Between 1960 and 2005, global cotton demand has grown at the same rate as the population (close to 2 percent per year), implying that per capita cotton consumption has remained steady at about 3.5 kgs per year. By contrast, consumption of chemical fibers, which compete with cotton, has increased over the last 50 years by 2.2 percent per year, causing cotton's share in total fiber consumption to decline from 60 percent in 1960 to less than 40 percent in 2005.

25. Cotton consumption is determined by the location of the textile industries. During the 1960s Europe, the US, and Japan were major textile manufacturers and hence major consumers of cotton. Gradually, however, the textile industries moved to South and Southeast Asia. Today, China, India, Pakistan, and Turkey account for more than 70 percent of global cotton consumption. Key reasons for the relocation of the textile industry to these countries include low wage and energy costs and the ability to deliver final goods in a timely fashion. Currently, the 10 largest cotton importers account for more than 70 percent of global cotton trade. Three major producers—China, Turkey, and Pakistan—also import cotton lint to supply their textile industries. The four East Asian textile producers—Indonesia, Thailand, Taiwan, and Korea—accounted for more than 20 percent of world cotton imports in 2005, compared to just 3 percent in 1960. The shift of cotton consumption to Asia has been aided by the abolition of the Multi-Fiber Agreement which, in effect, dictated the trade flows of textile products. In addition, it should be noted that Southeast Asia also has the highest concentration of chemical fiber production.

2.3. Declining and Volatile World Prices for Lint

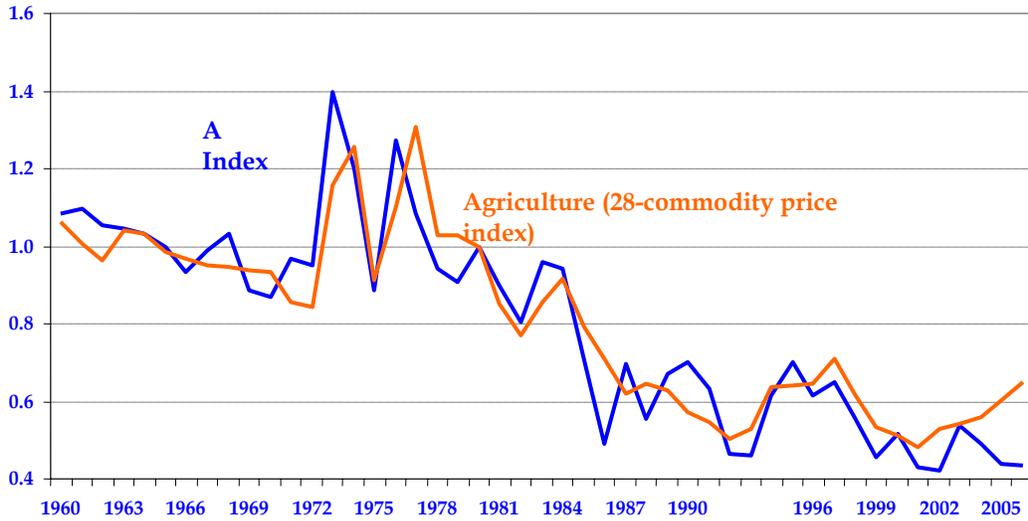
26. Real cotton prices have declined over the last two centuries, although with temporary spikes. The reasons for the long-term decline are similar to those characterizing most primary commodities: on the supply side reduced production costs due to technological improvements and on the demand side stagnant per capita consumption and competition from synthetic products (for some commodities, including cotton). Between 1960-1964 and 1999-2003 real cotton prices fell by 55 percent, remarkably similar to the 50 percent decline in the broad agriculture price index of 28 commodities (Figure 2). Two periods of pronounced spikes in commodity prices during that period have been the oil-induced boom of the 1970s and the price collapse of the mid-1980s. Note that the 1985 cotton price collapse was a result of a policy shift in US commodity programs (including cotton). It also reflects a policy shift in China that favored cotton production there.

27. In addition to the declining trend, cotton prices have also been volatile, a common phenomenon among most primary commodities. The degree of volatility, however, has changed considerably during the last 40 years. Various measures of price volatility calculated by Baffes (2005a) consistently show three distinct periods: (1) 1960 to 1972, when price were very stable, (2) 1973 to 1984, when various measure of volatility quadrupled, and (3) 1985 to 2002, when volatility fell by half but remained twice what it was during 1960 to 1972. This conclusion is similar to findings by Valdès and Foster (2003) who looked at price variability of corn, rice, sugar, and wheat as well as findings by Sarris (2000) who examined intra- and inter-year price variability of wheat and maize.⁹

28. Cotton has not been part of the recent commodity price boom (Figure 3). Likely reasons include the fact that a) cotton subsidies continue to depress prices (see Box 1 on subsidies); b) GM cotton production is expanding, particularly in China and India who have kept production costs low; and c) the prices of many other commodities have recently rallied because of the increasing demand for biofuels production (for example, maize and sugarcane for ethanol and rapeseed for biodiesel).

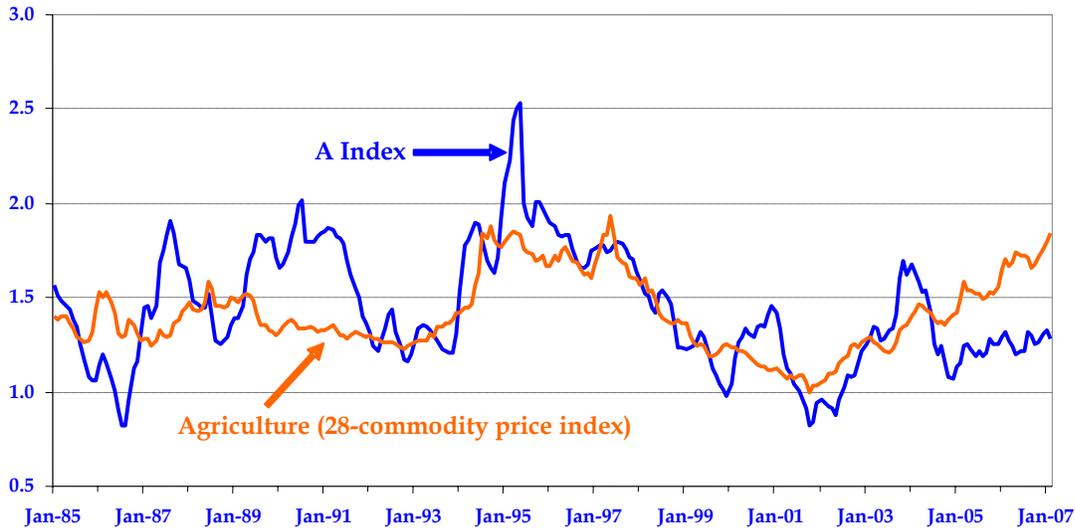
⁹ It should be noted that price variability of cotton has not been that different from other primary commodities. Pan and Valderrama (2005), for example, compared the price variability of 22 primary commodities and concluded that during the past four years, 17 commodities exhibited more price variability than cotton. Similarly, Gilbert (2006) ranked 21 commodities according to their volatility and found cotton to be somewhere in the middle.

Figure 2: Real (MUV-Deflated) Price Indices (1980=1.0)



Source: World Bank, Commodity Price Data

Figure 3: Cotton (\$/kg) and Agriculture (Oct 2001=1.0) Indices



Source: World Bank, Commodity Price Data

2.4. External Factors Affecting World Lint Prices

2.4.1. Currency Exchange Rates

29. Because cotton is traded in US dollars (as is the case with most commodities), cotton prices are affected by the movements of the US dollar—in addition to all other factors affecting cotton prices. Furthermore, all cotton producers are affected by the variability of the currency in which

their cotton is sold. In the group of countries examined in this report, there are three exchange rate-related issues. First, the CFAF, the currency of all WCA countries, has been linked to the euro (or the French franc prior to 2000) with only one adjustment since 1948 (in 1994 when the CFAF/FF parity changed from 50 to 100). Such long periods of fixed exchange rates between very different economies can lead to periods of significant economic imbalance. In WCA, the substantial appreciation of the CFAF since 2000/01 has received great attention from policy makers as a major cause of the profitability crisis affecting the region's cotton sectors. Indeed, during 2005/06 the US\$ Cotlook A Index average was roughly the same as in 2000/01, while during the same period the CFAF appreciated from 731 CFAF per US\$ to 535 CFAF per US\$. As a result, the world price of cotton in CFAF terms fell by 37 percent (Figure 3). What is less recognized is that the CFAF *depreciated* substantially from the 1994 devaluation through 2000/01, during which the CFAF/USD rate was at an all time high. As a result, both nominal and real exchange rates in 2006 were nearly identical to what they were in 1995, just after the adjustment (Gergely, this project). Taking this longer-term view, we see that mean real CFAF/USD exchange rate during the 2004-2006 period (when the financial crisis became severe) was 17% below its mean 1995-2006 level. Thus, while one might expect some depreciation in the CFAF at some point, two points must be kept in mind. First, it is impossible to predict when and by how much the depreciation will occur or indeed if it will occur at all in the medium-term. Second, the level of current overvaluation of the CFAF, based on this longer comparison, is not nearly as great as implied by the focus on the appreciation since 2000/01.

30. Exchange rate movements are also an important issue in Zambia, but for a different reason (Tschirley and Kabwe 2007b). From 1996 through 2001, the kwacha slowly depreciated in real terms against the dollar. As a result, export sectors with a significant share of costs in local currency would, all else being equal, have been able to earn slightly higher profits. From mid-2002 to mid-2005, however, the kwacha appreciated over 30 percent against the US\$. Though this pattern may have been broadly consistent with the depreciation of the US\$, the kwacha then appreciated an additional 35 percent over the next nine months, putting extraordinary pressure on the export sectors. A slight recovery in the real rate in late 2006 left it still well below typical levels from 1996 through 2002.

31. Zimbabwe faces exchange rate issues as well, albeit of a different kind. Since 2001, exporting companies have been required to remit a proportion of all foreign exchange receipts to the Central Bank, where they have been exchanged into Zimbabwe dollars (Z\$) at the official exchange rate. They have been allowed to keep the remainder in foreign currency accounts but since 2005 it has been difficult for companies to access and freely use the proportion (currently 70%) kept in foreign accounts. Since 2003, as the ratio of the parallel exchange rate to the official exchange rate has varied from 1.0 to 24.7 since January 2003 (average = 3.7), the proportion of their proceeds that companies are allowed to keep has become an important determinant of their profitability.

2.4.2. *Subsidies*

32. While there are various trade-distorting interventions in the cotton market, the most important at a global level is the domestic support given by the US (see Box 1). Although numerous models have evaluated the impact of US cotton policies on the global market, there is considerable variation in the results (a summary description of these models can be found in FAO

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2006).¹⁰ A simple average over all models shows that world cotton prices would have been between 10 and 15 percent higher without support. Applying a simple average to WCA cotton producing countries shows that these countries lost approximately \$150 million annually in export earnings due to the subsidies. Cotton subsidies became a contentious issue during the current trade round under the auspices of the Doha Development Agenda. The cotton subsidy issue was further highlighted following the move by four WCA cotton producing countries (Benin, Burkina Faso, Chad, and Mali) to demand compensation for the lower prices receives because of subsidies. Brazil also brought a case to the WTO against the US, claiming, among other issues, that subsidies reduce world prices and hence hurt its export earnings. Following the WTO's ruling, the US removed its *Step-2 Payment* part of its cotton program (amounting to about 15 percent of its subsidies). The WCA cotton producers, however, have not received any compensation. The fate of remaining US subsidies is currently under discussion within the framework of the US Farm Bill. Although there may be some reduction in US subsidies, it is unlikely that they will be eliminated altogether.

Box 1: Cotton Subsidies

Cotton subsidies in the United States have a long history dating from the commodity programs of the Great Depression. The specific provisions of these programs, including the one for cotton, change with each "Farm Bill" passed by the Congress (Farm Bills are introduced approximately every 4 to 5 years), but their chief objective has remained largely unchanged: to transfer income from taxpayers (and to some extent consumers) to producers. The main channels of support to U.S. cotton producers are the following: (i) *Price-based payments* (also known as loan rate payments) are designed to compensate cotton growers for the difference between the market price and the target price when the latter exceeds the former; (ii) *Decoupled payments* (renamed direct payments in the 2002 Farm Bill) are predetermined annual payments calculated on the basis of area historically used for cotton production. Direct payments were introduced with the 1996 Farm Bill to compensate producers for "losses" following the elimination of deficiency payments; (iii) *Crop insurance* is a subsidy to provide protection against weather-related crop failures; (iv) *Countercyclical payments* were introduced in 1998 (as "emergency payments") to compensate producers for income "lost" due to low commodity prices. They were made permanent under the 2002 Farm Bill. In addition to these transfers there are other publicly funded programs—among them research and extension services and subsidized irrigation. The US cotton program, which has been subject to review by the U.S. General Accounting Office twice (1990 and 1995), was (and still is) very complex and expensive.

The EU also supports its cotton producers. During the past 10 years, the budgetary expenditure on the cotton sector ranged between \$0.7 and \$1.0 billion, implying that, on average, EU cotton producers received more than twice the world price of cotton. EU cotton producers receive support even in periods of high prices, since the budgetary allocation to the cotton sector must be disbursed. For example, EU cotton producers received approximately the same level of support in 1995 and 2002, although cotton prices in 1995 were twice the level of 2002. A major reinstrumentation of the EU cotton program was undertaken under the Luxembourg Council's decision of April 22, 2004, which was based on the September 2003 proposal. Under the new program, an estimated €700 million will fund two support measures, with 65 percent of the support taking the form of a single decoupled payment and the remaining 35 percent taking the form of an area payment (European Commission 2003).

¹⁰ The highly divergent results for these models reflect a number of factors. First, there are differences in the level and structure of support. For example, some models incorporate China's support to its cotton sector and model its removal; others do not. Second, there are differences in the underlying scenarios. Some models assume liberalization in all commodity markets while others assume liberalization only in the cotton sector. Third, the models use different base years and hence different levels of subsidies. For example, support in the US was three times as high in 1999 as in 1997.

2.5. Increasingly Stringent Demand for Quality Fiber

33. Like all commodities, cotton is differentiated by quality parameters for the purposes of trade. Cotton fiber is the raw material for the textile manufacturer who transforms cotton into yarn and then into fabric for apparel, household goods, or industrial products. Cotton quality requirements can vary substantially depending on the final product, and the quality differences affect the price that manufacturers are prepared to pay and the value that they can get from the cotton lint. Price differentials are quite wide, with a ratio of about 1:4 between the lowest and the highest quality lints.

34. Increasingly, quality demands are being placed on the entire textile supply chain, from the raw material to end products. Chemical fiber performance has become a benchmark for cotton spinning. The main challenge for cotton is to be able to compete with artificial fibers, mainly polyester, on both price and quality. Chemical fibers are generally easier to process, more versatile, and stronger than cotton fiber, and modern textile industry machinery requires from cotton fiber the same characteristics of cleanliness and homogeneity as those offered by artificial fibers.

35. In short, the increasingly stringent demand for quality cotton can be articulated in the following motto: “fiber, only fiber, but more than just fiber.” The rest of this section elaborates on each aspect of this challenge.

2.5.1. *Fiber*

36. As cotton is a natural and seasonal product, its intrinsic quality (the fiber properties), its cleanliness and contamination, and the homogeneity of its characteristics can vary greatly due to genetic, environmental, harvesting, and ginning factors. Such variability impacts processing performance, costs, and quality throughout the cotton textile chain. Fiber properties primarily depend on varieties grown, agroclimatic conditions, and crop management practices. The cleanliness of lint refers specifically to the presence of vegetal matter other than lint, while contamination refers to the presence of nonplant matter. Both cleanliness and contamination depend on harvesting methods, storage, transport, and ginning practices.

37. Better fiber quality translates into better yarn quality and higher processing efficiency. Among the fiber properties, staple length has the greatest influence on spinning performance. Cotton fiber represents about 50 percent of the cost of yarn. Traditionally, the price of cotton was largely determined by factors such as staple length, grade, color, and micronaire.¹¹ Those factors are still the major determinants of price, but spinners today are also interested in other fiber properties that affect the quality of their yarns and the efficiency with which they can produce those yarns. As the textile industry has been striving to improve quality and efficiency through automatic high-speed machinery, new technologies place increasingly severe technical demands on textile fibers, raising the importance of other properties of cotton: strength (or tenacity), uniformity, maturity, fineness, elongation, and neps,¹² short fiber content, spinning performance,

¹¹ Fiber length is the average length of the longest half of fibers. Grade is a commercial value based on a visual assessment of a combination of lint color, cleanliness and preparation. Color is determined by the degree of reflectance (good) and yellowness (bad). Micronaire is a measure of fiber fineness and maturity.

¹² Neps are cotton fibers tangled into a knot.

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dyeing ability and cleanliness. All else equal, spinners pay a higher price for longer, finer, and stronger cotton lint that is white, bright, and fully mature.

38. The most commonly produced and traded cotton lint variety in the world belongs to the species *Gossypium hirsutum*, which is also known as upland cotton. Extra Long Staple (ELS) cotton used for producing very fine yarns come from another species¹³ and account for less than 5 percent of world cotton trade.

39. Following the global trend toward improving yarn quality, the market share of medium and higher grades is rising, while the share of shorter (“coarse count”) upland cotton is declining. Medium and higher grades of upland cotton now account for an estimated 75 percent of world trade, or some 7 million mt, and are typically used in ring spinning.

40. The recognized benchmark for international cotton prices, the Cotlook A Index, is based on the representative offering price for a “basket” of the medium grade cotton most commonly traded internationally. Those quotations refer to a common quality, contractual, and geographical¹⁴ basis (Table 2). Lint of this quality is typically used in ring spinning for the production of ring spun carded yarns.¹⁵ The fastest growing and most remunerative market for upland cotton is for higher grades and finer cotton used for producing ring spun combed yarns¹⁶ for the woven and knitted apparel sector. In that segment, the modern high-speed machinery requires better fiber characteristics to operate at maximum efficiency and spin high quality yarns.

As shown below, the fiber properties of most African upland cotton lie between these two levels, superior to Cotlook A Index specifications but not always reaching those needed for ring spun combed yarns.

Table 2: Fiber Properties of the Cotlook A Index, Typical African Upland Cotton, and Top Quality Lint for Combed Yarns

Fiber property	Cotlook A Index	Typical African upland cotton	Lint for ring spun combed yarns
Grade	Middling - white	Strict low middling to good middling	Strict middling — white
Staple length	1-3/32 inches (27.8 mm)	1-1/6 to 1-3/16 inches (27–30.2 mm)	≥ 1-1/8 inches (28.6 mm)
Micronaire	3.5-4.9	3.5–4.5	3.8–4.2
Fiber strength	25–30 grams per tex	27–32 grams per tex	≥ 30 grams per tex

¹³ *Gossypium barbadense*

¹⁴ Cost and Freight Far East.

¹⁵ Ring spun carded yarn is typically used for knitting and weaving, in a large range of coarse to fine counts.

¹⁶ Combed yarns are stronger, more uniform, smoother, purer, and have greater shine than carded yarns.

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41. In addition to requiring longer, cleaner, whiter, brighter, stronger, and finer fiber, this higher segment of the market is more demanding of other fiber properties, such as elongation and neps. It also demands a lower variance in fiber properties, notably greater uniformity of length and lower short fiber content.

2.5.2. *Only Fiber*

42. Cotton prices are not solely determined by intrinsic fiber properties and lint cleanliness. Contamination of lint by non-vegetable foreign matter is the most serious problem confronting cotton spinners around the world. Contaminated cotton causes disruptions in the spinning process, which increases the cost of spinning and reduces the quality of yarn and end products. There are no cost-effective means of removing contamination once it is present in yarn or fabric. As a result, contamination leads to the downgrading of end products or even to rejection of an entire lot.

43. Cotton that is contaminated, or that is suspected of being contaminated because of the origin, can only be sold at substantial discount to compensate the user for inspecting and cleaning the cotton before spinning. Price differentials for cotton with the same fiber characteristics range from 5 percent to 30 percent, depending on their degree of perceived contamination by extraneous matter, stickiness, and seed coat fragments. These discounts are usually applied indiscriminately to all cotton originating from an area or a country considered to be affected by contamination.

44. Contamination by foreign matter is more serious with handpicked cotton. Seed cotton picked by hand is cleaner, and the fiber obtained has fewer neps and a lower short fiber content than cotton picked by machine, which must be cleaned more vigorously because it has more vegetative residues. Handpicked cotton should therefore normally be purchased at a premium over machine picked cotton. However, handpicked seed cotton often gets contaminated during picking, storage, handling or transport, and the presence of foreign matter in the fiber offsets the theoretical advantage conferred by manual picking. As contamination of raw cotton by foreign matter is the main concern for quality yarn and fabric producers, spinners tend to prefer machine picked cotton to handpicked cotton. As a result, handpicked cotton has lost its advantage over the past 25 years and now trade at a discount to machine picked cotton. The elimination of contamination thus stands out as the first priority for quality improvement in SSA.

2.5.3. *More than Fiber*

45. Along with the fiber characteristics, some other criteria, like reputation and other marketing characteristics generally not included in the contracts, can have a lasting influence on cotton prices. However nonquality premiums and discounts are hard to quantify as each shipper and spinner may have different opinions on a specific growth or origin.

46. Pricing of lint is significantly influenced by the way cotton is marketed and shipped. The spinning industry today is especially concerned about consistency in shipments. Customers require homogeneous and reliable year-round shipments, with consistent cotton characteristics, standardized bales wrapped in cotton cloth, and bale per bale instrument classification data. Since some countries can offer bale per bale Standardized Instrument for Testing of Cotton (SITC) data, the lack of reliable cotton quality data on each bale negatively impact the price of cotton that are

classified manually. The homogeneity of deliveries depends on seed cotton grading, lint classification, and bale allotments.

47. In marketing, perception is often more important than facts. Trust and reputation matter in the cotton business, and the market rewards origins and shippers that have a strong record of delivering according to quality standards and with consistency, while respecting contract terms. Premiums and discounts attached to internationally traded cotton derive partly from the reputation of national origins.

2.6. Lint Marketing Strategies: The Role of the International Cotton Merchant

48. Until the mid-1980s most lint produced in Africa was sold by national cotton companies and marketing boards to international merchants or to spinners through commissioned agents. Today, two types of companies supply lint to the world market out of SSA: independent ginners sell lint to international cotton merchants, while ginning companies affiliated with such merchants (“affiliated ginners”) sell lint to or through their mother companies¹⁷. International cotton merchants thus play a leading role in the marketing of African lint. They buy cotton from independent ginners or receive it from their affiliated ginners, sell it to textile mills or other merchants, hedge price risks and arrange shipments.

49. Affiliated ginners are present in all countries in this review except Cameroon and Mali, which continue to operate national monopoly sectors. Most lint from SSA is handled by independent ginners. These include very large companies – the national monopolies of Mali and Cameroon and the former national monopolies in Burkina and Benin (SOFITEX and SONAPRA, respectively) – and smaller private companies, most of them in ESA. As a general rule, these independent ginners have little knowledge of the world cotton market, very limited ability to use risk management tools, and receive very little feedback from the end-users. International cotton merchants are thus in a strong negotiating position when dealing with independent ginners.

50. In WCA, forward sales contracts at fixed price have been used extensively for decades, primarily as a way to secure input and crop financing. Sales are contracted in euros per kilogram FOB, offsetting the exchange risk. Ginners usually base their prices on the Cotlook A Index¹⁸, valued at the forward exchange rate for the shipping period considered. Forward sales at fixed price in euro per kilogram are an effective way of mitigating risks, although high percentages of forward sales increase the risk of not being able to deliver the contracted quality and may lead to oversold situations. Smaller independent ginners in ESA are generally not in a position to guarantee the volume and the quality of their production before it is ginned, are not able to store lint for an extended period of time, and therefore seldom engage in forward sales. They primarily deal with price- and exchange rate risk by adjusting their buying price over the course of the season and by selling the lint as it is ginned.

51. Merchants carefully select sellers to guarantee contract performance. Large parastatal companies in WCA are considered reliable by merchants, defaulting only in good faith, while private independent ginners have mixed reputations. Merchants generally consider it much easier

¹⁷ In Africa, these mother companies include Dunavant, Cargill, Plexus, Dagrís, Reinhart, and others.

¹⁸ Or the quotation for the African Franc Zone in Cotton Outlook.

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to purchase cotton in WCA countries than from independent ginners in ESA countries because offers are not atomized between numerous trading companies¹⁹, and the volume is sufficient to ensure year-round shipments, while quality standards are relatively consistent. In contrast, small independent ginners in ESA are generally not in a position to guarantee consistent or year-round shipments, and big volumes.

52. Beside fixed price contracts, some basis pricing is done “on call” the Cotlook A Index, “on call” the African Franc zone quotation in Cotton Outlook or “on call” New York futures. “On call” pricing means that the buyer (or seller) agrees to a volume and delivery date, but agree that the price will be fixed at a later time. Major fluctuations in the basis (arithmetic difference) between spot prices and the New York futures can present challenges to hedging of African cottons.

53. Competition between buyers/ginners of seed cotton within a producing country may increase the producer price, especially when there is overcapacity in ginning. Among the countries included in this study, this practice is most common in Tanzania and Uganda. Yet the immediate impact of increased competition between ginners and exporters is to put pressure on the selling price of lint, as buyers (merchants and spinners) always take advantage of competing offers from several sellers to buy from the cheapest. A national monopoly (state-owned or private) is generally in a better position to protect its selling price.

54. Subsidiaries of international merchants involved in ginning are generally more aware of market demand and have less exposure to international price fluctuations than independent ginners, as a part of the market risk is taken by the mother company which has the ability to hedge price and exchange rate risks.

2.7. Valorization of by-products: Markets for Cottonseed Oil and Cake

55. The ginning process separates the cotton lint (fibre) from the seeds. In all of the study countries, ginning companies buy the raw cotton and own both the lint and the seed. In all countries but Zimbabwe, ginners treat a small proportion (typically less than 10%) of the seeds and pack them for distribution back to farmers as planting seed. Ginners sell the remainder²⁰ for processing into oil and cake or, in a few cases, are processed directly by the ginning company²¹.

56. The value of lint obtained from a ton of seed cotton is three to four times the combined value of the oil and cake that are derived from the processing of the seeds. For this reason, oil and cake markets are often neglected in the analysis of African cotton sectors. In some, but not all, of the study countries, the revenue from seed sales more than covers the cost of ginning. In Cameroon, SODECOTON has so far avoided the losses that have affected the other WCA sectors in part because of cross-subsidisation from its profitable, integrated oil business. In Tanzania

¹⁹ Though exceptions may exist: for example, supply is more atomized in Benin than in Zambia.

²⁰ In some countries, seeds are sold directly on the domestic market without processing into oil and cake. In Mali about 20% of cotton seeds are sold as livestock feed at prices 30% higher than those paid by the oil mills.

²¹ In most cases this processing takes place within the country of origin. However, varying quantities of seed are exported from Mozambique and Zambia to South Africa for processing. Similarly, at the end of the 1990s, there was a European demand for seeds. Some WCA cotton companies decided then to export, which brought financial problems to the large-scale oil industry in the countries concerned, which needs large quantities of seeds to cover its fixed costs. This export market has since declined and only one trader from WCA is still dealing on it.

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more than a third of cotton ginners now have an integrated oil processing business. Some of these see oil processing as their core (and most profitable) business, with seed cotton purchase and ginning feeding into this.

57. The importance of the markets for cotton seeds, oil and cake is likely to grow in the near future, for two reasons:

- i. Internal: as margins in lint production get tighter, cotton companies are likely to look more at ways to improve profitability of their business by paying greater attention to the value they can obtain from these co-products.
- ii. External: increased demand for biofuels, and potential rapid growth in dairy sectors of Southern Europe (which will increase demand for protein concentrates), may open new markets and strengthen prices for co-products of cotton ginning. Depending on policy and investment climates in cotton producing countries, these changes could drive more local competition for co-products and alter the relationship between farmers and ginning companies over time.

2.7.1 *International Trade in Cotton Oil*

58. It is estimated that about 5 million tons of cottonseed oil is produced worldwide per year. This is similar to the production of groundnut, coconut and palm kernel oil, but well behind palm oil (38 million tons), soybean oil (37 million tons), rapeseed oil (18 million tons), and sunflower oil (11 million tons). Moreover, whilst a large proportion of the four leading oils is traded internationally, less than 10% of global cottonseed oil production is traded.

59. During the last two years cottonseed oil prices have fluctuated between \$600 and \$700 per ton. Cotton oil used to be traded with a large premium over the four leading oils. However, the premium has almost disappeared lately because of the high biodiesel demand for rapeseed oil, which has also put pressure on soybean and palm oil prices²².

2.7.2 *Domestic Oil and Cake Markets*

60. Virtually all cottonseed oil produced in the countries studied here is consumed domestically. Because all countries are net edible oil importers (in most cases palm oil), cottonseed oil is an import competing crop. Table 3 estimates the proportion of edible oil consumption that can be supplied from cotton seeds in each of the nine study countries. This ranges from 50% or more in Benin, Burkina Faso and Mali to less than 10% in Mozambique, Tanzania and Uganda.

61. Cottonseed cake is a by-product of oil processing that is sold as livestock feed. It is rarely traded internationally due to its low value:weight ratio. Demand for cake, therefore, depends heavily on the size and degree of commercialization of the local livestock (cattle, poultry) industry.

²² It should be noted that because the world market of cottonseed oil is very thin, its price indicator may not be as reliable as those of the four major oils.

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Table 3: Summary of Indicators of Valorization of By-Products

	Average national seed cotton production (in tons) 2001-06	Cottonseed oil production as % of national oil consumption^a
Benin	339,500	53%
Burkina	557,833	57%
Cameroon	242,966	18%
Mali	488,281	50%
Mozambique	72,178	6% (potential)
Tanzania	235,000	8%
Uganda	78,410	4%
Zambia	160,000	20%
Zimbabwe	246,350	27%

Note:

a. This is estimated from the quantity of seed available for crushing (2001-06 average), after subtraction of seed retained for redistribution to farmers, using an oil outturn of 18% and an average oil consumption of 7kg per person p.a.

**SECTION II: HISTORICAL BACKGROUND AND CONCEPTUAL
APPROACH**

CHAPTER 3: HISTORICAL BACKGROUND, RECENT INSTITUTIONAL EVOLUTION, AND A TYPOLOGY OF AFRICAN COTTON SECTORS

3.1. West and Central Africa

62. Cotton was introduced in most Francophone countries of WCA in the last decades of the colonial period, as part of a broad policy aiming to supply the French textile industry with raw material. To that effect, the French government created a dedicated parastatal company, CFDT (*Compagnie Française pour le Développement des Textiles*). CFDT was entrusted with developing cotton cultivation as an integrated supply chain - from the provision of inputs to farmers to the marketing of lint - in countries of Francophone Africa. After independence in 1960, CFDT continued to operate through various country or sub-regional branches until the mid 1970s, when these branches were turned into national companies with a majority of shares belonging to government, and a minority retained by CFDT²³. Most of these companies²⁴ entered into long-term technical assistance contracts with CFDT. These companies were usually granted a legal monopoly on the purchase and processing of seed cotton and on lint marketing, and were obliged to purchase all seed cotton production at a fixed price set by government. Ginning was based on large units using saw gin equipment.

63. During the 1980s, the national cotton companies expanded their activities considerably, often with the assistance of internationally funded development projects: they increased ginning capacity, further developed input credit schemes, invested in transport for seed and lint cotton, and created their own extension services to disseminate technical packages²⁵. As in the past, they continued to guarantee purchase of the crop at a fixed, panterritorial price announced prior to planting. In some cases (Mali, and, to some extent, Cameroon), the companies were also given responsibility for rural development activities in the cotton areas. Cotton production grew rapidly as a result of these investments, based on an increasing number of cotton farmers, and increased farm yields and ginning outturn ratios. Lint quality also improved. Yields increased dramatically in most countries until the mid 1980s, thanks to intensified use of fertilizer (made possible through input credit), development of animal traction, and development of new varieties with higher yield potential, as well as higher ginning outturn ratios. Most varieties were developed in cooperation with IRCT, the French public Cotton and Textile Research Institute, later merged into CIRAD. Meanwhile, to cope with increasing seed production, large scale cotton seed processing units designed to supply domestic markets with quality refined oil were built, often as part of the cotton companies (in Cameroon and Mali).

3.1.1. *Strengths and Weaknesses of the WCA Model*

64. During the three decades following independence (1960-90), cotton development in WCA was widely regarded as a success story, with impressive and steady growth and outreach to nearly every farmer in cotton zones. However the rapid growth of the cotton companies put increasing

²³ CFDT was renamed DAGRIS in 2000.

²⁴ CFDT withdrew from Benin after the advent of the socialist regime in that country.

²⁵ With the exception of Benin and Burkina, where cotton extension was provided by the national agricultural extension systems.

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strain on their management capacities, and most of them lacked adequate control and supervision systems. Aware of the risks, most WCA governments introduced in the 1980s a new monitoring instrument called performance contracts, to be negotiated between the state, the cotton company, and, in some cases like Mali in the early 1990s, with the cotton farmer organization. The overall objective of the performance contracts was to make cotton companies more accountable to government and stakeholders. Specific objectives included untangling commercial activities from public service activities and securing separate funding for each, as well as establishing financial performance targets for the cotton companies, based on standard costs (“barêmes”). These performance contracts were implemented in Mali, Burkina Faso, and Cameroon from the mid-1980s to the end of the 1990s. In practice, the contracts proved difficult to monitor in the absence of a strong and independent reporting system; cotton companies were reluctant to provide information, would often argue that changes in the economic environment justified their performances and would still turn to the government to cover their losses. In the end, the era of performance contracts failed to deliver any significant and long-lasting improvements in the governance of the cotton sectors.

65. The need for deeper structural reforms began to appear for the first time at the end of 1980s, when WCA cotton sectors faced financial difficulties, due to poor cost efficiency of the cotton companies, declining world prices, and an over-valued local currency. After the 1994 devaluation of the CFAF, which boosted both production and cotton company profits, however, the need for reform was perceived as less urgent. World prices also surged from 1994 to 1996. The immediate post-devaluation period thus saw rapid production growth, high profits for the cotton companies, but often lax management practices, resulting in high cost structures. Farm yields had also begun to stagnate by this time. When world prices declined at the end of the 1990s, cotton companies again faced serious financial difficulties, which were aggravated when the CFAF began to appreciate against the dollar in 2001.

66. It can be argued that the WCA cotton sector organizational model, for long regarded as a successful model, became a victim of its own success during the last two decades as a result of the following constraints:

- The continuous development of cotton made economies of WCA, particularly in Sahelian countries, largely and increasingly dependent on the cotton sector. As a result, cotton and cotton farmers exercised considerable political and socioeconomic influence in rural areas, and the management of the cotton companies became subject to increasing political interference. At the same time, the companies themselves gained economic weight and political influence, which made them even more difficult to control.
- Decisions by governments and by cotton companies became indistinguishable, and were often driven by short-term political considerations rather than by the need to ensure long term sector sustainability.
- Because of the considerable income accumulated during the post-devaluation period, politicians were increasingly tempted to exert pressure to extract resources from cotton companies, either to finance public expenditures or for private gain.
- Finally, cotton companies failed to introduce the sophisticated management tools required for such large-scale and complex enterprises (SOFITEX and CMDT are the largest cotton companies in Africa), thus leading to growing inefficiencies and lax management control.

3.1.2. Changes made during the last decade

67. By the end of the 1990s, the repetition of financial crisis among cotton companies created a strong feeling among many stakeholders that the sectors needed reforms. However, in most of the region there was also a clear consensus that the single-channel relationship between producers and the cotton companies was necessary to ensure a sustainable input credit system and to guarantee intensive cropping practices and should therefore be maintained, at least at a regional level.²⁶ This position considerably reduced the options for liberalization and reform. Therefore, unlike in ESA countries, little structural change was effected in the cotton sectors of the reviewed countries, except in Benin. At the same time, incremental change was brought to the existing single-channel model. These changes pertained mainly to (1) the development of farmer associations and their progressive involvement in the delivery of critical services/functions, (2) the entry of private actors in ginning or input supply activities (Benin, Côte d'Ivoire, Burkina Faso), (3) the tentative and often partial withdrawal (in a limited number of countries) of government from the management of the cotton sector and the parallel empowerment of cotton sector "inter-professional committees" (IPC), and (4) the introduction of producer price-setting mechanisms which attempted to ensure a better linkage to world prices. The extent of changes brought to the original system varies substantially from one country to another in the selected sample, and in WCA in general.

68. ***Empowerment of Farmer Associations:*** The first attempts to build farmer organizations began in the mid-1970s in Burkina Faso and Mali, followed by Cameroon and Benin. These associations were originally viewed by cotton companies as a mean to cut their costs by transferring some functions to farmers (in particular primary collection of seed cotton and distribution of inputs and seeds), and as a way to secure input credit through mutual guarantee.

69. The first generation of associations lacked internal cohesion and their performance was generally disappointing. They were replaced in the 1990s by smaller associations that were legally recognized and exclusively involved in cotton. In parallel, regional and national unions of associations were built up with the support of the donor community: FUPRO was created in Benin in 1993, UNPCB in Burkina Faso in 1998, and OPCC in Cameroon in 2000, while the process is still underway in Mali. In Mali, Benin, and Cameroon, responsibility for input supply (through competitive bids) is being transferred to farmer associations and their unions. In Benin, Cameroon, and Burkina Faso, responsibility for extension services, particularly in the field of farm management, is currently being taken over by farmers unions. Ultimately, it is hoped that these more focused associations could develop the technical capacity and cohesiveness to become equal partners with the cotton companies in a balanced co-management of the cotton sector. If this were to happen, government could more effectively withdraw its involvement.

70. ***Entry of Private Actors in Ginning Activities:*** Privatization of the cotton companies has been, in all countries, strongly advocated by a number of development partners, with the objectives of (1) providing cotton companies with a clear managerial leadership, (2) improving management practices and cost efficiency, (3) reducing the risks of political interference, and (4)

²⁶ Benin and Côte d'Ivoire were exceptions to this pattern. Reforms in Benin started earlier than elsewhere but were complex and badly managed. In Côte d'Ivoire, a full liberalization took place, but was soon affected by the political crisis.

creating smaller and more manageable enterprises. However the involvement of the private sector has so far remained fairly limited. The privatization process has been long and difficult. It has had to overcome the reluctance of the established cotton companies, and to be accompanied by the design, in the absence of a clear reference model, of mechanisms to ensure that delivery of critical services/functions to farmers would be preserved. In the sample of reviewed countries, only Benin (in 1995) and Burkina Faso (in 2004) have so far permitted the entry of private investors, without however allowing them to compete for the supply of seed cotton. Each cotton company has its exclusive zone in Burkina Faso; seed cotton is allocated administratively to cotton companies, at a fixed price, in Benin.²⁷ In Mali privatization of CMDT was originally scheduled to take place in 2004, and has been postponed to 2008. In Burkina Faso, the scope of the privatization process was limited by the fact that the two private cotton companies represent less than 15 percent of the country's total cotton production and SOFITEX (in which the government retains a share of 35 percent) remains by far the largest ginner. In Benin, the main ginner, SONAPRA, is still a parastatal company and accounts for around 50% of seed cotton ginned in the country.

71. The expected benefits of the privatizations have not yet materialized, in large part due to the complicated financial situation of the sectors. In Burkina Faso, privatization had the potential to bring new investments and new partnerships with international traders but the current financial crisis is threatening progress. The impact of private sector entry on cost efficiency has been so far limited, probably due to the absence of real competition. Privatization efforts, while partial, have also not clearly reduced political interference, as illustrated by the failure to reduce producer prices in response to falling world prices. In Benin, the outcome of reform clearly fell short of expectations, and resulted in a sharp decline of the sector's performance for a number of reasons: new ginners were local and often inexperienced businessmen attracted by short-term returns but without long-term development strategies, the coordination mechanisms were not really enforced, and government played an ambiguous role with respect to vested interests.

72. The next country to privatize will be Mali, where CMDT is scheduled to be sold to four private companies, each with a regional monopoly, in 2008. In Cameroon, the privatization of the cotton company, SODECOTON, is on the agenda, but no timetable has been agreed upon, because of the mixed attitude of some stakeholders, who fear that it might endanger the positive role that cotton has played in rural development and social stability in the northern region of the country. Other privatizations are also planned for the short-term, in Benin (SONAPRA) and Chad (COTONTCHAD). These new privatizations should build on the experience of Benin, Côte d'Ivoire, and Burkina Faso. However, the likelihood of attracting strong and professional investors, given prevailing market conditions and financial difficulties is a concern.

73. *Evolution of Government's Role and Empowerment of Inter-Professional Committees (IPCs):* The creation of IPCs to take over monitoring and coordination responsibility in the cotton supply chain has been viewed as a way to remedy the deficiencies of the traditional state-controlled model, and as complementing the strengthening of farmer unions. Progress in operationalizing IPCs has been mixed:

²⁷ In other WCA countries, Côte d'Ivoire and Senegal have also introduced private cotton companies.

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- Benin created the first IPC in 1999. The body was given a legal mandate but has been struggling to exercise its power since it was created, as the final decision-making remains with government.
- Burkina Faso created its IPC in 2006 and empowered it to regulate relationships between stakeholders in the sector, especially for the funding and provision of critical functions (extension, research, and road maintenance) and decisions on producer prices. These responsibilities were previously exercised by government. The capacity of the Burkina Faso IPC to effectively manage the sector remains weak, as revealed by the recent financial crisis, by the marginal role of the two private cotton companies in decision-making processes, the residual influential power of government (in particular through SOFITEX and local parastatal banks), and by the absence of regional coordination bodies in each of the concession zones.
- An IPC is scheduled to be created in Mali in 2008 (after the privatization of CMDT).
- In Cameroon, where there is only one cotton company and one farmer organization, the creation of an IPC has not, up to now, been deemed necessary to achieve the co-management of the supply chain, but the two stakeholders have reached a high degree of cooperation in the decision making process on all sector issues.

74. *Evolution of Producer Pricing Mechanisms:* One major drawback of the monopoly system is that it has been accompanied by the setting of fixed producer prices. When this price is fixed prior to planting, ginning companies take on great risk. The extent of this risk was fully revealed in the 2003/04 season, during which world prices dropped by nearly 30 percent, creating trading losses for the ginning companies. All WCA countries have had to face this issue in recent years.

75. During the last decade, all WCA countries in the sample shifted from prices administered by government to prices set jointly by the cotton company(ies) and producer unions. In all of these countries, the price mechanism was, at least until the 2004 crisis, linked to a stabilization fund designed to support producer prices when the world market was low, and to be replenished when the world market was high (by paying farmers lower prices than could otherwise be paid). The rationale for these funds was to avoid dramatic drops in producer prices and to limit market risks for cotton companies. These support funds functioned well in Burkina Faso and Cameroon until 2004. Since then, however, they have fallen victim to the unsustainably high prices agreed to among cotton companies and producer unions. In Cameroon, the fund was exhausted by 2006, though it was sufficient to cover sector losses and so did not draw on the government budget. In Burkina Faso, the fund has been depleted and could not cover the deficits during the last two campaigns. In Mali and in Benin, the funds had been exhausted prior to 2004, and therefore could not be used when world market prices started to fall. The losses in the cotton sectors of those countries have been covered by direct government subsidies.

76. To remedy this situation, the Burkina Faso IPC adopted in 2006 a new price-setting mechanism, based on a formula linked to world market trends). This system represents a move in the right direction, but was not correctly applied for the 2006/07 season, resulting in additional losses for the cotton companies. In Mali, a new system was adopted for the period 2005 to 2008 based on a conservative initial producer price²⁸ and on a sharing of the actual selling price, at the end of the season, between producers and the cotton company. This system reduced the losses of the cotton company, yet it was unable to completely eliminate them during the past season.

²⁸ Eventually adjusted prior to harvest in case of major changes in world prices.

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77. Establishing price mechanisms that are acceptable for farmers and sustainable for cotton companies (while providing incentives for them to be more cost efficient) appears, therefore, as one of the major challenges for WCA cotton sectors in the near future. This is especially important if other features of the model (announcement of the producer price before the planting season, panterritorial price, obligation of purchase of all seed cotton offered) are not reconsidered, i.e. as long as no additional steps are made in liberalizing the sector.

78. WCA cotton sectors are currently engaged in discussions, with the assistance of some donors (in particular, *Agence Française de Développement*), on a possible linkage between price setting mechanisms inspired by the new Burkinabe system (that is, based on world market trends), and a national "smoothing fund". This fund would guarantee the payment of the producer price, but, unlike the former stabilization funds, would be operated and managed by a bank (under monitoring by the IPC), according to predefined rules. The expectation is that this approach will avoid manipulation of the rules or misuse of the fund.

3.1.3. Conclusion

79. Though limited structural change has taken place in WCA, incremental institutional and organizational changes have been significant. The strengthening of farmer organizations has paved the way to active involvement in critical activities such as input supply and extension, in which they have a potential comparative advantage, and has also created the possibility of active co-management of the cotton sectors by farmers and ginners through the IPCs. The reform of pricing systems has been difficult but it was necessary to make producer prices more connected to world market prices. The introduction of private cotton companies in Burkina Faso has shown the ability of national single channel systems to shift toward local concessions systems without disrupting input credit supply, though the potential advantages of such a change have not yet materialized, due to other constraints.

3.2 East and Southern Africa

80. In ESA, there is perhaps greater heterogeneity in the historical experience of cotton sector development compared to WCA but also important common threads across countries over time. One important contrast with WCA is the role assumed by the cotton sector in broader development. In WCA, colonial governments and then independent states made cotton an engine of development and organized the *filière* to serve that objective. By contrast, cotton cultivation in ESA typically had its origins in commercial or missionary activity, with the government assuming a greater role over time. Mozambique is the one exception in ESA. Here, the Portuguese colonial regime treated cotton as a strategic commodity, but the independent government was unable to maintain that commitment in the face of war and economic collapse.

81. The cotton sectors of Uganda and Tanzania have always been based on smallholder production, spurred by the colonial requirement that smallholder households pay taxes. In the early twentieth century, Asian businessmen dominated seed cotton purchase and ginning, while governments assumed responsibility for research and extension, seed multiplication, quality control, and lint export. Uganda was Africa's largest lint exporter until the beginning of the 1970s. Until the mid-1950s, the Uganda Lint Marketing Board was also responsible for the export of Tanganyikan lint.

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82. The cotton sector in Mozambique was also based on smallholder production for most of its history, with the exception of 1965-75, when growing opposition to the colonial government in the north (the cotton growing heartland) prompted government to promote production on European-controlled large farms. By contrast, large-scale farmers of European origin drove early sector development in Zimbabwe. At least until 1980, they had the political power to advocate for the establishment and maintenance of research and marketing systems to support their production activities.

3.2.1. ESA Sectors in the Post-Independence Years

83. From 1960-90, two main changes occurred in ESA sectors. First, countries achieving independence transferred control over the sector, with the government (or government-controlled organizations) playing an increasing role in seed cotton purchase and ginning at the expense of the private sector. The purported reason for these changes was typically to support smallholder cotton farmers. At the same time, performance declined more or less seriously in all countries except Zimbabwe.

84. In both Uganda and Tanzania, regional cooperative unions replaced Asian businessmen as buyers and ginners of seed cotton. The cooperative movement started as a member-driven phenomenon, but politicians soon increased government control over the cooperatives. In Uganda, cooperatives were given monopoly rights over seed cotton purchase and ginning in 1969, with the Lint Marketing Board handling the marketing of lint and seed and regulating the cooperatives. In Tanzania, cooperatives displaced Asian businessmen during the 1960s, initially with farmer support, then through force of law. At the same time, the government attempted to control the powerful Victoria Federation of Cooperative Unions (seen as an alternative centre of power to the ruling party) by replacing it with Nyanza Cooperative Union. When state-imposed cooperatives were seen to perform poorly in a number of the country's main cash crops, cooperative unions were abolished in 1976 and a parastatal Tanzania Cotton Authority assumed responsibility for crop purchase from village-based cooperative societies.

85. Cotton production experienced a precipitate collapse in both Uganda and Mozambique in the mid-1970s. With the seizure of power by Idi Amin, lint production in Uganda plummeted from 78,000 tons in 1972 to just 14,000 tons in 1976, undermined by poor policy and escalating costs and mismanagement at the cooperatives and Lint Marketing Board. Similarly, with independence in Mozambique in 1975, seed cotton production fell from a peak of over 140,000 tons in 1973 to below 40,000 tons in 1976. Production by commercial farmers collapsed to around 20 percent of its immediate pre-independence peak, and smallholder production also declined sharply, discouraged by disastrous central planning policies. With the outbreak of civil war in both countries, production fell further, to lows of 5,200 tons of seed cotton in Mozambique in 1985 and 2,000 tons of lint in Uganda in 1987.

86. In both Tanzania and Zambia, government mismanagement of the cotton sector led to mounting debts and eventually to delayed payments to farmers. However, the impact on production was nowhere near as disastrous as in Uganda or Mozambique. In Zambia, sector development was the responsibility of the parastatal Lintco from 1977 onwards. Production rose from around 3,000 tons during 1974-76 to a peak of over 60,000 tons in 1988, then trended down to 30,000 tons by 1994. Lintco debts also increased to the point where the government decided to privatize it.

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87. Cooperative unions were reinstated in Tanzania in 1984, as part of an economy-wide reform. Cotton production, which had declined steadily under Tanzania Cotton Authority management, began to recover, and reached record levels in 1991 and 1992. Production during the latter year was over 300,000 tons of seed cotton, a level which would not be reached again until 2004. The cooperative system delivered some credit to farmers and, until at least the late 1980s, Tanzania maintained a reputation for good quality lint. However, the inefficient restored cooperative unions required increasing financial assistance from central government (mostly as guaranteed loans from government banks, despite non-repayment of previous loans due to trading losses). As mismanagement and shortage of funds caused cooperative unions to take quality less seriously, Tanzania's reputation for lint quality began to decline (prior to the impacts of liberalization).

88. The good performance of the Zimbabwe sector during this period stands in contrast to that of the other ESA countries in the study. Production expansion during the 1960s was founded on two research breakthroughs: the introduction of the high-yielding Albar 637 seed variety in 1959-60 and effective chemical control of red bollworm. Production levels were maintained during the 1970s despite the escalating liberation war. The Agricultural Marketing Authority (AMA)—set up in 1967 to coordinate the activities of the Cotton Marketing Board (CMB) and other major parastatals—had 50 percent representation from the Rhodesian National Farmers' Union on its governing board. In 1976, AMA began to announce generous guaranteed minimum cotton prices prior to planting.

89. Following independence in 1980, activities of the CMB were reoriented toward meeting the needs of new, smallholder cotton producers in so-called communal areas. The number of buying posts in such areas was greatly increased and efforts were made to provide smallholder farmers with extension advice, while new seed varieties suited to production conditions in communal areas were developed. In addition, expansion of smallholder cotton production was supported by loans from the parastatal Agricultural Finance Corporation. Nevertheless, commercial farmers still accounted for 60 percent of national production in 1988.

90. Commercial farmers began to exit cotton for more profitable alternatives in the late 1980s and early 1990s. The CMB responded in 1992 with the introduction of a credit scheme designed to assist smallholder farmers to expand their cotton production. By the time of sector liberalization in 1994, smallholders accounted for 60 percent of production; their share had risen to almost 90 percent by the onset of the fast-track land redistribution program in 2001.

3.2.2. Cotton Sector Reform and Evolution in ESA

91. Of the study countries, Mozambique was the first to embark on thorough-going reform of the cotton sector. In 1986 the first of four joint venture companies, a collaboration between government of Mozambique and Lonrho, was established and given exclusive rights to run a cotton concession area in Cabo Delgado province. As the country was still fighting a civil war, developing cotton production entailed high costs (including some infrastructure investment and the hiring of private militia to protect company assets), so local monopoly rights over cotton purchase were considered necessary to give some assurance of a return to investment. Yet the sector has continued to be based on such local monopolies, and some have argued that the open-ended nature of the concession rights is at the root of the subsequent disappointing performance.

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92. The first concessions were granted to fully private companies in the 1990s; by 2002 there were at least twelve companies promoting cotton, all within the concession system. However, there were two periods—in the mid-1990s and around 2000—when new entrants began buying in concession areas, effectively challenging the concession system. On the one hand, this reflected dissatisfaction with the performance of some of the existing concession companies. On the other, it reinforced any reluctance that these companies had to invest in better service delivery, as they could not be sure of capturing the returns. Both “crises” were eventually resolved by granting new concessions to the more powerful new entrants. Notions of liberalizing the market seem now to have receded. In addition, the entrance of several international companies has raised hopes that sector performance will begin to improve. However, despite much deliberation and planning, nothing has yet been done to reform the basis on which companies hold their concessions.

93. The other four countries in the study (Zambia, Zimbabwe, Tanzania, and Uganda) all liberalized their sectors during 1994/95, when world prices were near an all-time high. As a result, all these liberalized sectors benefited initially from high world lint prices.

94. The initial structure of the liberalized sectors mirrored their pre-liberalization organization. In Tanzania and Uganda, where ginning has historically been dominated by roller gins (cheaper and with few economies of scale) in the hands of decentralized cooperatives, a large number of private buyers and ginners entered the sector. Both countries quickly reached more than thirty seed cotton buyers. In Zambia and Zimbabwe, where ginning has historically been dominated by saw gins (larger and more expensive) and where a single parastatal controlled all aspects of the chain from input supply to lint marketing prior to liberalization, the orderly privatization of the parastatals led to effective duopolies. In 1995/96, the Cotton Company of Zimbabwe Ltd (Cottco), the privatized successor to CMB, was joined in the market by Cargill. The latter established a 25 percent market share in its first two years of operation, a share that has remained stable ever since. In Zambia, the assets of Lintco were sold in two parts to Lonrho and Clark Cotton. These operations have subsequently been sold to Dunavant and Cargill, respectively, and these companies still dominate the market.

95. In the first few years after liberalization, the concentrated sectors were found to perform best (Poulton et al. 2004). Zimbabwe completed its transition to a smallholder-based system, with Cottco’s credit scheme (based on the scheme established by CMB in 1992) an important part of this story. Strict attention to quality by Cottco and Cargill allowed the sector to maintain its excellent quality reputation on international markets. Meanwhile, Zambia achieved a strong increase in production due to a gradual increase in yields among established farmers and large increases in the number of farmers. This production increase was temporarily interrupted by side selling of seed cotton, caused by the entry of a number of new firms in 1998 and 1999. However, several of these firms exited when world lint prices fell. Meanwhile, Dunavant, which had bought out Lonrho during this period, introduced a system of independent “distributors” to handle credit and extension provision to farmers, and this contributed to a further expansion of production. Clark’s more traditional system with extension agents was quite effective, while the Distributors trained by Dunavant focus primarily on input distribution and credit recovery, and only to a very secondary degree on extension advice²⁹. In addition, both companies spearheaded a campaign

²⁹ Distributors are farmers picked from the community to mainly help in the logistics of credit provision given the large number of farmers that Dunavant deals with. Efforts at more serious extension assistance have been carried out through Dunavant’s YIELD program, financed by GTZ.

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against polypropylene contamination, which laid the foundation for a sizeable increase in the price premium that Zambian lint now receives on world markets.

96. Meanwhile, Tanzania and Uganda struggled to support farmers in a highly competitive output market. Efforts by individual companies to provide input credit were quickly abandoned, as the credit could not be recovered. The Uganda Cotton Ginners and Exporters Association (UCGEA) experimented with an innovative scheme to provide chemicals to producers on a sector-wide basis, but this had to be abandoned for various reasons. Eventually, in 2003 the sector moved to a zoning system that severely restricted competition, as a way to give ginneries the security to invest in extension provision and input supply.³⁰

97. Starting in 1999, Tanzania began experimenting with an input trust fund to provide farmers with minimal access to chemical input. This fund was subsequently replaced by a passbook (forced saving) system, which was superior in a number of ways. As in Uganda, a sector-wide solution had to be sought to the input supply challenge, as the private incentives do not exist for individual companies to provide input in a highly competitive output market. An additional challenge in Tanzania was maintaining the quality of seed cotton and lint. Liberalization accelerated the decline in lint quality that had begun earlier, as seed varieties were soon mixed and a scramble for seed cotton undermined farmer incentives to supply good quality seed cotton to buyers.

98. After a short-lived boom induced by high world prices, production fell sharply in Tanzania after liberalization. In Uganda it has remained disappointingly stable since liberalization. The challenges of increasing productivity and production in a sector with numerous small-medium ginners have encouraged multi-stakeholder collaboration in both countries, but with uneven results. In Tanzania, at least, this collaboration now appears to be bearing fruit.

99. Meanwhile, a fairly dramatic change in sector organization has occurred in Zimbabwe since 2001 and a similar change may also now be occurring in Zambia. In Zimbabwe, the onset of economic crisis in 2001 made acquisition of foreign exchange a top priority, and cotton production appeared an attractive way of achieving this. In addition, the real exchange rate depreciated spectacularly during 2001 and 2002, but the existing cotton companies did not pass on the benefits to farmers. As a result, the total number of ginners rose from five in 2000/01 to 17 in 2006/07. The overall effect of this dramatic change is still to be determined, but it is clear that the sector now faces similar challenges on quality control, input supply, and extension provision as have been described above for Tanzania.

100. Established players in the sector have realized that the new circumstances require a new regulatory framework. In 2004 they presented a draft set of regulations to the Minister of Agriculture, but so far the changes have not been approved. Instead, consensus has been reached on stricter licensing procedures for 2007 that require all cotton lint exporters to demonstrate that they have supported smallholder cotton farmers. As in Uganda and Mozambique, it appears that attempts to strengthen incentives for provision of pre-harvest services by ginning companies will come at the cost of reduced competition in the seed cotton market.

³⁰ Input costs are subsidized by companies, rather than provided on credit. Yet because the subsidy must eventually be recovered in the price, it can be conceived as partial in-kind credit.

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101. In Zambia new companies have also entered the sector over the past two to three years, and there has been a resurgence of side selling of seed cotton. Unlike in 1997, however, this new entry is backed by investment in new ginneries, so it seems unlikely that the sector will return to its former duopoly structure. As in Zimbabwe, the new entry appears to be associated with low seed cotton prices in recent seasons, and also to instability in the real value of the exchange rate. In the Zambian case, the kwacha appreciated rapidly (but temporarily) prior to the 2006 election, limiting the prices that companies could pay for seed cotton. This, however, occurred at a time when farmers were already dissatisfied with prices, compounding their sense of dissatisfaction and making them willing to switch allegiance to new players.

102. In Zambia there has been an intermittent debate about a new regulatory framework for the sector ever since the first burst of new entry and side selling in 1997. The major points of contention have been enforcement of contracts and prompt resolution of disputes when they occur. There have been suggestions of establishing fast track courts to for this purpose, and of amending the Agricultural Credits Act. However, the main stakeholder focus has been on ensuring passage of a revised Cotton Act; as of August 2007, the Minister of Agriculture has submitted the revised Act to Parliament, but it has not yet been passed (Tschirley and Kabwe, 2007a).

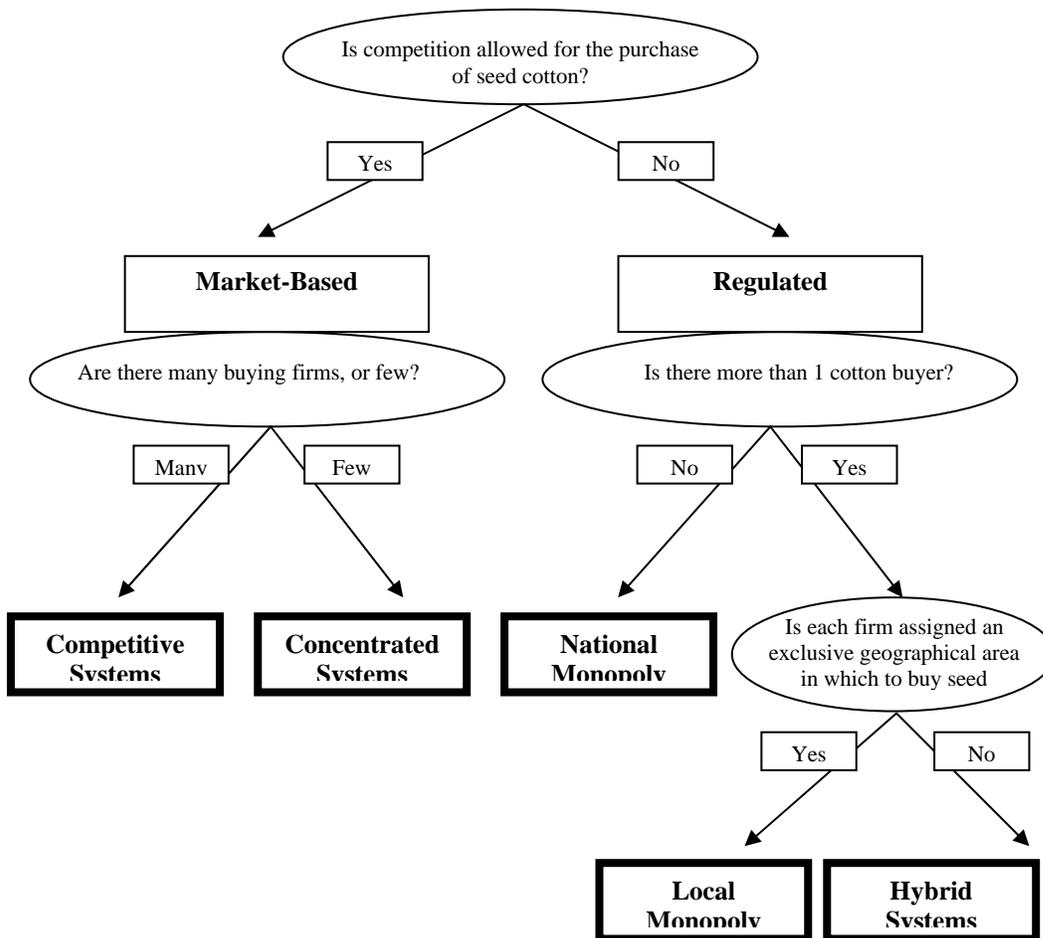
103. Overall, therefore, the story in ESA is one of heterogeneity in sector structure post-liberalization, of ongoing evolution in those structures and, with this, new challenges as to how the different cotton sectors should be regulated. While WCA does not have the same clear experience of “liberalization” as ESA, the two regions do have plenty in common in terms of their ongoing search for effective responses to changing global conditions and common challenges.

CHAPTER 4: A TYPOLOGY OF AFRICAN COTTON SECTORS

104. For the purpose of this analysis five basic types of African cotton sector are distinguished, based on the structure of the market for seed cotton purchase and the regulatory framework in which firms operate. Both of these factors influence firm conduct, which influences sector performance. The types are set out in Figure 4 in a decision tree framework. The first distinction is between “market-based” and “regulated” sectors. Since all markets function within some type of regulatory framework, “regulated” in this context means a sector in which competition for the purchase of seed cotton is not allowed. This type of regulation was standard throughout African cotton sectors prior to the early 1990s, and has continued in most of WCA to the present.

105. For market-based systems, two systems can be distinguished: those with “many” buyers of seed cotton (competitive systems) and those with “few” such buyers (concentrated systems). Necessarily subjective, this distinction is nevertheless meaningful when one compares a country like Tanzania (30+ buyers) with Zambia (one dominant buyer, one large competitor, and 2-3 other very small buyers).

Figure 4: Decision Tree for Cotton Sector Typology



Box 2: Is this Typology Specific to Africa?

The typology presented in this section grew out of work in ESA, and needed only minor modifications to usefully incorporate WCA. Two questions thus emerge. First, are the sector types we identify found in other areas of the world, and does an assessment of their strengths and weaknesses stretch beyond African borders? Second, does the rest of the world exhibit sector types not found in the typology, and do these provide any glimpses into the likely future evolution of African systems? More to the point, do other sector types provide clues as to what types of change policy makers and stakeholders should be encouraging in their sectors?

Characterizing the cotton sectors worldwide is obviously quite complex and would require further investigation. Yet a number of trends can be observed in the institutional evolution of cotton sectors throughout the world:

- Cotton ginning is not by nature a heavy industry. Hence there are numerous examples of farmers grouped in associations, as well as farm-based agribusinesses that are engaged in cotton production and ginning in some of the major exporting countries such as the US, Australia and Brazil. There are similar cases in Africa such as SICOSA in Cote d'Ivoire, the ginning company established by a cotton farmers union (URECOS-CI) at the end of the 1990s. In other cases, ginning is a service provided on a fee basis (toll ginning) to farmers, who retain ownership of the final products (lint and seeds).
- There are few remaining examples of state-owned enterprises buying raw cotton from farmers through a single channel (national monopoly) system. Even former Soviet republics of Central Asia, who are large exporters of raw cotton, have with the exception of Turkmenistan to various degrees moved away from the national monopoly system (Uzbekistan, Tajikistan, Kazakhstan).
- Local monopolies seem to be more a transitional arrangement in the evolution from a single-channel system than a permanent sustainable organizational model. Most cotton sectors in the world can be characterized as either concentrated or competitive types.
- Cotton production and ginning activities are very seldom integrated with downstream industries such as spinning, weaving and textile manufacture, except in some particular locally favorable conditions (China, India, Turkey).

We infer from this short review that change in African cotton sectors is moving in similar directions to what can be observed among other major cotton producers in the world: retrenchment of governments and state-cooperatives from industrial and commercial activities, growing empowerment of farmer groups in the management of the cotton sectors and in ginning and exporting activities, and a sharply increased investment in local cotton industries by international cotton merchants and commodity based multinationals when they see opportunities at country level. However, this is not to say that convergence in modes of sector organization is imminent. The organization of cotton sectors in Africa faces specific challenges due to the combination of two factors: 1) the high input intensity of cotton production, and 2) the weakness of markets for inputs and – arguably even more important, given the lack of capital of most African smallholder households – seasonal finance in Africa. As long as the seasonal finance constraint remains, the issue of the optimal form of cotton sector organization in Africa will continue to be a complicated one and convergence with forms of cotton sector organization observed in other parts of the world will remain partial.

4.1. Competition and Coordination

106. Poulton et al (2004) defined coordination as “effort or measures designed to make players within a market system act in a common or complementary way or towards a common goal.” They noted that the pursuit of effective coordination “may ... require effort or measures designed to prevent players from pursuing contrary paths or goals”. In the neoclassical ideal of perfect competition, the only coordination required is vertical coordination between players at different levels of the system, and this coordination is fully achieved through the price mechanism. Coordination among players at one level in the system – horizontal coordination – does not appear in this model. Yet North (1990) argued that implicit in the perfectly competitive model – and essential to any real world approximation of it – is a highly sophisticated set of institutions, which make information available and define and enforce the “rules of the game”. Poulton et al suggest that in the real world, where the perfectly competitive ideal never fully holds, it “becomes more likely that there will be some form of trade-off between competition and coordination.” This hypothesized trade-off is at the center of the proposed typology, and it is possible to

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summarize expectations of the sector types with respect to their likely performance in each dimension.

107. Competitive systems are characterized by large numbers of ginners, with open market competition for seed cotton purchase among them. These systems have high incentives for efficiency, but are likely to find it difficult to achieve (horizontal) coordination across firms to ensure input credit, extension, and lint quality. National monopolies (the “single channel” systems that have been common in WCA) solve the coordination problem by consolidating most downstream activities in a single firm; this solution comes at the cost of potentially very low incentives for efficiency; for example, ginning and overhead costs may rise and performance on input credit and extension quality may also decline over time. Concentrated systems and local monopolies are likely to lie toward the middle in each dimension. Concentrated systems are dominated by two or perhaps three major ginners, which compete directly for the “right” to buy seed cotton from farmers (that is, there is no geographical segregation of their activities). The competition is focused on getting producers to “sign up” with a particular company for a given season and tends to be based as much on the quality of services provided to producers as on seed cotton price. Once a growing season is underway, the major ginners generally respect the contracts that each has reached with particular producers for the duration of that season. Local monopolies don’t rely on this self-policing approach, instead prohibiting companies from competing for seed cotton outside their specified zone. Expected differences in performance between concentrated systems and local monopolies are not large; however, policy, regulatory capacity, history, and other factors can heavily affect firm behavior and performance.

108. According to Figure 4, the basic difference between competitive and concentrated systems lies in the number of ginning firms within the sector. Thus, the concentrated sectors shown in Figure 5 (Zambia and Zimbabwe) were both, until fairly recently, effectively duopolies where the top two firms accounted for 90 percent or more of seed cotton purchases. By contrast, in Tanzania there are around thirty ginners, the top five of which only account for around 40 percent of seed cotton purchases (and these top five typically change from year to year). However, we note that the number of ginning firms within the sector is essentially a continuum and so the dividing line between the two systems is not entirely clear cut.

109. On the other hand, as noted above, there are also important differences in the nature of competition within competitive and concentrated systems. This has come into sharp focus in Zimbabwe since 2001, where, as new firms have entered the sector, it is arguably the clash of competitive cultures that has caused more problems for established firms than the fall in the concentration ratio. During this period the share of seed cotton purchases accounted for by the top two firms has fallen to around 80 percent, which is at least 10 percent less than previously, but is still heavily concentrated. However, the conduct of many of the new firms has resembled that of firms in the competitive Tanzanian sector (offering few preharvest services, willing to compete on price at harvest time, thereby encouraging side selling by producers who have received credit from established companies) rather than that of the two established firms within the sector. The Zimbabwe experience shows that it is difficult for the two competitive cultures (and the visions for the cotton sector that underlie them) to coexist within a single sector.

110. Finally, hybrid systems are a potentially diverse group, emerging either out of attempts to liberalize a national monopoly (Benin) or to solve the problems unleashed by liberalization in a sector with a competitive structure (Uganda). Thus, Benin has fewer than 10 ginners, each with a

purchasing quota but no fixed geographical zone in which to make those purchases. The sector also has a complex clearinghouse approach to the provision of input and purchase of seed cotton. Uganda has upwards of 30 ginning firms that initially competed against each other after reform. Now, in response to input credit problems created by that competition, each ginner operates against a purchase quota in a defined geographical zone that it shares with at least one other ginner. Incentives for efficiency and costs of coordination in hybrid systems thus depend on the details of institutional design, and no firm a priori expectations can be formed.

4.2. Dynamic Considerations

111. As illustrated by the previous sections, sectors may at times move from one type to another. Because competitive systems have difficulty providing input credit to farmers, and because some level of external input use is typically required for a sector to be competitive in the world market, there may be pressure for competitive systems to move toward more coordinated systems. But because cotton ginning does not have high economies of scale (especially where roller gins are used), a move from a competitive structure toward an unregulated, concentrated system is unlikely. Therefore, if competitive systems change, it is likely to be toward one of the regulated systems. Because it is impractical to impose a single monopoly on a system with many private firms, this movement is very likely to be to a local monopoly or hybrid system.

112. In the study's sample of countries, Tanzania and Uganda both have competitive structures which undermined input credit after reform. Yet each has followed very different paths in dealing with this challenge. Tanzania has maintained its commitment to a competitive system while experimenting with innovative approaches to partially address the input credit problem. Uganda has moved to a hybrid system that keeps all ginner operating, but attempts to eliminate all direct competition among them for seed cotton, while investing heavily in training of farmers. Section 3.2 suggests possible explanations for these radically different choices in two countries with very similar pre-reform histories and nearly identical post-reform competitive structures.

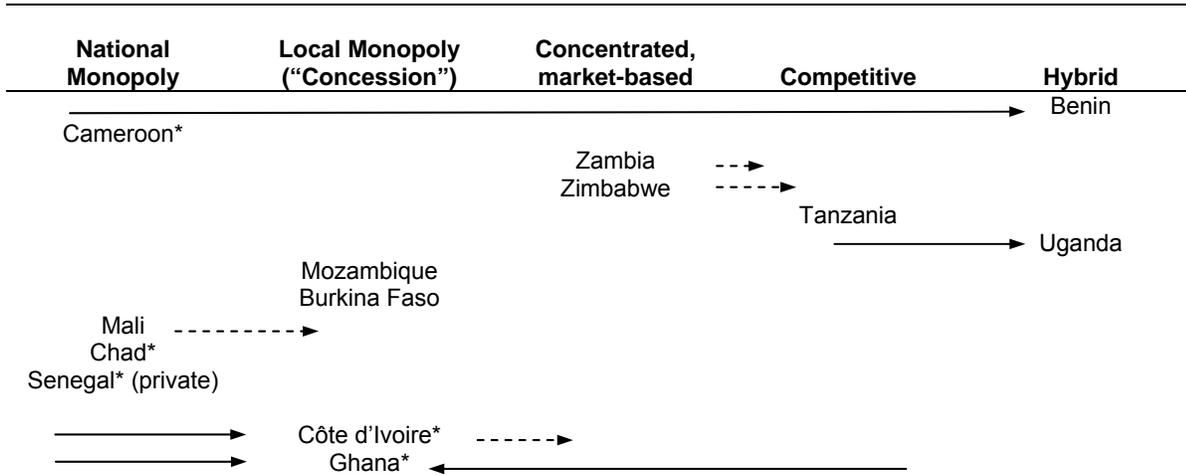
113. National monopolies are likely to show growing inefficiency over time. This inefficiency can eventually undermine performance on input credit and extension and cost competitiveness of the enterprise. If these systems change, the direction of change depends on policy choice. In principle, a single channel system could move quickly to a competitive system if free entry is allowed and competition is not regulated. In practice, the cultural norms which resulted in the single channel system will often (though not always) lead to a more deliberate reform, either toward a local monopoly system (Burkina Faso and Mali) or to a concentrated, market-based system (Zambia and Zimbabwe). History and cultural norms also likely affect which of these two paths are chosen.

114. In Mali, the move to a local monopoly system has been proposed, but has yet to be implemented. The changes in Zambia and Côte d'Ivoire are recent and deserve to be observed further. Uganda has a large number of private ginning companies that competed heavily against each other at one point. The sector has experimented with two different hybrid regulatory approaches over the past nine years to solve its input credit problem.³¹ In terms of firm conduct, we expect that Uganda and Benin both now resemble a local monopoly system.

³¹ The details of this system will be explained in more detail in Chapter 6.

115. Figure 5 maps the study sectors (and a few additional examples) onto the typology, along with indications of how sectoral structures have changed, if at all, since the onset of reform in the continent in 1994. Solid lines depict definitive changes, while dashed lines suggest changes that may be underway.

Figure 5: African Cotton Sector Typology



Note: * Not included in this study

4.3. Predicted Strengths and Weaknesses of Different Sector Types

116. Poulton et.al. (2004) identified four main challenges facing smallholder-based African cotton sectors:

- Provision of input credit to producers
- Maintenance of quality control
- Maintenance of a high quality research system and effective extension of resulting research knowledge and products
- Giving an attractive seed cotton price

117. Table 4 summarizes some of the strengths and weaknesses hypothesized about different sector types. In the absence of a strong, high capacity government regulatory agency, they hypothesized that “coordinated” sectors (national and local monopoly, concentrated) will be more likely to respond effectively to the first three of these challenges, whereas competitive sectors will be more likely to generate attractive seed cotton prices for farmers. These hypotheses are further explored in this report.

118. While these hypotheses assume the absence of a strong, high capacity government regulatory agency, the earlier summary of historical experience in WCA and ESA served to emphasize the importance of sector governance to good performance in all five sector types.

119. Concentrated sectors have the advantage that they can perform quite well with minimal input from the state. Good performance then depends on private coordination among the dominant ginning firms. However, producers are reliant on these companies’ (continued)

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ambitions for expansion for an attractive seed cotton price. As has been seen in both Zimbabwe and Zambia in recent years, such sectors can be contestable, which should provide an incentive to incumbent firms to keep paying attractive prices to producers. However, if they cease to do this and other firms enter, the change in sectoral structure brings challenges as well as advantages. So far there are no examples of market forces alone producing significant concentration within a cotton sector from a more competitive base. Thus, the change in sectoral structure from concentrated to competitive is likely to necessitate a new approach to regulation and a more active role for the state.

Table 4: Trading Off: Strengths and Weaknesses of Different Sectoral Types

	National monopoly	Local monopoly	Competitive	Concentrated
Nature of Competition between Ginners	None	Concession rules may create competition; Some emulation across zones on costs, prices, and services	High - tends to focus on seed cotton pricing	Moderate – as much on service provision as on pricing; price leadership often observed
Potential Strengths	Conditions may be conducive for provision of input credit, quality control and extension	Conditions may be conducive for provision of input credit, quality control, and extension	Seed cotton pricing;	Conditions may be conducive for provision of input credit, quality control, and extension
Potential Weaknesses and Major Challenges	Cost control; maintaining attractive producer prices; political interference	In presence of a weak state, requires strong farmer organizations to ensure setting and implementation of transparent rules for concession allocation and performance evaluation	Preharvest service delivery; quality control; accountability of government agencies responsible for these functions	Seed cotton pricing heavily dependent on internal objectives of dominant companies; instability of market structure

120. The competitive model may be presumed to be ideal, but failures in the market for seasonal finance (and hence input access) and in quality control mean that competitive sectors have had to look to government agencies to play an active role that goes beyond the provision of conventional public goods. This, of course, raises the potential for government failure—and indeed government agencies in both Tanzania and Uganda (classified here as a hybrid system but with a large number of private ginning companies) have faced such challenges. Thus, the development of mechanisms by which other stakeholders can hold government agencies accountable for their actions becomes critical to overall sector performance.

121. The regulatory challenge is arguably greatest in the local monopoly system, where theory predicts that performance will be enhanced by the setting and impartial implementation of transparent rules for concession allocation, periodic performance evaluation, and reallocation. This is a tall order even in a developed economy, let alone an African economy that has had much less experience with government capacity building. However, there may be strong pressures for a local monopoly system from cotton companies that are skeptical of their ability to make a market-

based system work. In addition, the fact that a local monopoly system has a legal foundation may give it a degree of stability.

122. We also note the possibility of a range of variants on the basic local monopoly model. Specifically, we note that decisions about pricing may be taken at a centralized level (through some sector-wide price setting mechanism, as currently happens in both Burkina Faso and Mozambique) or a decentralized, that is, concession, level. This may also be true of other decisions. We emphasize that, like hybrid systems, the performance of a local monopoly is likely to be heavily influenced by the detailed rules of the game governing such decision making.

123. The past history of national monopoly systems suggests that one of the biggest challenges is how to prevent politicians from meddling in sector governance. The Cameroon case shows that this can be accomplished (albeit in perhaps quite special circumstances), while experiences in Burkina Faso and indeed Tanzania show that this challenge is not confined to national monopoly systems. One of the main justifications for intervention by politicians is to ensure that producers receive a fair price for their seed cotton. However, history is replete with cases (a recent example being Mali during 1994 to 2002) where political intervention achieved the opposite outcome. Another key challenge facing national monopoly systems, therefore, is how to ensure that producers' interests are effectively safeguarded, in particular that company operating costs are kept under control and attractive prices can be paid to producers.

4.4. Conceptualizing the Links between Cotton Sector Organization and Performance

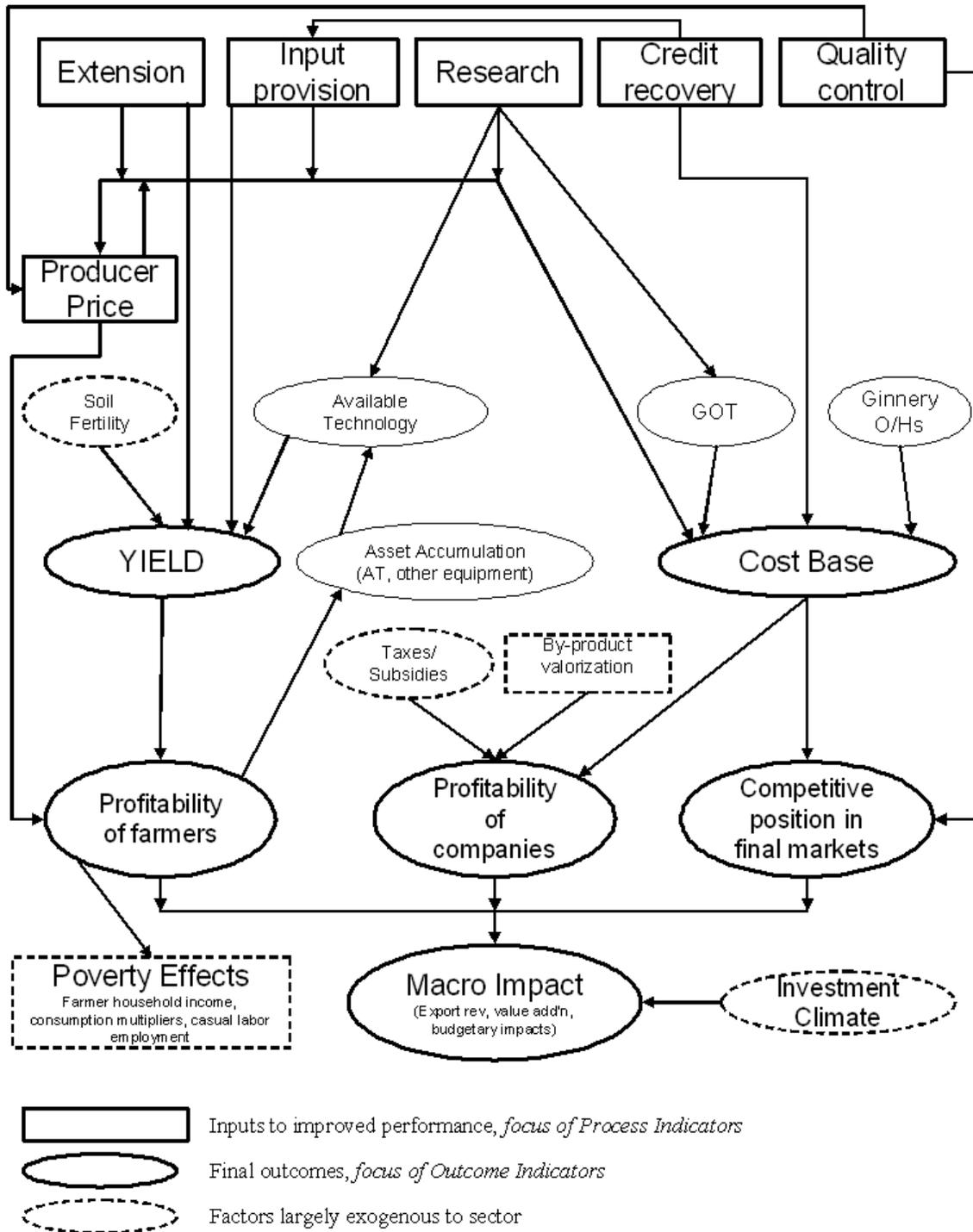
124. The previous section set out a number of strengths and weaknesses associated with different forms of cotton sector organization. In this section the key linkages between cotton sector organization and various dimensions of performance will be set out more systematically. The section culminates in discussion of a series of indicators by which cotton sector performance will be assessed within this report. Figure 6 sets out the conceptual framework, which underlies much of the subsequent analysis in the report. Given the various links in the chain, one can think of cotton sector performance at various levels

125. First, there are the processes and services that are under the direct control of cotton companies and/or other stakeholders within the cotton sector. These include public good generation within the sector, the services delivered to cotton producers, seed cotton pricing decisions and the mechanisms that companies and/or other stakeholders put in place for controlling (and enhancing) cotton quality. These are shown in the rectangular boxes near the top of Figure 6. Performance at this level focuses primarily on the quality of services provided to farmers and the prices paid. The "process indicators" for assessing performance at this level are analyzed in section III of the report.

126. At the company level, the extent and efficiency of these processes and services influence the overall cost of operations. More extensive pre-harvest services raise company costs, but so too does a higher seed cotton price. Cost of operations is also heavily influenced by the efficiency of the basic ginning function which, theory suggests, is likely to be closely linked to cotton sector organization. Cost of operations may be thought of as an intermediate performance indicator, but one that has a major influence over both company profitability and the competitive position of the sector in final markets.

127.

Figure 6: Linking Cotton Sector Organization and Performance



128. Meanwhile, at the farm level, the public goods generated and the services delivered by cotton companies are major determinants of seed cotton yields (although “exogenous” factors such as soil fertility also come into play – portrayed with dotted ovals in the figure)³². As with cost of company operations, seed cotton yields may be thought of as an intermediate performance indicator. Along with seed cotton prices, they are a major determinant of farm-level profitability of cotton production. At this point an important feedback loop also comes into play, whereby high profits and cash incomes from cotton can facilitate the acquisition of capital assets, such as draft power and related equipment that can further enhance both the scale and the efficiency not just of cotton production but of the whole farm enterprise

129. Section IV of the report analyzes performance at both company and farm level, focusing on what is called the “outcome indicators”. At farm level, both yields and returns to producers are examined. At company level, the focus is on cost efficiency and then on overall competitiveness in the lint market - a function of both the costs of production and the price that a sector realizes for its lint.

130. Ultimately, the goal would be to link organization of a cotton sector to its contribution to poverty reduction. However, many exogenous factors mediate the impacts of cotton on poverty reduction within an economy and modeling the impact on poverty within the focus countries is beyond the scope of this report. The analysis was therefore restricted to “outcome indicators” since there are indications of clear relationships between the indicators chosen in this report and the impact of the cotton sector on poverty within a given country.

131. Beginning at farm level, increasing profitability of cotton production for producer households does not guarantee poverty reduction, but should contribute to it. Directly, the incomes of cotton producers (many of whom may start poor) increase. Indirectly, higher profitability of cotton production should encourage more hiring in of labor, whilst higher incomes should set off consumption multiplier effects within the local economy. As profitability of cotton production increases, it may also encourage more households to engage in cotton production. The impact on household incomes may often be quite marginal, unless the cotton sector is able to sustain a higher rate of productivity growth over time versus competing crops and activities.

132. At macro level, a healthy cotton sector should also contribute to economic growth, and thereby to poverty reduction. It creates value within the economy, has backward and forward linkages to input supply and textile industries, generates foreign exchange and should generate tax revenue for the state that can be used for subsequent investment.

³² By labelling soil fertility “exogenous”, the intention is not to dismiss concerns about the impact (negative or positive) of cotton production on soil fertility. Rather, it points out that other factors also make a major contribution to observed soil fertility, the inherent characteristics of the soil, population density and the overall management of the farming system being three major ones.

4.4.1. *Selected Indicators*

133. Table 5 summarizes the key indicators of cotton sector performance which will be explored within the report and the ways each indicator will be measured.

Table 5: Key indicators of Cotton Sector Performance

Type of Indicator	Measured By
Process Indicators	
Quality and Marketing	Estimated average realized premium over Index A on world markets (US\$/lb lint)
Pricing	Mean % of FOT price paid to farmers
Input provision	a) % of cotton farmers receiving input credit, b) Adequacy/quality of input credit package, if provided c) Repayment rate
Extension	a) % of companies providing assistance b) Qualitative assessment
Valorization of by-products	Price of cotton seeds
Research	# of varieties released and taken-up, past 10 years
Outcome Indicators	
Yield	Kg of seed cotton produced per hectare
Company cost efficiency	Adjusted farm gate price to FOT cost (US\$/kg lint)
Farmer welfare	Returns per day of family labor (US\$/day)
Number of farm households participating in sector	
Overall competitiveness	Ratio, total FOT cost to total FOT value
Macro impact	a) Total value added per capita (including value of seed sales) b) Net budgetary contribution per capita (taxes paid minus transfers received)

134. Table 6 summarizes predictions about how different sector types will perform on these indicators. Predictions are clearer for the process indicators and for the intermediate outcome indicators (yield and company cost efficiency) than for the final outcome indicators. There are two reasons for this. Firstly, existing work (e.g. Poulton et.al. 2004) has focused more on process indicators than on outcome indicators. Secondly, more than one “process” can contribute to an “outcome” and a particular sectoral type may be expected to perform strongly in one of the processes, but poorly in another. This is seen most clearly in the case of farmer welfare, where returns per day of family labor are influenced by both yields (in which coordinated sectors are expected to outperform competitive) and seed cotton pricing (in which competitive sectors are expected to outperform coordinated). In Table 6, therefore, “no clear prediction” means that this is an empirical question worthy of additional research.

135. We also note that actual performance in all cases will depend on how a particular sector is regulated. The job of regulation may be thought of as seeking correction in areas where an unregulated sector is likely to perform poorly, whilst preserving that sector’s strengths. The corollary of this is that the predictions in Table 6 may be most accurate in situations where regulation is weak. In general, regulatory capacity in Africa is low. However, as has already been described (Chapter 3), there are ongoing efforts to evolve more effective regulatory regimes for the cotton sector in several of the study’s focus countries.

Table 6: Expected Performance along Key Indicators

	National Monopoly	Local Monopoly	Concentrated	Competitive
Process Indicators				
Quality & Marketing	Medium - strong control of supply but incentives depend on mgmt. culture & regulatory effectiveness		High	Low
Pricing	Low if left to companies alone		Low	High
Input Provision		High	Medium	Low
Extension		High	Medium	Low
Research		High	Medium	Low
Valorization of by-products		Low	Medium	High
Outcome Indicators				
Yield		High		Low
Company Cost	Low			High
Efficiency				
Farmer Welfare			No clear prediction	
Overall			No clear prediction	
Competitiveness				
Macro Impact			No clear prediction	

4.4.2. *Place of the seed oil industry in the typology*

136. This report considers the cotton sector as a whole, i.e. including the broad range of activities from seed cotton production through ginning to marketing of the resulting products (lint, seeds, oil and cake)³³. As a result, included in the analysis is a description of the way cotton oil industries are organized and how they contribute to the sector’s performance. One of the arguments made in this study is that performance of oil and cake sectors is becoming increasingly important and is something that requires more attention than it has received before. We also note that, in some cotton sectors outside Africa, farmers own and retain their cotton seeds after ginning. Therefore, to be fully representative at a global level, it seems appropriate for the comparative review to cover the issue of valorization of seeds and how they differ according to various organizational models, particularly from a farmer’s perspective.

137. In Table 5 we include the valorization of seed cotton by-products as a process indicator. Similarly in Figure 6 we present it as an “endogenous” variable, i.e. something directly affected by the organization of the cotton sector. In fact, we recognize that this is a debatable point. The organization (and hence performance) of oil and cake markets are indeed related to the organization of the cotton sector. However, the nature of this relationship is not the same as that between cotton sector organization and performance on, say, input supply or quality control. Historically, in WCA, the organization of the oil sector was bound up with the national monopoly in cotton ginning - all part of the overall development approach to the cotton “filière”. While this is history as much as anything inherent in a national monopoly in cotton ginning, it has determined the structure and evolution of the cotton oil industries in most of WCA countries. Meanwhile, at the other end of the spectrum, it can be argued that competitive cotton sectors are more likely to be associated with (more or less) competitive oil markets.

³³ Consistent with this definition, this study does not cover the further processing of lint because it belongs to a completely different, downstream segment of the cotton/textile value chain.

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**SECTION III: COMPARATIVE ANALYSIS:
CORE ACTIVITIES AND SERVICE DELIVERY**

CHAPTER 5: PRICING SYSTEMS AND PRICES PAID TO GROWERS

138. Until recently, most cotton sectors in WCA were national monopolies, requiring an administered approach to producer price setting. While details vary across countries, each country in WCA followed broadly similar approaches to this issue. Since reform in ESA, cotton sectors have included all sector types described in chapter 4: local monopolies (Mozambique), concentrated (Zambia and Zimbabwe), competitive (Tanzania and Uganda until early 2000s), and hybrid (Uganda since 2003). Predictably, approaches to price-setting in ESA have been as diverse as their sectoral and regulatory structures.

139. The summary indicator for pricing performance is the percent of FOT price paid to farmers. The typology laid out in the previous chapter generates clear expectations of performance on this measure for market-based systems: competitive systems should pay the highest FOT share, while concentrated are likely to pay the lowest. Performance in national and local monopolies is not fully predictable from the typology, since political factors and the strength of farmer associations weigh more heavily in these sectors. Before presenting summary results, we briefly review pricing mechanisms in the two regions.

5.1. Pricing Mechanisms in WCA

140. Pricing mechanisms in francophone WCA have a remarkably similar historical background across all countries, based on a commonly accepted principle that single channel systems require fixed prices: unique for the whole cotton-growing area in the country (panterritorial), fixed throughout the whole cropping season (panseasonal) and announced publicly before sowing. Another major feature is the guarantee of purchase by the cotton company of all quantities of seed cotton offered at the official price. Typically, in the 1970s and during most of the 1980s, the Ministry of Agriculture would announce the producer price for seed cotton before the planting season, and the cotton company was mandated to collect and pay the raw cotton to farmers throughout the country. There was intense bargaining each year between government and the cotton company based on standard costs for inputs and services including ginning (“barêmes”), since the cotton company was de facto assuming the financial risks of the guaranteed price and tried to cover risks and overheads by well-negotiated barêmes. This bargaining and fairly untransparent system was replaced at the end of the 1980s by performance contracts negotiated and signed between government and the cotton companies to set performance targets and costs.

141. In recent years, in order to bring flexibility and reduce financial risks, most WCA countries have reformed their pricing systems with a two-tier payment linked to world prices : a base price negotiated at the beginning of the cropping season and a price complement to be paid at the end of the season, in case the cotton company makes a profit (Cameroon) or in case the actual sales price is above the base price (Burkina and Mali). Initial campaign prices, administratively set until the end of the last decade, are now typically agreed prior to the planting season through direct negotiation between cotton companies and farmers, or, in some countries (Burkina and Mali) through a commonly agreed pricing formula within an Inter-Professional Committee. The parameters of the pricing formulas have been progressively improved: references to the production cost (in Mali) have been abandoned, and replaced, both in Burkina and Mali, by a fixed percentage (60 percent) of the FOB price paid to farmers, thus linking producer prices to world market prices. Even when such mechanisms are well designed and applied, they are still

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facing the major difficulty of uncertainty about what will be the actual world price one year in advance, at the time when the initial producer price has to be announced. The fixed producer price system also creates significant financial risks for the cotton companies who have to buy at this preset price. If actual market prices are lower than this level, cotton companies will make trading losses, leading to inability to repay credit and the need for bailouts or financial restructuring.

142. In all countries, the pricing mechanism was, at least until the 2004 crisis (when the world price fell by 30 percent during the season), linked to a stabilization fund designed to limit fluctuations in producers prices and avoid having prices fall under a "minimum" level. Only one of these funds (in Cameroon) survived the crisis, but was exhausted in subsequent years. The collapse of the stabilization funds, due to prices set at levels well above what was allowed by the world market, entailed major financial crisis for cotton sectors, requiring government support (in Mali, Benin and Burkina).

143. Table 7 shows the essential elements of pricing mechanisms in the WCA study countries. The traditional cotton pricing mechanisms used in WCA have numerous economic and financial implications. First, panterritorial prices transfer resources from growers with low transport costs to growers more distant from gins or in less accessible areas. Additionally, panseasonal prices do not allow cotton growers to choose the time of selling according to their preferences and needs. Second, when the prices are announced prior to planting, all price risks are borne by the cotton companies who will have problems operating profitably if market prices during the season fall below the level of the pre-announced price. In effect taxpayers and donors are also carrying the price exposure since the companies then frequently need to be financially supported by the governments. Following the cotton price decline of the late 1980s along with an overvalued CFAF, several cotton companies had to be bailed out and the recent financial difficulties of most cotton companies in the region are similar to the problems experienced at that time. A third implication is that between 1970 and 2005 there has been virtually no correlation between the Cotlook A Index and prices received by cotton growers. During this time period the price variability of the Cotlook A Index (expressed in real CFAF terms) was six times higher than the variability of prices received by cotton growers.³⁴ Thus, the pricing mechanisms have delivered remarkable price stability to cotton growers, one of the stated objectives of the approach, but at great cost.

³⁴ Because of the presence of unit roots, the Z-measure of price variability was used instead of the traditional measure of variance. It is defined as: $Z = [\sum_t (P_t - P_{t-1})^2 / (n - 1)]^{1/2}$ where P_t and P_{t-1} denote current and lagged price levels while n denotes the number of observations.

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Table 7: Summary of Pricing Mechanisms in WCA Countries as of 2006

	Benin	Mali	Burkina	Cameroon
Administered price?	Mixed	Yes	Yes	Yes
Panterritorial, panseasonal?	Yes	Yes	Yes	Yes
How set?	Government has arbitrary role	Negotiated within interprofessional committee	Negotiated within interprofessional committee	Negotiated within interprofessional committee
Announced prior to planting?	Yes	Yes	Yes	Yes
Adjusted prior to harvest?	Yes	No	No	Yes
Secondary payment after marketing?	Yes	Yes	Yes	Yes
Linked to A Index?	Yes in principle, not so clearly in practice	Yes	Yes	Yes in principle, not so clearly in practice
Stabilization fund?	Yes, but exhausted	Yes, but exhausted	Yes, but exhausted	Yes, but exhausted
Sector wide deficits?	Yes	Yes (estimated US\$91 million for 2005 alone)	Yes (estimated €110 million, 2004/05-2005/06)	None through 2007

5.2. Pricing Mechanisms in ESA

144. Prior to the reforms of the early 1990s, cotton pricing mechanisms in ESA closely resembled those of WCA in the sense that a cotton parastatal (or cooperative union in Tanzania and Uganda) was the sole buyer of cotton at a preannounced, panseasonal and panterritorial price. Following reforms, pricing mechanisms in the region became more market-linked and flexible and diversified in line with the diverse sectoral types that have emerged (Table 8). As a result, no country in the region operates a stabilization fund, and none have generated sector-wide deficits that government had to cover.

145. Mozambique has the only (local) monopoly system in the region, and is the only country that maintains a fully administered, panseasonal and panterritorial price. Government's role in price setting is strong in Mozambique, due in part to the very weak state of farmer organizations in the country. In Zambia and Zimbabwe's concentrated sectors, pre-planting prices have been maintained but this reflects business decisions by the dominant firms as they exercise price leadership in the sector; government has no say in pricing in either country. Prices paid to farmers throughout the region are much more strongly linked to Index A than in WCA, though the way in which this happens varies greatly. For example, prices in Zambia largely adjust only year-to-year, due to price leadership by Dunavant, while in Tanzania and to some extent in Zimbabwe they fluctuate throughout the marketing season. Even in Uganda's hybrid system, which attempts to eliminate competition among firms, prices vary over the course of the marketing season.

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Table 8: Summary of Pricing Mechanisms in ESA Countries as of 2006

Pricing Element	Mozambique	Zambia	Zimbabwe	Tanzania	Uganda
	Local Monop	Concentrated	Concentrated	Competitive	Hybrid
Administered price?	Yes	No	No	No	Only pre-planting price
Pan-territorial?	Yes	Yes for individual companies, but prices vary across company	Yes for individual companies, but prices vary across company	No	Only pre-planting price
Pan-seasonal?	Yes	Yes	No	No	No
How set?	Negotiated between government and ginners; very little direct role of farmers	Dunavant acts as price leader	Price leadership by Cottco and Cargill	Competitive market price, no price leadership	Government (CDO) sets pre-planting price in collaboration with ginners' association
Announced pre-planting?	No	Yes, only by Dunavant	Yes (Cottco and Cargill only)	No	Yes
Adjusted prior to harvest?	N/A	Yes	Continually adjusted over season due to hyper-inflation	N/A	Not formally, but actual prices paid do fluctuate over marketing season
Secondary payment after marketing?	No	No	Yes (Cottco and Cargill only)	No	No
Linked to A Index?	Yes in principle, not so clearly in practice	Yes	Yes	Yes	Yes
Stabilization fund?	No	No	No	No	No
Sector wide deficits?	No	No	No	No	No

5.3. Comparing Pricing Performance at Farmer Level

146. Table 9 shows the share of the FOT lint price received by farmers in each of the study countries over the past 15 years. Producer prices for seed cotton are adjusted to lint equivalent using the average ginning outturn ratio, and any input costs borne by the companies are added to this result, to show the net value received by farmers. The Cotlook A Index is then adjusted to FOT based on transport and port cost data. Estimates of average quality premia for each country (see Chapter 7) are then added to estimate the value received by the ginner at the ginnery door. The ratio of these two values—that paid to farmers by the ginners and that received by ginners at the factory door—shows the share of FOT paid to farmers. The FOT lint price is chosen instead of FOB because FOT is the final product price most within the companies' control. Transport costs from FOT to FOB tend to be higher in landlocked countries (Burkina Faso, Mali, Uganda, Zambia, and Zimbabwe) than in coastal countries (Cameroon, Mozambique, and Tanzania).

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Thus, for example we estimate costs from FOT to FOB to be 50 percent higher in Zimbabwe (US\$0.157 per kg of lint) than in Tanzania (US\$0.105 per kg of lint) entirely due to geography. Note that, due to differential transport costs seed cotton prices in US\$ terms may be lower in Uganda than in Tanzania, but the share of FOT paid to farmers may be larger.

147. Caution is required in interpreting the figures in Table 9 for a number of reasons. First, in WCA, with the exception of Cameroon, the cotton companies have accumulated large deficits during the last few seasons, so that prices received by cotton growers include taxpayer (and/or donor) resources not captured by the FOT shares. Second, even FOT figures do not account for differential rates of taxation across countries (for example, Tanzania taxes its cotton sector quite heavily while Uganda does not). Third, there are various exchange rate issues in six of the nine countries examined, implying that several of the cotton sectors have been taxed (e.g. a likely overvaluation of the CFAF in WCA and the effects of local currency appreciation in Zambia).

5.4. Conclusions

148. Focusing first on ESA, four patterns stand out. First, Mozambique (the region's only monopoly sector) paid extraordinarily low prices prior to 1995, due in part to additional costs that the companies had to bear: maintenance of private militias during the war, and substantial costs to keep roads open. As these costs disappeared during the final two periods, prices improved but remained the lowest in the region.

149. Second, and perhaps surprisingly, price shares in Zimbabwe and Zambia (concentrated sectors) were relatively high in the five years following reform, even matching those in Tanzania and Uganda, which had more competitive sectors. Shares in both the concentrated sectors, however, dropped sharply during 2000 to 2005, clearly underperforming Tanzania and Uganda. We observe that the newly privatized sectors in both Zimbabwe and Zambia were making particular efforts to attract additional smallholders to cotton during 1995-99, while the fall in price shares in 2000-05 can be attributed to the sectors not passing on to farmers the benefits of higher quality premia on world markets (Zambia) or a major real exchange rate devaluation (Zimbabwe). The 1995-99 experience shows that farmers can receive reasonable prices under concentrated systems, while the 2000-05 experience shows that, in the absence of appropriate regulation, they are vulnerable to changes in the objectives or conduct of the dominant firms.

150. Third, considering the whole of the past decade (the post-reform era in ESA), Tanzania and Uganda have clearly paid a higher share of FOT to farmers than any other countries in the region. Both sectors have competitive structures. However, while competition remains unregulated in Tanzania, it has become highly regulated in Uganda since 2003. In the Uganda case, the continuing attractive prices are likely due to ginners' need to increase capacity utilization (very low at about 20 percent), their knowledge that farmers in Uganda move in and out of cotton based largely on relative prices (a dynamic seen much less in WCA), and therefore the need to pay attractive prices if they are to attract growers. In Tanzania, over the past few years ginners have become more sophisticated regarding knowledge of global market prices and trends, ability to negotiate with buyers, understanding of price exposure, and the use of market-based approaches to mitigate that risk.

151. Finally, price shares in WCA rose sharply during the 2000 to 2005 period, reflecting the greater role of farmer organizations (supported by political pressures) in the price setting process

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during that time, and the reluctance of stakeholders to reduce producer prices. In fact, during this period, price shares in every WCA country exceed those in every ESA country. Clearly, however, these prices are not sustainable, as evidenced by the huge sectoral deficits that have been generated in every country except Cameroon.³⁵

Table 9: Summary of Producer Shares of FOT Lint Price (percent)

	1990-94	1995-99	2000-05	1995-2005 (Post reform in ESA)	Entire period (1990-2005)
Benin	58	62	71	67	64
Burkina Faso	55	57	73	66	62
Cameroon	61	61	73	68	66
Mali	56	52	76	65	62
Mozambique	27	52	48	50	43
Tanzania	49	65	70	68	62
Uganda	—	72	68	70	70
Zambia	—	68	58	62	62
Zimbabwe	63	69	49	58	59

152. Assessing the impact of price stability on rural income and poverty is clearly beyond the scope of this study. It is however worth noting that more flexible prices, widely regarded in WCA as highly detrimental to rural development, poverty reduction and development of the cotton sector, are well accepted both by farmers and cotton companies in ESA countries.

³⁵ And in the latter, the price support fund has been exhausted by the high prices.

CHAPTER 6: INPUT CREDIT AND EXTENSION

153. Concern about input credit supply has long been at the center of debates regarding cotton sector reform in SSA.³⁶ The typology in Chapter 4 was heavily informed by this issue, suggesting that more concentrated sectors would be best able to ensure provision and repayment of inputs on credit and some level of extension advice, while both of these would likely be undermined by side selling in more competitive sectors. We further suggested that monopolies would perform well on input provision and repayment, while the adequacy of the package might deteriorate over time by not adapting to changing conditions. The country case studies confirm these general hypotheses while providing detail and nuance that are relevant to sectoral policy discussions. This section briefly discusses approaches and performance on input credit and extension across the eight countries, organized around the typology of Chapter 4, before closing with general lessons learned.

6.1 Mali and Cameroon: Government Monopolies Show Similar Strengths and Weaknesses, but Cameroon Performs Much Better

154. Mali and Cameroon, along with Burkina Faso, share similar approaches to input credit and extension based on the “West African model” of cotton promotion. The model features exhaustive coverage of farmers in agroecologically suitable areas with a standard in-kind credit package that includes about 50 kg of urea and 100 to 150 kg of compound fertilizer per ha, about six insecticide sprays per season, herbicides among some farmers, treated and reasonably well-maintained seed, and widespread adoption of animal traction. Most countries also feature an elaborate structure of village cotton farmer organizations organized into regional and national “Apex” organizations. These Apex organizations, along with ginning companies, form –or are in the process of forming - an “inter-professional” body with responsibility to make joint decisions about input supply and pricing, among other factors. Notably, the government is not part of these inter-professional bodies, except through its ownership stake in the cotton company.

155. Objective indicators of input system performance are comparable across the countries:

- Input packages are nearly identical in composition and cost, and coverage of farmers is exhaustive in the main zones of each country.
- Average yields are about 200 kg per ha higher in Cameroon, but this may be due to agroecological factors more than input quality (yields in the extreme north of Cameroon are nearly identical to those in Mali).
- Yields are trending down at about the same rate in each country, related at least in part to higher cost and lower use of fertilizers.

156. Two key differences in input and extension systems in the two countries are worth noting. First, Cameroon’s producer organizations are substantially stronger and play an active role, in collaboration with SODECOTON, in input procurement, pricing and distribution, credit recovery, and provision of extension services. Associations of better farmers in Cameroon employ and pay extension staff. OPCC, the national Apex organization, employs 76 trainers to strengthen village

³⁶ See the Introduction to this report for background on this issue.

level associations. In Mali, the national Apex does not yet exist, and it will likely take at least several years for the system to gain the financial and operational strength already seen in Cameroon.

157. A second key difference is that management of SODECOTON may be more attuned to opportunities to improve performance and reduce costs in its input supply operations. One example of this is that it imports generic bulk insecticides which farmers mix in the field. The company claims that these products are cheaper, and that it is able to use them because of the relatively dense network of field agents, who are able to disseminate techniques of pesticides preparation to farmers.

6.2. Local Monopolies: Vastly Differing Histories Complicate Comparative Assessment in Mozambique and Burkina Faso

158. Burkina Faso moved to a local monopoly system with three firms in 2004, in the midst of a huge boom in cotton production made possible by many years of investment in research, input credit distribution, and extension.³⁷ In sharp contrast, Mozambique created its local monopoly system in the late 1980s, as a civil war still raged and after national production had fallen below 10,000 tons of seed cotton. Even prior to the civil war and the economy's collapse, cotton production in Mozambique used far fewer external inputs than did the system in Burkina Faso. One area in which both countries show similar performance is in the share of all farmers growing cotton in the cotton zones: 85 percent across Burkina Faso's whole cotton zone, and as high as 80 percent in Mozambique's cotton belt.

159. In reforming its cotton sector, **Mozambique** returned to the concession (or local monopoly) model prevalent during the colonial era. Key themes during the post-reform era have been the absence of any systematic approach to evaluating and re-awarding concession areas, extremely weak farmer organizations unable to negotiate with ginners or provide services themselves, widely divergent performance between early investors and new entrants (most affiliated with international cotton trading firms), recurrent credit default crises, and the government's openness to new investment, albeit always within the concession model. Until recently the country clearly lagged its neighbors in productivity, though new entrants since the early 2000s have begun to change this in some areas of the country.

160. Key lessons from Mozambique's experience are, first, that a local monopoly system does not eliminate the possibility of serious credit default crises. If investment opportunities and regulatory capacity in a country are limited, the cotton sector is likely to attract new entrants, leading to side selling which creates risk of increased credit default. Eventual decline in seasonal input credit and extension services is usually the result. Second, policy makers in local monopoly systems must choose their companies carefully. All countries in Mozambique face the same, very weak, regulatory capacity of government. Yet some have chosen to invest aggressively in improved input supply and extension, while others have operated for many years much like the new entrants in Zimbabwe, providing minimal quantities of poor quality input. Significant in Mozambique, the companies making the more aggressive investments are all affiliates of

³⁷ Some of Burkina Faso's reported production is due to seed cotton coming over the border from Côte d'Ivoire and other countries, spurred by the unrest in Côte d'Ivoire and high prices paid by SOFITEX.

multinational cotton trading firms: Dunavant, Plexus, and C.N.A. (DAGRIS). These firms have all chosen to invest outside the traditional cotton growing zone of Nampula.

161. In **Burkina Faso**, the division of SOFITEX into three companies in 2004 changed very little with regard to input credit and extension; the West Africa Model discussed above continues to be applied, though it seems likely that the severe financial difficulties of the past two years has prevented companies from making much progress on stated desires to modify the input and extension package. A key point to keep in mind as Burkina Faso moves down its reform path is that, despite the very developed structure and strong coverage of farmer groups within cotton areas, operational capacities remain very weak. While they do receive and distribute inputs to members and organize the cotton market, neither UNPCB nor its regional unions are in a position to take over the importation and distribution of input to villages. Until this can happen, seasonal input credit from cotton companies will be critical to the sector's success.

6.3. Competitive Sectors: Tanzania and Uganda Struggle and Take Very Different Paths to Ensure Input Supply and Quality³⁸

162. The pre-reform cooperative-based cotton systems in Tanzania and Uganda led quickly after reform to highly competitive markets with 20 to 30 independent buyers competing for farmer production. Price competition was intense and farm prices improved, but each country witnessed the collapse of its input supply and extension systems. As a result, the two countries in ESA that most closely approached the competitive ideal in market structure saw the most direct and persistent government involvement in efforts to ensure input provision to farmers.

163. Initial efforts in both countries involved removing input supply from the private sector, to allow competition in the output market: Tanzania's Cotton Development Fund (CDF) created in 1999, and Uganda's similar collaborative approach between ginners and the country's public Cotton Development Organization (CDO). Each approach achieved some success but failed after two years due to management and design problems.

164. Since these initial failed attempts, the two countries have moved in dramatically different directions. Uganda has eliminated competition in the output market to facilitate input supply and extension by ginners (see Baffes, background paper on Uganda, 2007 for more detail), while Tanzania has maintained a competitive output market and used innovative approaches to provide some minimal level of input to farmers (Poulton and Maro, background paper on Tanzania, 2007). Uganda's zonal quota system features collaborative production planning among 2-3 ginners in each of 11 zones, prohibits cotton movement across zones, and facilitates sale of inputs at 50 percent of cost, with the subsidy implicitly collected in the price paid to farmers. Extension is a heavy focus in the system, with 7,000 demonstration plots and training days financed two-thirds by ginners and one-third by USAID. The consensus among ginners and observers is that input supply and extension would be drastically reduced if the zoning system, or some variant of it, was not in place.

³⁸ Though we have classified Uganda as a Hybrid sector, we discuss it here with Tanzania under Competitive sectors because its competitive structure since reform has created problems very similar to those found in Tanzania and has driven the types of hybrid institutional set-ups we described earlier.

165. Despite these major efforts at input supply and extension, production in Uganda has not consistently risen above 20,000 to 25,000 tons of lint. In hindsight, it appears clear that a short-lived production boom in 2004 and 2005 was due primarily to high prices in the two preceding years (Baffes, background paper on Uganda, 2007).

166. Under Tanzania's passbook system, farmers selling cotton receive a stamp in their passbook which entitles them to a value of seed or chemicals³⁹ the next year proportional to the amount of cotton they sold. For most farmers, the entitlement amounts to one or two chemical sprays and some seed the following year. The system is funded by a levy paid by ginners to CDF, which funds the importation of insecticides by private companies. Based on field interviews, Poulton and Maro (this project) suggest that the system has been "one contributory factor toward the major resurgence in cotton production in 2004 and 2005," but concludes that "the system can make only a limited contribution to the intensification of cotton production in Tanzania," since it can finance only limited insecticide sprays and no fertilizer applications.

167. Several factors might explain why these two countries, with very similar pre-reform histories and nearly identical structures after reform, have chosen such radically different approaches to solving the input credit and extension problem. First, geographical factors mean that the scope for expanding cotton production under an extensive (low input) approach is far greater in Tanzania than in Uganda, at least as long as the far north of Uganda remains insecure. For the moment, ginners in Uganda must try to increase production in relatively small areas already under production. If this line of reasoning is correct, then once the northern region in Uganda becomes secure, incentives for ginners to operate the quota system may decrease. Second, farmers in Uganda may have more remunerative cash cropping options than Tanzania. Providing some substantial level of input credit and/or extension is thus imperative if ginners are to attract farmers to cotton. Finally, greater cultural homogeneity among Ugandan ginners may have facilitated collective action approaches that were infeasible in Tanzania.

6.4. Concentrated, Market-Based Sectors: Zimbabwe and Zambia Perform Well on Input Credit and Extension, but Face Instability

168. The two countries in ESA with single channel marketing systems prior to reform maintained relatively concentrated sectors for several years after reform. Each has performed much better on input provision than have Tanzania and Uganda. However, each has faced substantial structural instability that has affected input credit supply; Zimbabwe's sector is currently much less concentrated than it was five years ago, and Zambia's may also be heading in the same direction.

169. **Zimbabwe** transitioned during the 1980s from a sector dominated by white commercial farmers to one with almost no such farmers, while building systems for effective input credit supply and extension assistance to a substantial minority of the new smallholder farmers. Cottco, the private company that emerged out of the government-owned CMB with a market share of 70 percent to 80 percent, continued this effective performance into at least the early 2000s and enjoyed credit repayment of 95 percent or higher in most years.

³⁹ Seed has so far been included in the system but may be removed next year.

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170. Between 2001 and 2004, the number of seed cotton buyers in Zimbabwe rose from 5 to 11, spurred by a fall in the real prices paid to farmers by the major players⁴⁰. Credit default increased, and Cottco dramatically reduced input credit in 2004/05. Though the company has since expanded its system again, credit default remains a major problem. Draft regulations to deal with the situation were developed in 2004, but never enacted. For the 2006/07 season, the sector is trying various approaches, including establishment of a code of good conduct that cotton companies must adhere to if they are to receive an export permit in future years.

171. An unusual result of Zimbabwe's move to a less concentrated system is that a substantially *larger* share of farmers received some form of input credit in 2006 than in the early 2000s. Whereas about 40 percent of growers received credit from Cottco or another company in 2002, nearly 95 percent received some type of support in 2006. However, regulation was a key driver of this result, and newer companies tend to provide seed of uncertain quality, and little or no insecticide. As noted above, the entry of these new companies was also accompanied by large increases in credit default among farmers. In an echo of patterns seen. In Zambia, and especially in Mozambique (see below), widespread provision of very inadequate input packages has often been used as pretext to buy aggressively (and indiscriminately) during the harvest. To the extent that this is happening in Zimbabwe, the apparent increase in credit provision, and may therefore actually undermine such input credit provision in the longer term.

172. **Zambia's** cotton sector built relatively effective input credit and extension systems in the years following reform in 1994, consistently providing farmers with high quality treated seed, four- to six treatments of insecticides, and (for the top 20 percent or 30 percent of farmers) foliar feed fertilizers on 100 percent credit terms. Typical credit repayment was above 95 percent for Clark, and above 85 percent for Dunavant. As a result, the sector has seen slow but steady rises in the yields of established farmers and a near tripling of the total number of farmers growing cotton over the past decade (Tschirley et al, 2004).

173. Despite the financial strength and high market shares of the two main companies, the sector has experienced two severe credit default crises since reform. The crisis of 1998-2000 was overcome as Dunavant and Clark strengthened their input credit supply and recovery and (especially for Clark/Cargill) extension systems, and demonstrated to most farmers the benefits of remaining loyal to the company. As a result, credit default receded as a problem, and production boomed through the 2006 harvest season. The second credit default crisis occurred in 2006 and 2007, again spurred by the entry of new companies⁴¹. Unlike in 1998 - 2000, it appears likely that at least some of these new companies will be able to remain important players in the sector.

174. As in Zimbabwe, the sector is struggling to find a regulatory approach to deal with these stresses. Dunavant and Cargill, along with two of the emerging companies and farmers as represented by Cotton Association of Zambia, are pushing for submission by the government to Parliament of the revised Cotton Act, which would create a cotton board with power to regulate the sector but not to participate as a buyer or seller. Also as in Zimbabwe, ginners and buyers would have to abide by specified rules of conduct to be granted a license, and could be subject to fines and seizure of cotton if shown to be involved in the promotion of side selling.

⁴⁰ For more detail, see Tschirley et al. 2006 (forthcoming) and Poulton and Hanyani-Mlambo, background paper on Zimbabwe cotton sector, World Bank, 2007.

⁴¹ A sharp appreciation of the Kwacha from late 2006 through May or June 2007 was also a major factor.

175. A key point which emerges from this review is that concentrated, market-based systems may be unstable, with a recurring tendency to move to a more competitive structure (see Box 3 in Chapter 4). Tipping points may exist, in which the entry of two or three additional companies can dramatically change the prospects of coordination for input supply and extension (and quality control; see next chapter). As the number of players rises, input credit is the first service to suffer, certainly in quality (in Zimbabwe) and also in the number of farmers served (in Zambia). A key question which emerges is whether these systems will be successful in their efforts to establish enforceable rules of the game that ensure good pricing performance (see previous chapter) while safeguarding credit repayment.

6.5. Conclusions

176. Table 10 summarizes the resulting assessment of input credit and extension performance across sector types. Realized performance matches expected performance most closely for competitive sectors and national monopolies; Uganda, which defied expectations for competitively structured systems, did so only by eliminating competition among firms. Concentrated, market-based systems, and local monopolies show the greatest diversity in performance. The former can perform quite well on input and relatively well on extension, but are structurally unstable and thus face periodic credit default crises. The sample of countries includes only one (Mozambique) where local monopolies had existed for a sufficiently long time to allow reasonable assessment. Highly variable performance across concession companies in Mozambique suggests that policy makers must carefully select new investors with an eye toward productivity and quality; affiliates of multinational cotton trading firms have performed best in this regard in Mozambique.

177. A key question that cuts across local monopolies and concentrated systems regards the factors that favor or hinder the emergence of an effective coregulatory approach featuring active collaboration among ginners and farmers, and balanced involvement by government. The hypothesis is that firms are motivated to collaborate both by fear of loss and desire for gain, but that fear of loss may be the strongest motivator.⁴² If this is the case, then concentrated, market-based systems, which provide the possibility of loss through unfettered competition, may provide better prospects for effective coregulatory approaches. This expectation is conditioned by two factors. First, a history of collaborative decision making matters. Second, strong farmer organizations can impose losses on ginners under local monopolies by boycotting or otherwise confronting behavior to which they object. In both regards, countries in WCA are in a better position to achieve effective coregulation under local monopoly set-ups than are countries in ESA.

⁴² See concept of loss aversion in behavioral economics, in which "the disutility of giving up an object is greater than the utility associated with acquiring it" (Kahneman, Knetsch and Thaler 1991).

Table 10: Summary of Input Supply Systems

Country	Current sector structure/ governance	Mechanisms for input credit supply	% of cotton input sourced independently by farmers	Indicators				
				Receiving some cotton input credit	Using inorganic fertilizers	Adequacy/quality of package received on credit	Credit repayment rates	
Mali	National monopoly	In-kind credit by CMDT to farmer cooperatives; relatively little operational involvement by farmers	Negligible	~ 100% cotton farmers, >90% all farmers in cotton zones	~ 100%	Treated seed, urea, compound, pesticides, some herbicides; questions re seed quality and appropriateness of fert rec's	Std. pkg US\$119/ha ("at cost") 35%-45% of mean prod'n value	95%. Fell to 90% as early as 2001
Cameroon	National monopoly	In-kind credit jointly managed & financed by SODECOTON & farmer apex. Decreasing involvement of SODECOTON	Negligible, but reliance on SODECOTON is decreasing	~ 100% cotton farmers, >90% all farmers in cotton zones	~ 100%	Treated seed, urea, compound, pesticides, some herbicides. Little or no adjustment to differing agroeco conditions	Std. pkg US\$123/ha ("at cost") 35%-45% of mean prod'n value	95%-99%. Fell to 90% 2006
Burkina Faso	Local monopoly	In-kind credit by 3 companies to farmers, with some (limited) operational involvement of farmer orgs	Negligible. Intention to transfer task to farmers, but limited progress	~ 100% cotton farmers, 85% of all farmers across whole cotton zone	~ 100%	Treated seed, urea, compound, pesticides, some herbicides. Little or no adjustment to differing agroeco conditions	Std. pkg US\$171/ha 45%-55% mean prod'n value. Seed sold at 55% of cost	95%
Mozambique	Local monopoly	In-kind credit from ginning companies; highly varying quality; negligible involvement of farmer orgs	Negligible	~ 100% cotton farmers, >80% all farmers in key cotton zones	~ 0%	Highly variable across companies. Mix of treated & untreated seed. Some pesticides. Little or no fertilizer	Highly variable. Typically US\$10-US\$30/ha, 10%-20% mean prod'n value. Seed free	Highly variable: 60%-90%
Zambia	Concentrated	In-kind credit from main ginning companies; no operational role to date for farmer orgs	Negligible	~ 100% cotton farmers, 30%-35% all farmers in cotton districts	20%-30% (foliar only, though not just for micro-nutrients)	Treated seed, pesticides (5-6 sprays), some foliar fert for 2-3 main companies; seed & limited pesticides from others	US\$20-US\$30/ha, 10%-20% mean prod'n value; some evidence that sold above market rates	Typically 85%-98%. Falls below 70% during periodic crises
Zimbabwe	Concentrated (becoming Competitive)	In-kind credit from ginners; highly varying quality; main schemes (Cotco, Cargill) highly selective of best farmers, others get mostly poor farmers	Up to 60% early 2000s, now falling	90%-95% cotton farmers (up from 40% early 2000s). 70%-80% of all farmers in main cotton zones	45%, covering nearly 90% of cotton area	Cotco: treated seed, fertilizers, chemicals. Some newer companies only seed and limited chemicals	Cotco \$237/ha, 43% mean prod'n value. Others: US\$50-US\$90/ha, 33%-39% mean prod'n value	90% Has fallen since early 2000s
Tanzania	Competitive	No input credit; passbook system for input supply linked to "forced savings"	% outside passbook: seed 75%, chemicals 50%-75%	0%	1%-2%	(Passbook, not credit) No treated seed; chemical qt's inadeq for full spraying regime (2-3 sprays for most farmers)	Seed US\$1-US\$2/ha. Chemicals variable, depending on passbook entitlement & cash purchases	NA
Uganda	Hybrid (Competitive)	Cash sale by ginners at 50% cost, implicit recovery of subsidy in price	~20% Active secondary market in subsidized chemicals	(subsidized cash sale) ~ 100% cotton farmers	<10%	(Implicit credit) Highly variable, as farmers free to purchase input they wish. All use treated seed. Nearly all use some insecticides	US\$6-US\$8 for most farmers, 6%-18% of prod'n value. <10% uses ~ US\$110, 20% of prod'n value	

Note: Uganda's structure is competitive but its conduct currently is not, due to the regional quota system. It is therefore classified as a hybrid sector.

77 LESS COMPETITIVE MORE COMPETITIVE

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CHAPTER 7: QUALITY CONTROL

178. As discussed in Chapter 2, the fiber characteristics of African cottons are typically superior to the Cotlook A Index. Because it is nearly all hand picked, it is also cleaner and has fewer neps than cottons of most other origins. For these reasons, African cotton could command as much as a US\$0.10/lb premium on international markets if it could develop a reliable reputation for lint uncontaminated with foreign matter. The typology suggests that concentrated and competitive systems will be best able to apply the supply chain management practices needed to achieve this potential premium. We expect competitive systems to show very limited ability to protect fiber quality. Concentrated systems (Zambia and Zimbabwe) should thus achieve the highest quality premiums, while competitive sectors should achieve the lowest. The typology delivers no clear prediction for national and local monopolies, suggesting that performance depends critically on management culture and (in local monopolies) regulatory effectiveness.

179. This section first reviews the typical practices in each study country that affect cotton quality, then develops estimates of key quality indicator for each country: the average realized premium achieved in international markets. It closes by summarizing across sector types and comparing expected to realized performance.

7.1. Quality Control Systems and Performance

180. Cotton production has similar characteristics across Sub-Saharan African countries that impact quality. *Upland* cotton, grown on small-scale farms, is entirely rain fed. Production is labor intensive, using manual or ox-drawn implements and relatively few purchased inputs. All seed cotton is harvested by hand, mostly saw-ginned, and lint is classed through visual and manual inspections. Instrument classing is done on a sample basis. At national level, African cotton is relatively homogeneous in fiber characteristics, due to similar growing conditions and the low number of varieties planted in most countries. However, variability within bales is greater than for developed countries because the production of several farmers can be mixed in a single bale.

181. Prices received by African farmers are based on a visual assessment of seed cotton quality, theoretically on the basis of the grade of lint likely to be produced after ginning. In practice, however, seed cotton grading is generally very lenient. Contamination is often not taken into account and little care is given to the cleanliness of cotton before it reaches the gin. However, there are exceptions to this as some companies do pay attention to quality and contamination. The price of African cottons on world markets is penalized by the way they are marketed and shipped. African lint lacks instrument-classing data for each bale, shipments are less reliable, less homogeneous in quality and packaging, and have longer transit times than those of their major competitors.

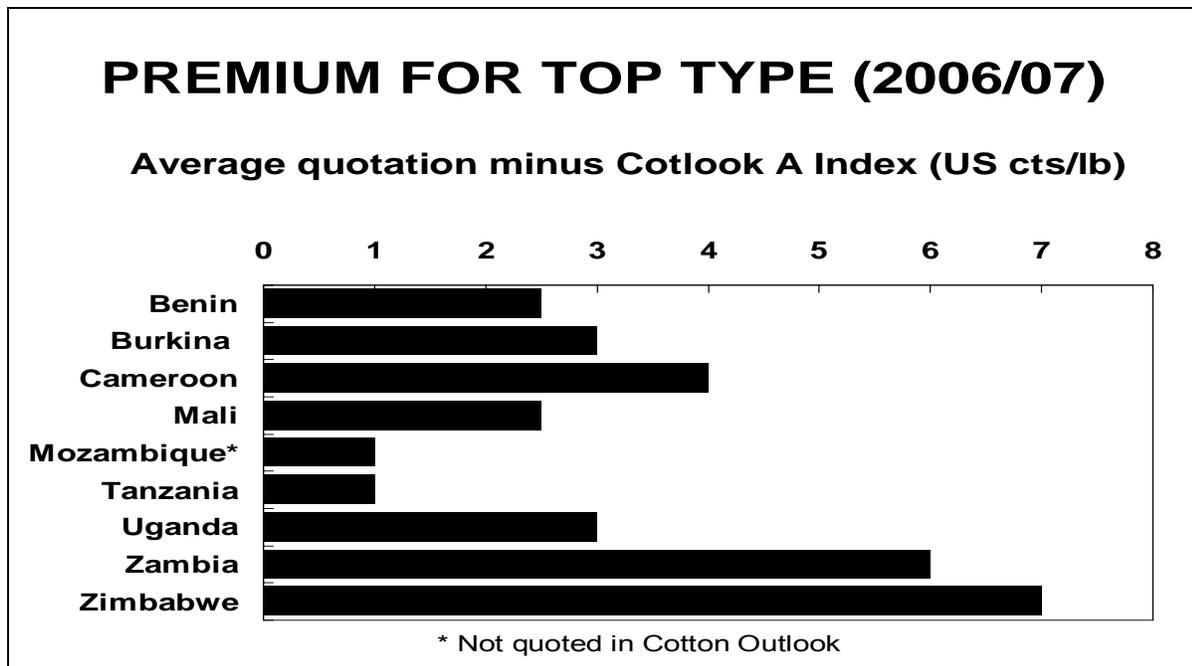
182. Growing fewer varieties in a country makes it easier to maintain homogeneity of quality, though proper controls (as in Zambia) and good classification can ensure good performance even when several varieties are grown. More seed cotton grades is generally good, but only if these are strictly linked to lint classification outcomes. Instrument testing is increasingly important in the global lint market but is rarely used in Africa. International cotton merchants put great importance on the reliability of lint classification in a country, independent of the actual quality

of the lint; lint that is typically high quality but not reliably classified will not earn the premium that it otherwise would. Longer staple length is always good, and 1-1/8” is a typical benchmark. Contamination is crucial in pricing, and a reputation for high contamination is difficult to overcome.

7.2. Impact of Quality on Export Prices

183. Because there are no major differences in basic fiber parameters between African cottons, price differentials between different origins primarily reflect their level of contamination (real or perceived). In 2006/07, the average premium of the quotation for the top type of each country in Cotton Outlook over the Cotlook A Index ranged from 1 to 7 cents per pound, with Zimbabwe and Zambia receiving the highest premium and Tanzania and Mozambique the lowest (Figure 7).

Figure 7: Estimated Premium for Top Type of Lint during 2006/2007, by country



184. Since the mid-1990s, premiums increased in Zambia (+5 cents/lb), Cameroon (+4.5 cents/lb), Mozambique (+2 cents/lb), and Burkina Faso (+1 cent/lb). None of those cotton sectors belongs to competitive systems. Progress made in Zambia and Cameroon is clearly due to the successful reduction in contamination and stickiness, which would have been difficult or impossible to achieve in a competitive system. In contrast, differentials vis-à-vis the Cotlook A Index declined by 1.5 cents/lb in Tanzania, 1 cent/lb in Uganda and Zimbabwe, and 0.5 cents/lb in Benin and Mali. The declines reflect increased competition between ginners in all three ESA countries, and lax seed cotton grading and contamination due to poor management in the two WCA countries.

185. The premium paid to the top types in each country does not necessarily reflect the overall effectiveness of quality control in these systems, because it does not indicate the share of those types in total production. Calculating an average realized price – which would more accurately

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reflect the success of quality control in the sectors -- requires data on the share of each type in total production and the premium received by each of these types. Such data are exceptionally difficult to obtain. Therefore a theoretical average quotation by country⁴³ is calculated based on the following data:

- Average premium for the quotation of the top type, as shown in Figure 7,
- Usual world market price differences for grade compared to middling, as follows: Good Middling +1.5-2.5 cents/lb; Strict Middling +0.75-1.0 cents/lb; Middling +0 cents/lb; and Strict low middling minus 0.5-2.0 cents/lb
- Usual world market price differences for staple length, relative to 1-3/32":
 - 1-5/32" +1.5-2.0 cents/lb
 - 1-1/8" +0.5-1.0 cents/lb
 - 1-3/32 +0 cents
 - 1-1/16" minus 1.75 to 4.0 cents/lb
- Actual 2005/06 classing data for WCA countries and most recent available data or estimates for ESA countries.

186. To calculate the theoretical average export price of the crop, a deduction of one cent per pound is applied to the weighted average quotation to reflect the usual difference between the seller's offering price and the actual negotiated contract price. Based on these calculations, theoretical weighted average export price differentials compared to the A Index range from – US\$0.02/lb to + US\$0.04/lb (Figure 8).⁴⁴

187. Zambia's concentrated sector stands out as the outstanding performer. Zimbabwe also looks good, but this is at least in part a legacy of the past outstanding performance delivered by the national monopoly, followed by the concentrated system through 2001. The country's premium would have been substantially higher five years ago, prior to the entry of new firms, and is likely to fall over the next 2-3 years if quality control measures are not improved. The effect of Tanzania's competitive system is clearly seen in the 2 cent/lb discount that its cotton receives; Uganda, with a competitive structure that is heavily regulated to eliminate direct competition for cotton, does better, though some of this difference is due to the larger share of roller ginned cotton in that country. Mozambique's poor performance reflects the legacy of a nearly unregulated local monopoly system with original concession companies uncommitted to productivity and quality; while quality is likely better among the newer affiliated ginners (Dunavant, Plexus, CNA/Dagris), it will take time for them to overcome the country's poor reputation.

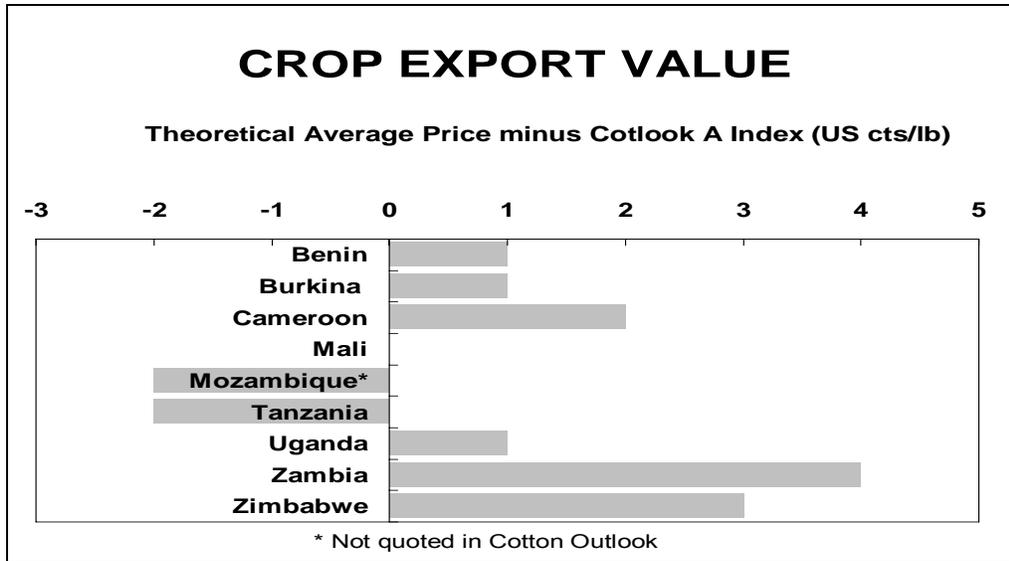
188. WCA's performance is quite variable but generally lies between the extremes of Zambia and Tanzania/Mozambique. Cameroon may show what a national monopoly can do when political interference is kept to a minimum. Mali's zero premium is unimpressive when one recalls that its

⁴³ Assuming that the whole crop was sold on a given day.

⁴⁴ Actual season-average contract prices can be different from the above theoretical averages depending on the timing of sales. In addition, final average realized prices can be different from the contract prices depending on the actual quality and weight shipped and on eventual claims. Nevertheless, these calculations represent the current best estimates of average market quality premia earned by each sector.

fiber characteristics – like nearly all fiber coming from Africa – are superior to the A Index. Unlike Cameroon, political interference likely has played some role in this poor performance.

Figure 8: Estimated Premium Weighted Average Basis - by country, US cents/lb



7.3 Conclusions

189. Overall, quality performance is remarkably consistent with the expectations generated from the typology: Zambia’s concentrated system delivers the best performance, comparable to what Zimbabwe delivered prior to the entry of new competitors. Zimbabwe’s premium is still high, but falling as a result of increased competition. Cameroon, with a national monopoly largely free of political meddling, also performs well, though not up to the standards of Zambia. The other national and local monopolies show highly variable performance, while Tanzania’s competitive system is, along with Mozambique, the worst quality performer.

Table 11 summarizes available quality information for each country in this study. Growing fewer varieties in a country makes it easier to maintain homogeneity of quality, though proper controls (as in Zambia) and good classification can ensure good performance even when several varieties are grown. More seed cotton grades is generally good, but only if these are strictly linked to lint classification outcomes. Instrument testing is increasingly important in the global lint market but is rarely used in Africa. International cotton merchants put great importance on the reliability of lint classification in a country, independent of the actual quality of the lint. Lint that is typically high quality but not reliably classified will not earn the premium that it otherwise would. Longer staple length is always good, and 1-1/8” is a typical benchmark. Contamination is crucial in pricing, and a reputation for high contamination is difficult to overcome. All of these factors contribute to the average premium a country is able to earn over the A Index; these estimates are presented in the final column of the table, and discussed in more detail in the next sections.

Table 11: Summary Information on Quality Control Mechanisms and Results in Study Countries

	Sector Type	# of varieties	# seed cotton grades	Strictness of Seed Cotton Grading	Share of lint classed by instrument testing	Classification rating	Share of lint classed $\geq 1-1/8''$ and above	Reputation for contamination	Overall reputation and trend	Est. weighted avg premium over A Index (US cts/lb)
Cameroon	National Monopoly	2	2	Strict	0%, but micronaire tests for each bale	Good	65%	Among most affected by stickiness but improving sharply	Good, improving (entered fine cotton market segment)	+2
Mali	National Monopoly	2	3	Very lax	6%	Average	98%	Among the most contaminated	Average, improving	+0
Burkina Faso	Local Monopoly	3	3	Lax	N/A (sample basis)	Good	80%	Moderately contaminated and improving	Good, improving	+1
Mozambique	Local Monopoly	8	2	Lax	0%	Poor	15-20% (est.)	Moderately contaminated	Poor, possibly improving	-2
Zambia	Concentrated	3	3	Strict	70%-80%	Very good	70-80% (est.)	Very good	High and improving	+4
Zimbabwe	Concentrated (becoming competitive)	2	4	Very lax	N/A (sample basis)	Mixed	70-80% (est)	Moderately contaminated	Has fallen sharply since 2002	+3
Tanzania	Competitive	1	2	Very lax	N/A (sample basis)	Average	30-40% (est.)	Among the most contaminated	Poor, fell since reform	-2
Uganda	Hybrid (competitive structure)	1	2	Very lax	N/A (sample basis)	Average	93%	Among the most contaminated	High but much lower than in 1970s	+1
Benin	Hybrid	1	2	Lax	5%	Average	76%	Moderately contaminated	Good but irregular	+1

Sources: SONAPRA, SOFITEX, SODECOTON, CMDT. IAM, TCA, CDO, DUNAVANT, C. Poulton, International Traders

CHAPTER 8: VALORIZATION OF SEED COTTON BY-PRODUCTS

190. As pointed out in Chapter 2, by-products derived from the processing of cotton seeds have growing markets and represent an important complementary source of revenues for cotton sectors in Africa. According to standards worldwide, 20 to 25% of the total value of the seed cotton can come from the by-products (cottonseed oil and cake). However one stark finding in this study is that the markets for these products are not well developed in Africa, valorization is generally sub-optimal if not low, and farmers are generally not getting the full returns from the processing of cotton seeds.

8.1. Structure and Organization of Oil Sectors

191. There are important differences in the organization and performance of the oil sectors across the study countries. The differences in organization exhibit some parallels with the differences in organization across the cotton sectors. However, as the organization of the oil sector is not the major focus of this report, it will only be discussed briefly. Meanwhile, differences in the performance of oil sectors have important consequences for the profitability and competitiveness of the national cotton sector.

192. Table 12 below shows considerable variation in the number of cottonseed oil processors across the study countries. There is no domestic industry in Mozambique (where demand for cake is extremely limited), a monopoly in Cameroon, a dominant price-setter in Mali and Burkina, and an increasingly competitive market in some of the other countries. In terms of vertical relationships, there is a wide spectrum from full integration with cotton ginning (Cameroon, most cotton oil processors in Tanzania, three new companies in Zimbabwe), through various forms of vertical coordination (SN SITEC in Burkina, larger companies in Zimbabwe) to market relationships.

193. Transaction cost economics (Williamson, 1985) can provide some insights into the varying vertical relationships observed. In an African context, large-scale processing equipment for high quality oil (deodorized, neutralized, cleaned, and gossypol removed) is a fairly specific asset. Here, either vertical integration or coordination could strengthen the incentives for investment in oil processing. Thus, in Zimbabwe three large-scale oil processors have maintained close relationships with the two largest cotton companies through regular interaction on the National Cotton Council (NCC)⁴⁵. By contrast, outside of WCA and Zimbabwe, processing operations are much smaller scale and often produce oil of a lower quality. Many of the new processing plants being installed in Tanzania, Zimbabwe, Mali and Burkina use low-cost Indian equipment. For such plants, relying on spot market purchases of seed represents only a modest risk.

194. However, the main factor explaining observed variations in sector structure is not the techno-economic attributes of different types of processing equipment, but policy choice. Until the 1990s, in WCA countries vertical integration of large-scale oil processing within the parastatal cotton company was part of the development model for the national cotton sector. In subsequent years, an early part of the reform process has been the privatization of the oil

⁴⁵ For some years the NCC was chaired by a representative of one of the oil processors, ensuring that sector policy protected their interests, as well as that of ginners and producers.

processing enterprises. These privatizations have rarely followed an open and transparent process, however. In Mali, a private processing monopoly, Huicoma, was created that delivered very poor performance. Huicoma is also now in dire financial straits, so smaller operators are entering the market in competition. In Burkina Faso, the French company DAGRIS, a shareholder in the main cotton company SOFITEX, is also the majority shareholder in the main private oil processor. Cameroon, the one country in the sample where significant reform of the cotton sector has so far been limited, is also the one country where the integration of ginning and oil processing has remained intact. Here, though, oil processing is managed in an entrepreneurial manner and contributes to the overall stability of the cotton operation.

195. In ESA, where the cotton market has been liberalized since 1994/95 (earlier in the case of Mozambique), oil processing is entirely in private hands. Given the small proportion of national edible oil consumption that cotton oil supplies in these countries (Table 12), cottonseed oil processing has limited strategic importance. As a general rule, where multinational trading companies have invested in cotton production in these countries, they have shown little interest in cottonseed processing, the volumes of oil available being too small for companies that are primarily interested in international markets. Oil processing has thus been left to domestic and/or Asian entrepreneurs.

196. In Tanzania the first private oil processors entered the cotton sector soon after liberalisation as a way of guaranteeing access to seed supplies. More recently they have been followed into oil processing by several of the cotton ginners, although it is not clear from our information gathering whether these ginners are primarily seeking to stabilize the price that they realize from their seed (see the recent price fluctuations reported in Table 12) or responding to the attractive profits obtained by the existing oil processors.

197. In Zimbabwe, investment in similar oil processing equipment by Indian- and Tanzania-owned cotton companies has been observed in the past couple of seasons. This is a response to a national shortage of edible oil – part of the ongoing economic crisis in the country. Until 2000 the three established oil processors supplied around 80% of national oil requirements using a blend of soya oil and cottonseed oil in roughly equal proportions. With the onset of the fast track land redistribution programme, however, soya production contracted rapidly, whilst cotton production has also recently been lower than it was in 1999-2001. The shortage of local raw materials has been compounded by a lack of foreign exchange for either imported materials or edible oil. There are thus attractive profits to be obtained by those who control the supply of scarce cotton seeds.

198. In general in Africa (except possibly South Africa) farmers do not own the cottonseed. To "own the cottonseed", farmers need either to own ginneries or to toll gin. The latter option is easier, but still requires significant volumes per consignment – hence a degree of farmer organization that is lacking in most countries. Farmers also need to be free of obligations to cotton companies; hence able to finance their own production without company credit. However in Zimbabwe a company started setting up an operation as a toll ginner (see box 3 below). Even if this experience lasted only a few years, it indicates that some of the obstacles mentioned above could be overcome in the future and that new ways of doing business could emerge.

Box 3: Toll ginning experience in Zimbabwe

In Zimbabwe Cottrade offered a brokerage service for farmers during 2000-04, whereby they arranged toll ginning contracts and assistance with the sale of both lint and seed, for a 2% commission. With the exit of commercial farmers, they tried to work with groups of smaller producers. In the years when Cottco and Cargill failed to pass on the benefits of exchange rate depreciation onto producers, organized producers could get much more money via Cottrade than through normal channels. However, few were sufficiently organized and/or could produce the necessary volumes without company credit. In 2004 the exchange rate changed back and the gap between what farmers could achieve through Cottrade and normal channels narrowed significantly. This seems to be what persuaded Cottrade to cease brokerage operations, but lack of progress with farmer organization may have been a contributory factor. In 2006 Cottrade began operating more as a “traditional company” in Zimbabwe, purchasing seed cotton and processing it.

8.2. Performances of Oil Sectors, Seed Pricing and Returns to Farmers

199. For the purposes of the current study, a key performance indicator for the oil sector is the price that ginners pay for cotton seed. Given the competition from imported palm oil in all the study countries, one would expect the main determinants of the cotton seed price to be:

- Whether or not the country is landlocked (a major determinant of the overland transport cost incurred by imported palm oil). Note that this partially compensates ginning companies in landlocked countries for the high f.o.t. – f.o.b. costs that they incur when exporting their lint.
- The level of tariff protection (if any) offered to domestically produced edible oils. In Benin, Burkina and Mali, a common external tariff of 5% applies to edible oil imports. However, not only do some smuggled oil imports avoid this tariff; they also avoid the 20% VAT that is applied to domestically produced oils. Thus, domestically produced oils are at a net disadvantage when compared with these smuggled oils.
- Whether or not oil processors are able to brand cotton oil, so as to raise its price above that of imported palm oil.
- The quality of oil produced, insofar as this reflects the degree of processing. Discussions in Tanzania suggested that it could cost twice as much to produce high quality oil (deodorized, neutralized, cleaned, and gossypol removed) as to produce a semi-refined oil.
- The strength of demand for cotton seed cake from the domestic livestock industry
- The efficiency of the oil processing sector.

200. Table 12 shows the cotton seed prices paid by oil processors in the nine study countries in 2006. This shows that the price paid in Zimbabwe was more than twice the price paid in Burkina (the lowest recorded within the group). This degree of variation cannot be justified by economic fundamentals. We observe the following:

- i. Firstly, landlocked countries in ESA (Zimbabwe, Uganda and Zambia) record high prices for seed, as expected. In Zimbabwe the observed price is exacerbated by the national oil shortage.
- ii. Secondly, coastal countries (in both ESA and WCA) record modest prices for seed, again as expected. A range of US\$55-63 per ton is observed, with Benin the highest, followed by Cameroon. However, as noted in Table 12, the price in Tanzania can go well above this price range when seed supplies are limited.
- iii. Thirdly, it is more difficult to brand cotton oil as a superior product (commanding a price premium over imported palm oil) when it accounts for the majority of the total oil

market than when it accounts for a much smaller share. Within the four WCA countries, the only one where cotton oil has been successfully branded and promoted in this way is Cameroon. Likewise, in Tanzania some of the early private oil processors have established brands that are well known within the cotton growing regions around Lake Victoria. Here cotton oil is preferred over palm oil for the frying of fish and local doughnuts, because it burns at a higher temperature.

- iv. Fourthly, demand for cotton seed cake from the domestic livestock industry is much stronger in the Sahelian countries (Burkina and Mali), plus possibly Zimbabwe⁴⁶, than in the other countries in the sample. In the Sahelian countries, cake is sold for around FCFA 50 per kg (US\$0.1 per kg) ex-factory, which makes the value of cake about half that of oil (given a cake out-turn of 80% per kg of seed processed).
- v. Fifthly, oil produced by the established companies in the four WCA countries plus Zimbabwe is of a higher quality (and with commensurately higher processing costs) than that produced in Tanzania or by the newer companies in WCA and Zimbabwe.

201. Taking these observations together, the clear outliers in terms of cotton seed pricing are Burkina and Mali. Both are landlocked and exhibit strong demand for cotton seed cake, but in 2006 seed prices were only US\$44 and US\$50 per ton respectively. We note that the retail oil price in Burkina is also low for a landlocked country and this may reflect the impact of oil smuggled in through Togo. However, in both Burkina and Mali, the fundamental problem appears to be monopsony power. In Mali, where there the privatization of the parastatal processor has already been commented upon, even US\$50 per ton was an improvement over the price paid in the previous two years. In Burkina the privatized ex-parastatal SN SITEC still accounts for around two thirds of seed purchases and acts as a price leader. The ten smaller new entrants should eventually make a difference to the seed price, but currently do not appear to account for enough of the market (or have enough working capital) to push the price up significantly.

202. Overall, we observe a limited, but variable, degree of development of domestic oil and cake markets. From the perspective of cotton ginners, the main problem observed is the monopsony power exercised by oil processors in Burkina and Mali, as well as a lack of transparency and contestability on the transfer price of cotton seeds established through long-standing arrangements between the cotton company and the oil processor – the latter often a subsidiary of the former – officially justified by the need to protect domestic industries. Nevertheless oil consumers may gain at the expense of seed cotton producers in Burkina.

203. Given the often tight margins obtainable from lint production, more research is worthwhile on measures to improve the efficiency of the markets for oil and cake. Based on crude estimates of oil processing costs, there are reasons to believe that many of the observed seed prices could be raised by additional competition. On the consumer side, this does raise a quality issue: oils from newer, smaller processing units are typically less refined than oils from larger, established companies. However, as long as basic food safety requirements are met, it may well be that a significant proportion of poor consumers would willingly accept a lower quality oil if its price was also lower. In this regard, there would appear to be parallels with the liberalisation of maize markets in ESA in the 1980s, leading to rapid new entry of small-scale hammer mills in competition with established, large-scale roller mills (Jayne et al. 1995).

⁴⁶ Demand for cake in Zimbabwe would certainly have been strong in the 1990s, when a strong commercial livestock industry existed.

204. The other major challenge for the regulation of liberalizing oil markets is the enforcement of tariffs and other taxes on imported oils.

8.3. Summary

205. With the importance of by/co-products increasing fast, we can expect to see changes in institutional structure in many countries where the number of farmers is large and/or where they have reasonable organization capacity and independent access to finance, as opposed to simply sell seed cotton to ginneries as they currently do. In this area, African sectors could lag.

Table 12: Cottonseed Production and Processing in Study Countries

	Benin	Burkina	Cameroon	Mali	Mozambique	Tanzania	Uganda	Zambia	Zimbabwe
Average national seed cotton production (tons) 2001-06	339500	557833	242966	488281	72178	235000	78410	160000	246350
Cotton oil production as % of national oil consumption ^a	53%	57%	18%	50%	6% (potential)	8%	4%	20%	27%
Number of cotton oil processors (2006)	2	11	1	2	0	13+	4	3	6+
Retail price of oil (US\$/l) 2006-07	-	0.95	1.28	-	-	0.83 ^b	-	1.29	1.55
Seed price (US\$/ton) 2006	63	44	59 ^c	50	55	27-117 ^d	86	71	95
Landlocked	no	yes	no	yes	no	no	yes	yes	yes

Notes:

a – this is estimated from the quantity of seed available for crushing (2001-06 average), after subtraction of seed retained for redistribution to farmers, using an oil outturn of 18% and an average oil consumption of 7kg per person p.a.

b – Tanzania figure is wholesale price, so estimated retail price = US\$ 1.00-1.08 per litre

c – This is the accounting price recorded within the integrated company.

d – US\$27 per ton is lowest price reached in 2005 (bumper harvest), whilst US\$117 per ton is highest price reached during 2006 (drought year). Average figure is not available, but some respondents reported that a "normal" price would be in the order of US\$50.

CHAPTER 9: COTTON RESEARCH

206. Farm-level productivity gains are clearly important for Africa's cotton sectors to improve international competitiveness and contribute more effectively to poverty reduction. The next chapter shows that while world average yields for rainfed cotton production have increased by more than 150 percent over the past 25 years, yields in Africa over the same period have been essentially flat. Within Africa, average yields in ESA have risen modestly while those in WCA have declined, notably so in the case of Mali. There is also a high level of variation in productivity among African cotton farmers. The most pg60

207. roductive are able to achieve cotton yields close to or even above the world rainfed average, suggesting that the main cause of low average yields in Africa is the inability of the majority of farmers to access or use existing technology packages effectively. This raises important resource allocation choices between efforts to close the yield gap between more and less efficient cotton farmers using *existing technology* versus evaluation and transfer of *alternative technologies* that a higher proportion of African farmers could use effectively.

9.1. Cotton research organization and performance

208. Like the evolution of cotton sectors, research on cotton production has deep historical roots as well as being influenced by recent reform processes. The overview below starts with the organization of cotton agricultural research, then looks at human and financial resources, followed by the internal and external linkages between research and other actors, and finally the outputs and utilization of research products. Even this brief review indicates that research could play a much more effective role in improving cotton sector competitiveness than appears to be the case currently.

209. Agricultural research in Africa is overwhelmingly funded from the public sector and at much lower levels than developed countries relative to its contribution to GDP. Growth in agricultural funding in Africa slowed dramatically in the 1990s compared to previous decades even as numbers of researchers increased.⁴⁷ The organization and financing of cotton research depends very much on the historical context at both regional and country levels. In francophone WCA, cotton research reflects a long history of investment by the French former cotton research institute (IRCT) with co-financing at country level by the former cotton parastatal (CFDT) and good information exchange among researchers in the region. The history of co-financing of cotton research by cotton companies in francophone countries continued after independence, often supplemented by development loans or grants, as cotton was seen as an "engine of development" that enabled the capitalization of smallholder farming. Some Anglophone WCA countries also followed this example after independence.

210. In contrast to francophone Africa, Great Britain focused its colonial era research investments in regional commodity research programs (Beintema and Stadt, 2006), but cotton was not among them. Instead, individual colonies were left to finance cotton research through industry levies where cotton was an important crop for the economy. Current research structures and regional linkages still reflect these historical patterns.

⁴⁷ For a recent and thorough review of agricultural research in Africa see Beintema and Stadt (2006).

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211. The persistence of the parastatal monopoly model of cotton sector management in WCA countries has clearly contributed to organizational stability for cotton research when compared to ESA. Most cotton research programs in the WCA region continue to be organized along disciplinary lines with variety, pest control and agronomy sub-programs. The heavy involvement of parastatals in cotton research funding in WCA is also reflected in the breeding focus on varieties with higher GOT ratios that lead to improved ginning margins. The main organizational change in recent years has been an increasing move to joint financing of research by all stakeholders through the inter-professional organizations set up in response to the financial crises encountered in recent years. Cotton researchers in the ESA region have experienced more turbulent times as a result of cotton sector liberalization and reform processes, yet private companies have often been proactive in working with the relatively smaller public sector programs to introduce new varieties. In Zimbabwe, a private sector seed company is financing its own research program.

212. In terms of human and financial resources, cotton research programs in WCA case study countries range from 9 to 25 research staff with annual budgets varying from \$300,000 to \$500,000 per year. Similar to publicly funded agricultural research in general, researchers often complain that high fixed costs, in part related to high support staff levels, often do not leave sufficient operational resources for field research activities. Research programs in ESA case study countries are smaller than WCA in absolute terms (ranging from 3 to 11 research staff) but not in proportion to production by the cotton sector. Like WCA, there is a high degree of variability among countries in the ESA region with Zimbabwe having the largest and Mozambique having the smallest number of researchers. In virtually all countries research plays an important role in basic seed multiplication. Few research programs (Burkina Faso and Mali are exceptions) appear to integrate a socio-economics component on a systematic basis.

213. Internal and external linkages play an important role in the effectiveness and impact of agricultural research. Internal linkages refer to linkages among national stakeholders, and in particular institutional linkages between research and extension as well as direct contact between researchers and company and farmer clients. In virtually all countries there has been a trend to smaller extension-farmer ratios, with a high level of extension worker effort devoted to input delivery and credit management activities. Mechanisms for articulating demand to researchers, and exacting accountability from them, appear to have weakened in the process of parastatal restructuring or liberalization. External linkages that could leverage country level research resources, particularly regional research networks, are non-existent or weak. ASARECA has no cotton research network while CORAF/WECARD has recognized the need to rejuvenate cotton in its strategic plan. Reports of the ICAC tri-annual international research meetings indicate that participation by African researchers is very limited.

214. Given the limited resources invested in cotton research, and weak linkages among researchers in different countries, it is not surprising that research is underperforming relative to its potential contribution. Nevertheless, as can be seen in Table 13, several ESA countries have recently released varieties or have varieties in the pipeline that should help close the productivity gap. WCA countries, by contrast, made many varietal introductions in the 1980s and early 1990s, but the rate of introduction of new cultivars has slowed in the past decade. In both sub-regions a more complex set of quality parameters now have to be taken into account in variety selection as discussed in Chapter Seven.

Table 13: Varietal release rates in selected WCA and ESA countries

	Cumulative Number of Varietal Releases Over Time		
	5 Years	10 Years	20 Years
Burkina Faso	1	1	10
Cameroon	1	2	7
Mali	4	6	27
Mozambique ⁴⁸	0	0	0
Tanzania	0	0	1
Uganda	0	3	6
Zambia ⁴⁹	1	1	1
Zimbabwe	2	4+	8+

Source: Country case study reports

215. In addition to varietal development, a great deal of effort has gone into the development of Integrated Pest Management (IPM) and pest scouting methods to reduce costs and pest resistance build up. Unlike varieties, where companies can enforce adoption, uptake of IPM methods by farmers has tended to be slow despite potential increased returns to adoption. Other crop management innovations have met with greater success in terms of adoption. The use of organic fertilizer in Mali and the rapid uptake of herbicide application and direct sowing in Cameroon are examples of emerging success stories. The variable success rate in terms of adoption of different technologies indicates the need for greater integration of social scientists in on-farm testing and early adoption studies.

9.2 Conclusions

216. Chapter 12 of this report identifies some specific opportunities where research could potentially contribute to improved long run competitiveness and sustainability of cotton in Africa.

⁴⁸ Two new varieties have been introduced in the last five years with support from the Mozambique cotton institute (IAM) in collaboration with ginning companies but they were not officially released by the research system.

⁴⁹ In addition to the one variety released up to six promising varieties are in the pipeline.

SECTION IV: COMPARATIVE ANALYSIS: OUTCOMES

CHAPTER 10: YIELDS AND RETURNS TO FARMERS

10.1. Cotton yields

217. Cotton yields on farmer fields are clearly an important determinant of sector competitiveness and its impact on poverty reduction. In this section we focus on yield trends in a global and regional context, factors underlying those trends, and their relationship to different ways of organizing the cotton sector. When comparing across sector types, it is helpful to consider both average yields and yield trends. Chapter Four's typology suggested that average yields will be strongly influenced by performance on input provision and extension (expected to be best in monopolies and concentrated sectors), but will also depend heavily on past investments, especially in research.

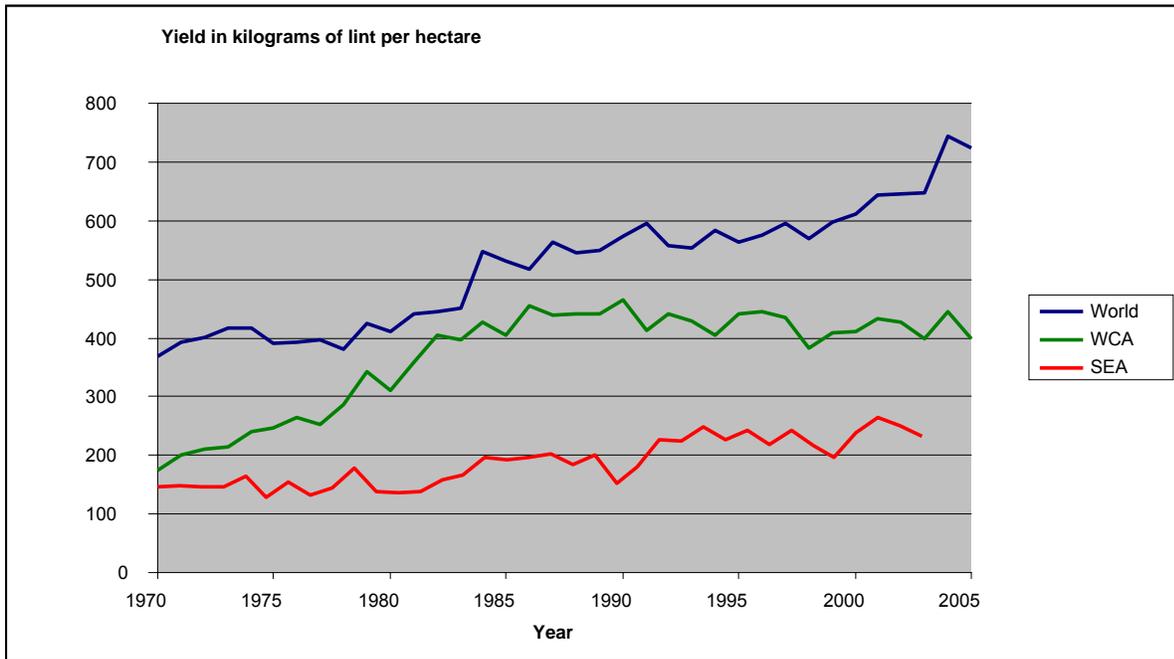
10.1.1. Cotton Yields in a Global Context

218. World cotton yields expressed in lint equivalent have increased from an average of 300 kg per ha in the early 1960s to more than 700 kg per ha in 2005, equivalent to a 1.9 percent annual increase (Figure 9). Yields in WCA increased at an annual rate of 5 percent until the early 1980s, reaching about 450 kg/ha at that time, mainly in response to the introduction of fertilizer (a characteristic in all cotton producing WCA countries). Yields in this region have, however, stagnated or even declined slowly over the past 20 years⁵⁰. Yields in ESA have been increasing at the same rate as the world average since the early 1970s, albeit from a very low base. Average yields in ESA today are slightly more than one-half the WCA average and one-third the world average.

219. To understand the factors underlying long-term yield trends, we must first distinguish between irrigated and rainfed production systems. Africa's cotton is almost entirely rainfed, while world average yields reflect the fact that 55 percent of cotton is produced under irrigated conditions. Though average yields under irrigation are much higher than under rainfed conditions, worldwide yield growth has been much greater in the latter: average yield in rainfed cultivation has more than doubled over the past 25 years, growing 3.9 percent per year, while yield in irrigated systems has increased by only 60 percent, or 1.8 percent per year (Figure 10). Yet Africa has not seen this kind of growth in its rainfed yields: ESA yields have risen only about 2.1 percent per year, while WCA yields have stagnated or declined. As a result, while WCA yields were well above world average rainfed yields in 1980/81, the rest of the world's rainfed cotton production systems have now caught up with and overpassed WCA. What has been driving these divergent yield trends?

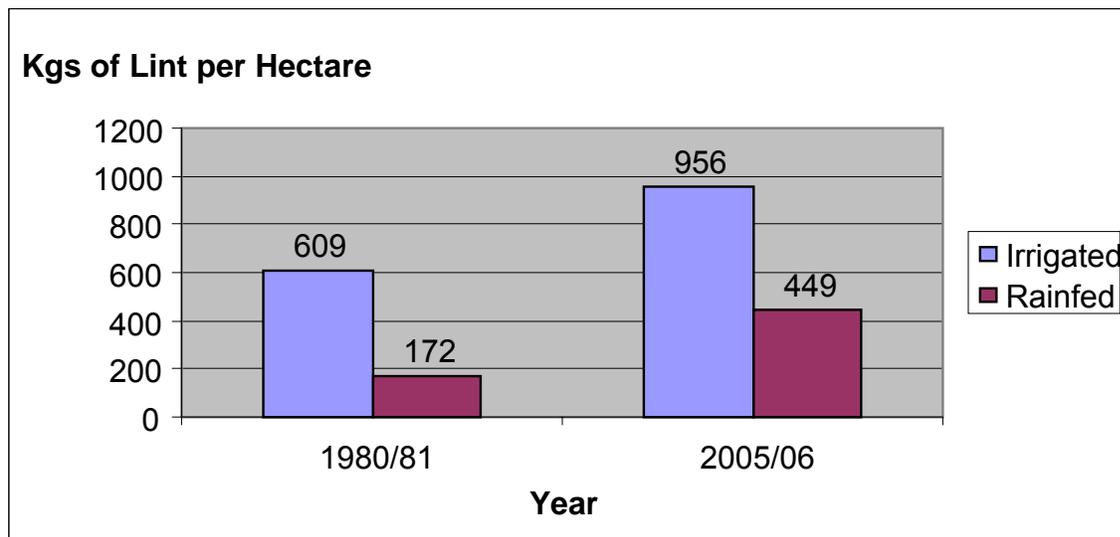
⁵⁰ Yields in Mali, Benin, Burkina Faso, and Chad have all followed this general pattern, though Chad's yields have remained below the others.

Figure 9: Cotton Yield Trends in World, WCA and ESA (1970-2005).



Source: Authors

Figure 10: Average Worldwide Yields of Irrigated and Rainfed Cotton



Source: Authors

10.1.2. Evolution of Cotton Yields in WCA and ESA

220. Declining cotton yields in WCA are commonly explained by the following factors: (1) declining fertilizer use, partly due to a reallocation to food crops, (2) decline in the number of insecticide applications, resulting in higher infestation levels and increased resistance of pests to insecticides, (3) problems with seed quality, often quoted as a reason for declining yields in interviews with farmers (Mali 2007), and (4) degradation of soil fertility due to continuous cultivation and inadapted fertilization formulas. These factors are discussed further in section 10.2.

221. Country average yields over time mask variation within countries due to spatial and socioeconomic factors. In Benin, for example, during the 2001/02 cropping season, yields ranged from 810 kg per ha in the south to 1,318 kg per ha in the northern region, due primarily to the introduction of a more productive variety in the north. Spatial factors linked to climatic and soil conditions also contribute to large differences in yields between southern and northern Cameroon (670 kg per ha and 1,500 kg per ha, respectively). In both regions, yields have declined following the reduction of fertilizer subsidies. The role of socioeconomic differentiation can be illustrated by Mali, where household seed cotton yields range from 1,090 kg per ha with manual cultivation to 1,259 kg per ha for farms equipped with their own animal traction (2002/03). The role of socioeconomic differentiation is discussed in more detail later in this chapter.

222. Figure 11 illustrates differences in cotton yields (lint equivalent) among the major ESA cotton producers, based on a 20-year average. ESA country averages are well below world and WCA levels, and vary by a factor of more than two between Uganda (lowest) and Zimbabwe (highest). Most cotton sectors in ESA are based on a low input/low output system. For example, outside Zimbabwe virtually no fertilizer is applied by ESA cotton farmers, who benefit from better soils than those in WCA. There is generally a higher inter-annual yield variability among ESA countries due to climatic events than in WCA.

223. The steady yield improvement in ESA is due to improved varieties and, in some countries, improved input use. Zambia provides the best example of a steadily upward yield trend since liberalization; the input distribution and extension efforts of the two dominant companies are the main reasons for this. However, ESA has not seen rapid increases in productivity like those seen in India, Pakistan, and China, where GM cotton varieties have been introduced.

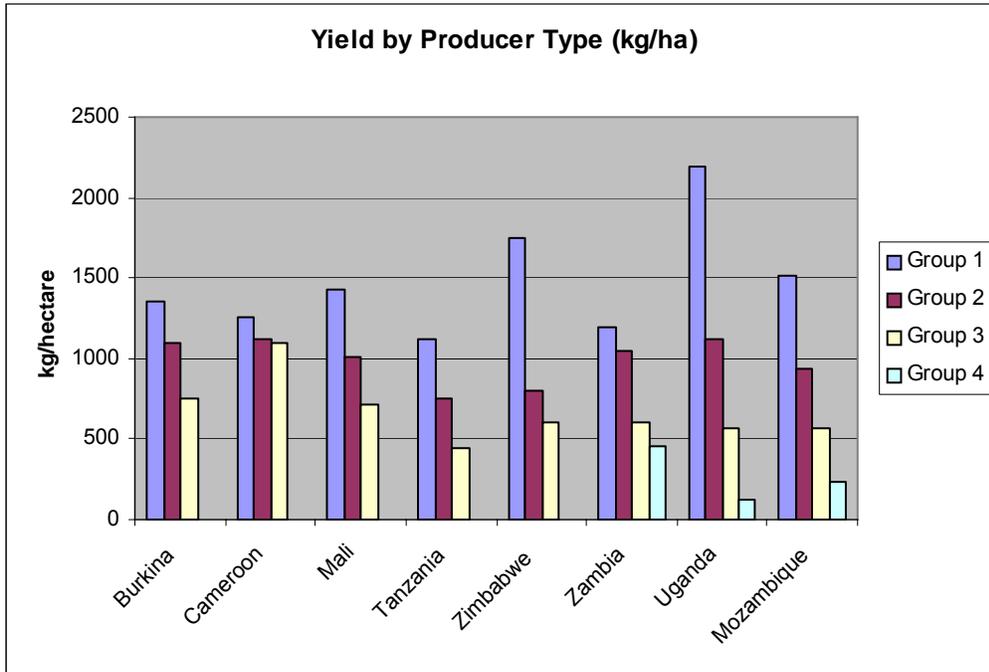
10.1.3. Yields by Farmer Type

224. In order to assess performance of different categories of farmers, focus group discussions were undertaken as part of this study in seven of the nine study countries (all except Cameroon and Benin). Respondents were asked to group farmers in their area according to volumes of production. Generally speaking, the groups can generally be thought of as “large” – Group 1, “medium” – Group 2, “small” – Group 3, and “very small” – Group 4, although what constitutes each category varies by country context. Additional details about the methodology of this research, and its limitations, can be found in Appendix A. A key insight emerging from the farmer group interviews concerns the variation in yields across groups within individual countries, which are at least as great as the variations across countries. These are shown in Figure 12.

225. There are two main causes of this inter-group variation.

- Differential access to inputs is an important factor in ESA, but much less so in WCA. Largely as a result, the variation in yields across groups is less pronounced in WCA than in ESA. The average ratio of yields (top group:bottom group) in the three WCA cotton sectors is 1.65, compared to 6.4 in the five ESA sectors.
- Differential ownership of assets, of which the most important are arguably oxen and plowing equipment. Households that own their own animals and ploughs can prepare their land as soon as the rains begin, thus permitting both timely planting (a prerequisite for good yields) and the cultivation of larger areas of land. We also note that larger producers tend to have either the family labor or the working capital to hire labor in a timely fashion. The poorest farmers are often caught in a food insecurity trap, which causes them to prioritise hiring out their labor for immediate cash income over the timely performing of cultural practices on their cotton plots.

Figure 11: Variation in Yields Across Farmer Groups



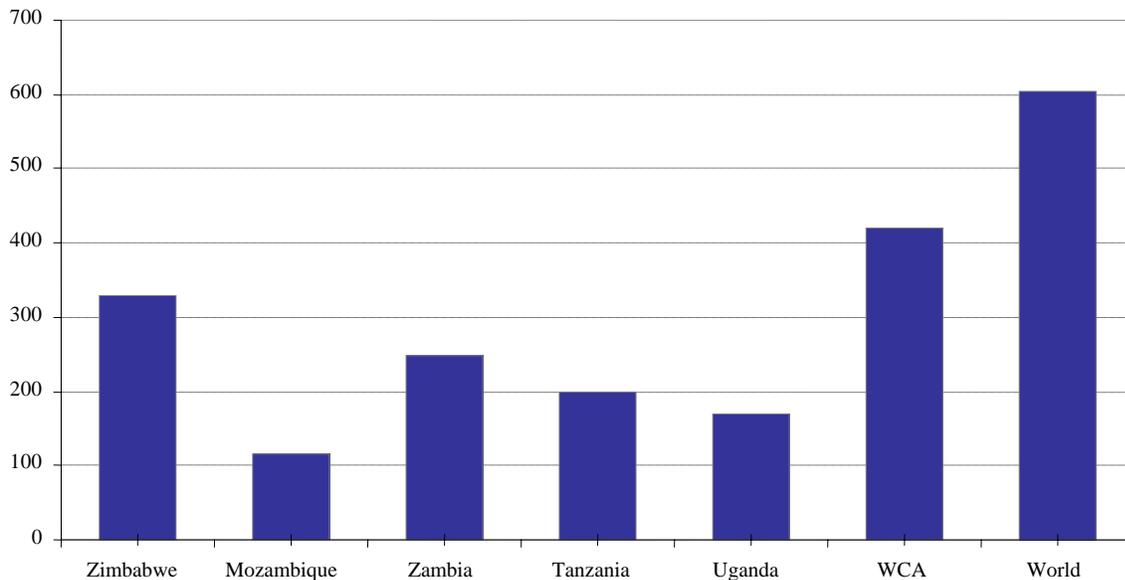
10.1.4 Conclusions

226. Yield levels and trends at the regional and country level are correlated with cotton sector organization. The national monopoly systems established in the Francophone countries of WCA delivered impressive and sustained yield growth over a period of three decades, from very low yields in the 1950s to well above the world rainfed average yield in the 1980s (around 1,200 to 1,400 kg per ha). This achievement was due to a reliable system for varietal development, input supply and credit, quality extension services, and logistical organization provided by the cotton companies. Since the mid-1980s, this trend has not been sustained and the productivity gap has started to widen. The system has not demonstrated a capacity to adapt to changing technical and

economic circumstances, particularly in regard to making improved technical packages available to farmers.

227. In ESA countries, by contrast, the trend has been slow but steady increases in yields based on low input/low output production systems, reaching around half of the world average for rainfed cotton today. Variation in yield performance among ESA countries is also correlated with sector organization. Yields are higher in the more concentrated systems (Zambia and Zimbabwe) than in the more competitive models (Tanzania and Uganda) which have found it very difficult to raise yields (Figure 11).

Figure 12: Cotton Yields in ESA Countries, WCA, and World, 1994/95-2003/04 Average (kg of lint per hectare)



Source: International Cotton Advisory Committee

10.2. Returns to Farmers

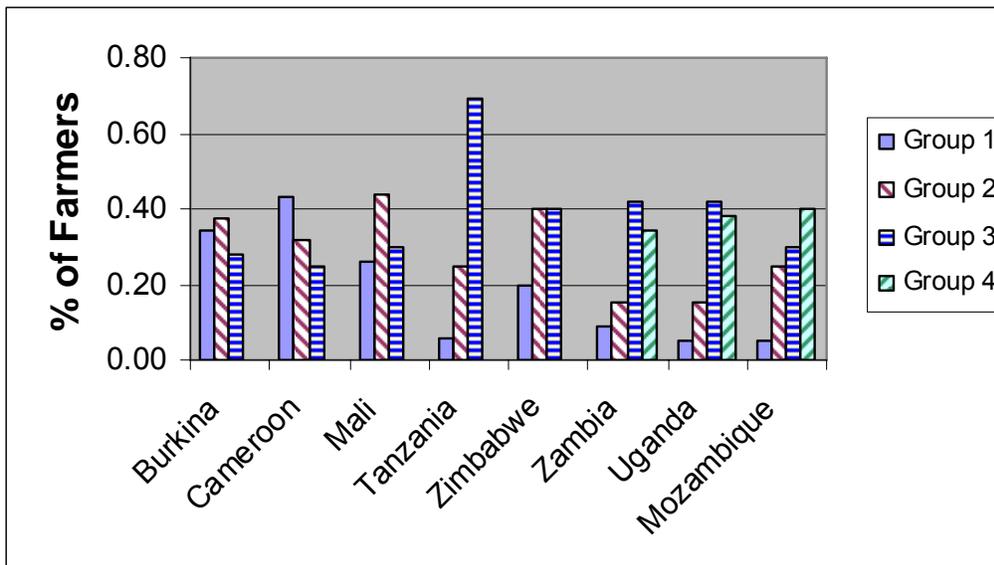
228. The recent evolution and typology of cotton sectors presented in Chapter 4 gives rise to an important question given the study objectives. Do farmers consistently benefit more from a more competitive system that pays them a higher share of world lint prices, but is less effective at delivering support services that help them raise yields, or from a more coordinated sector that delivers reasonable support services but a lower seed cotton price? A corollary question is whether some types of farmers do better under one system and others under another? Because farmer welfare depends on several factors, and because no one sector is expected to perform best on all these factors, the typology delivers no clear expectation on how farmers will fare under different sector types. Yet answers to these questions are crucial to informing the design of reforms that improve competitiveness and accelerate poverty reduction.

229. Factors beyond company services also influence the returns to farmers and their costs of production; the analytical challenge is to disentangle these from the impacts of the mode of sector organization. In particular, we will note below the impact of:

- Historical investment by cotton sector stakeholders, especially investments by companies to promote, and by farmers to adopt, animal traction;
- Differences in soil fertility across cotton growing regions and countries.

230. In this section we use crop budget data to generate two key indicators: returns to family labor and to total labor (including hired). In a development on previous work (e.g. Poulton et.al., 2004), the crop budgets are disaggregated by types of farmer in each country. The types or groups of farmers are those identified by focus group discussions in seven of the sample countries. In the case of Cameroon, where no focus group discussions were undertaken, we use data from SODECOTON monitoring surveys. Figure 13 shows estimates of the proportion of cotton producing households by group in each country.

Figure 13: Proportion of Cotton Farmers by Farmer Group



10.2.1 Impact of Inputs on Crop Budgets

231. Table 14 below presents summary crop budgets by farmer type. We focus our discussion on use of labor and other inputs, and the two key farm level indicators: returns to family and total labor. Table 14 also presents data on costs of seed cotton production across groups and countries. Here the most striking finding is the increase in unit costs of production as one moves from the top producers to the poor (and less efficient) ones.

232. According to the focus group informants, average labor input per hectare of cotton production is 40 percent higher in ESA than in WCA⁵¹. The main reason for this is the greater

⁵¹ This calculation excludes the labor figures provided by focus group respondents in Mozambique, which were very high. It is not clear to what extent the very high labor figures in Mozambique were a result of differing data

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penetration of animal traction technology within WCA, where it is used by nearly all farmers for land preparation, and by many for weeding. Efforts are also being made to promote labor-saving herbicide usage in WCA, whereas in ESA only the top two groups in Mozambique recorded any use of herbicides.⁵² As a result, weeding is the single largest contributor to this labor use differential between the two regions.

233. Comparing higher and lower producing groups, total labor input falls with production level. Smaller producers require less labor for harvesting, tend to weed fewer times and require less labor (if any at all) for fertilizer application and spraying. On the other hand, smaller producers (group 3 in Tanzania, Zambia and Mozambique; all group 4s) often do not have access to animal traction even for land preparation, so may have to use hand hoes, which is much more labor intensive. Alternatively, they have to hire plowing services, which raises their expenditure on hired services above that of larger producers (e.g. Burkina group 3).

234. Focus group discussions in Mali and Burkina did not distinguish between family and hired labor input, so in Table 14 below all labor input in the WCA countries is considered as family labor. While this may not be entirely true, average family sizes are much larger in WCA than in ESA, and it is understood that most labor tasks on WCA cotton farms are performed by family members. By contrast, the top producer groups in ESA countries rely heavily on hired labor, which accounts for over 70percent of total labor input for group 1 in Mozambique, Tanzania, Zambia and Zimbabwe (and also in Zambia group 2). Smaller producers in ESA countries are more reliant on family labor.

235. As discussed in Chapter 6, given the high input costs associated with cotton production and the difficulties that African smallholder households have in affording such inputs, one of the main strengths of coordinated cotton systems is their ability to provide producers with access to inputs on credit.

236. Participants in focus group discussions in Burkina Faso and Mali insisted that all groups use the same quantity of fertilizers per hectare. This response may have been influenced by the presence of the local extension officer at the discussions. Yet all producers are entitled to receive a similar quantity of fertilizers (per hectare of cotton cultivated) on credit, so a fairly uniform usage is credible. By contrast, fertilizer use is highly skewed in Uganda and Zimbabwe, the only two countries in ESA where any inorganic fertilizer is used on cotton. Despite a 50 percent subsidy in Uganda, only group 1 farmers report using fertilizers. According to participants in the focus group discussions, fertilizer use by the top group in Zimbabwe is higher than in any other country, including WCA. However, due in part to nationwide fertilizer shortages in Zimbabwe in 2005/06, fertilizer use by group 2 is much less than by group 1, while group 3 is not considered creditworthy enough to receive credit for fertilizer even under normal circumstances.

237. The reasons that inorganic fertilizer is not used in Mozambique, Tanzania or Zambia vary across countries⁵³. In Tanzania the highly competitive sectoral structure makes recovery of input

collection methods used there as opposed to reflecting actual differences in labor use. It is true that high prevalence of malaria and malnutrition (especially during 2005/06) are believed to depress labor productivity in Mozambique.

⁵² In Mozambique pre-emergence herbicide use is in a pilot phase in Cabo Delgado province. Farmers were very positive about this initiative, despite the increased costs, because it enabled them to weed their food crops on time. Cargill also provides herbicide to some farmers in low altitude areas of Zambia, where weed pressure is intense.

⁵³ Group 1 in Zambia does use a foliar feed fertilizer that they receive on credit.

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loans impossible, and the passbook system (see Chapter 6) is not designed to enable access to (much more expensive) inorganic fertilizers. In Mozambique and Zambia (and, for the time being, perhaps also Tanzania), it is questionable whether producers really need inorganic fertilizers, given existing soil fertility levels and the generally moderate fertilizer response of cotton. Particularly in Mozambique, the (relatively) high levels of soil fertility are a major advantage for the cotton sector. It is inconceivable that the yields claimed by group 1 farmers in Mozambique could be achieved by producers in other countries without the use of either inorganic fertilizer or manure. At the other end of the spectrum, producers in WCA and Zimbabwe grow cotton on less productive soils.

238. There is less variation in the provision and use of chemicals across countries and groups than there is in the case of fertilizers. Nevertheless, usage is more uniform across groups in WCA countries than in SEA.

239. Table 14 also shows the ratio of input costs to gross revenues for each producer type and sector. This is one important indicator of the risk entailed in cotton production. A cross-country comparison shows that the most important determinant of the ratio of input costs to gross revenues is the quantity of inorganic fertilizer used. The ratio is thus higher in WCA and Zimbabwe (which also has the highest number of pesticide sprays per season) than in Mozambique, Tanzania, Uganda or Zambia.

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Table 14: Summary Crop Budgets by Farmer Type and Country – Farmer Groups 1 and 2

Budget Element		Burkina	Cameroon	Mali	T'zania	Z'babwe	Zambia	Uganda	Mozam.
Group 1									
Yield	Kg/ha	1350	1259	1429	1125	1750	1200	2188	1519
Seed Cotton Price	US\$/kg	0.33	0.32	0.32	0.28	0.31	0.25	0.25	0.21
Gross Revenue	US\$/ha	441.45	399.10	452.99	314.06	542.50	300.00	547.00	322.03
Cost of Inputs	US\$/ha	172.89	141.44	168.61	35.83	236.85	31.07	111.11	36.50
Cost of Hired Services	US\$/ha	28.52	48.83	33.69	54.18	32.98	17.06	72.22	22.25
Cost of Hired Labor	US\$/ha	0	0	0	122.90	65.10	150.71	116.27	136.70
Gross Margin, excl labor	US\$/ha	240.04	208.83	250.69	224.06	272.67	251.87	363.67	263.28
Returns to (All) Labor	US\$/day	2.38	1.37	2.63	1.60	2.19	1.73	2.76	1.36
Returns to Family Labor	US\$/day	N/a	N/a	N/a	3.37	6.15	2.68	3.81	2.56
Cost per kg	US\$/kg	0.22	0.32	0.21	0.22	0.21	0.20	0.19	0.15
Family Labor Input	Days/ha	100.7	152	95.4	30.0	33.8	37.8	65.0	49.5
Hired Labor Input	Days/ha	0	0	0	110.0	90.7	108.0	67.0	144.8
Input Cost / Gross Revenue		0.39	0.35	0.37	0.11	0.44	0.10	0.20	0.11
Group 2									
Yield	Kg/ha	1100	1120	1011	750	800	1050	1125	935
Seed Cotton Price	US\$/kg	0.33	0.32	0.32	0.26	0.29	0.25	0.25	0.21
Gross Revenue	US\$/ha	359.70	355.04	320.49	196.88	232.00	262.50	281.25	198.22
Cost of Inputs	US\$/ha	164.89	132.76	159.58	18.00	90.08	31.07	8.33	36.00
Cost of Hired Services	US\$/ha	34.55	15.91	31.30	40.83	25.38	39.36	71.11	4.76
Cost of Hired Labor	US\$/ha	0	0	0	42.71	35.85	109.52	62.50	116.80
Gross Margin, excl labor	US\$/ha	160.26	206.37	129.61	138.05	116.55	192.07	201.81	157.46
Returns to (All) Labor	US\$/day	1.78	1.36	1.64	1.16	1.08	1.44	2.15	0.66
Returns to Family Labor	US\$/day	N/a	N/a	N/a	1.19	1.31	2.65	2.49	0.28
Cost per kg	US\$/kg	0.26	0.32	0.27	0.24	0.27	0.21	0.21	0.28
Family Labor Input	Days/ha	90.2	152	79.1	80.0	61.4	31.2	56.0	143.0
Hired Labor Input	Days/ha	0	0	0	39.5	46.1	102.0	38.0	95.8
Input Cost / Gross Revenue		0.46	0.37	0.50	0.09	0.39	0.12	0.03	0.18

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Table 14 (contd.): Summary Crop Budgets by Farmer Type and Country – Farmer Groups 3 and 4

Budget Element		Burkina	Cameroon	Mali	T'zania	Z'babwe	Zambia	Uganda	Mozam.
Group 3									
Yield	Kg/ha	750	1090	711	438	600	600	563	565
Seed Cotton Price	US\$/kg	0.33	0.32	0.32	0.24	0.24	0.25	0.25	0.21
Gross Revenue	US\$/ha	245.25	345.53	225.39	103.91	144.00	150.00	140.75	119.78
Cost of Inputs	US\$/ha	156.89	141.44	146.04	5.50	48.55	20.41	8.33	13.50
Cost of Hired Services	US\$/ha	75.87	11.61	23.10	1.04	0	9.93	71.11	0.80
Cost of Hired Labor	US\$/ha	0	0	0	0	0	28.57	5.21	6.70
Gross Margin, excl labor	US\$/ha	12.49	192.48	56.25	97.37	95.45	119.66	61.31	105.48
Returns to (All) Labor	US\$/day	0.17	1.27	0.99	1.02	0.90	0.78	0.72	0.49
Returns to Family Labor	US\$/day	N/a	N/a	N/a	1.02	0.90	0.72	0.74	0.49
Family Labor Input	Days/ha	75.3	152	57.0	95.0	106.3	126.0	76.0	200.8
Hired Labor Input	Days/ha	0	0	0	0	0	27.0	9.0	13.1
Cost per kg	US\$/kg	0.41	0.33	0.32	0.23	0.26	0.35	0.38	0.29
Input Cost / Gross Revenue		0.64	0.41	0.65	0.05	0.34	0.14	0.06	0.11
Group 4									
Yield	Kg/ha						450	125	240
Seed Cotton Price	US\$/kg						0.25	0.25	0.21
Gross Revenue	US\$/ha						112.50	31.25	50.88
Cost of Inputs	US\$/ha						16.86	5.56	13.50
Cost of Hired Services	US\$/ha						10.33	0	2.00
Cost of Hired Labor	US\$/ha						0	0	5.30
Gross Margin, excl labor	US\$/ha						85.31	25.69	35.38
Returns to (All) Labor	US\$/day						0.70	0.28	0.24
Returns to Family Labor	US\$/day						0.70	0.28	0.24
Cost per kg	US\$/kg						0.38	1.27	0.45
Family Labor Input	Days/ha						122.5	91.0	123.7
Hired Labor Input	Days/ha						0	0	25
Input Cost / Gross Revenue							0.15	0.18	0.27

Notes: 1) As no focus groups were undertaken, Cameroon data are from monitoring surveys by SODECOTON. Labor data are not disaggregated by farmer type and are generally considered too high. 2) Calculations of returns to (all) labor assume no payment for hired labor. 3) For calculations of production cost per kg, all labor input is costed at an average casual labor wage.

10.2.2. Returns to Farmers

240. To evaluate returns to farmers we use two key indicators at farm level: weighted average return to family labor, and to all labor. First, however, we examine farm profits per ha by farmer

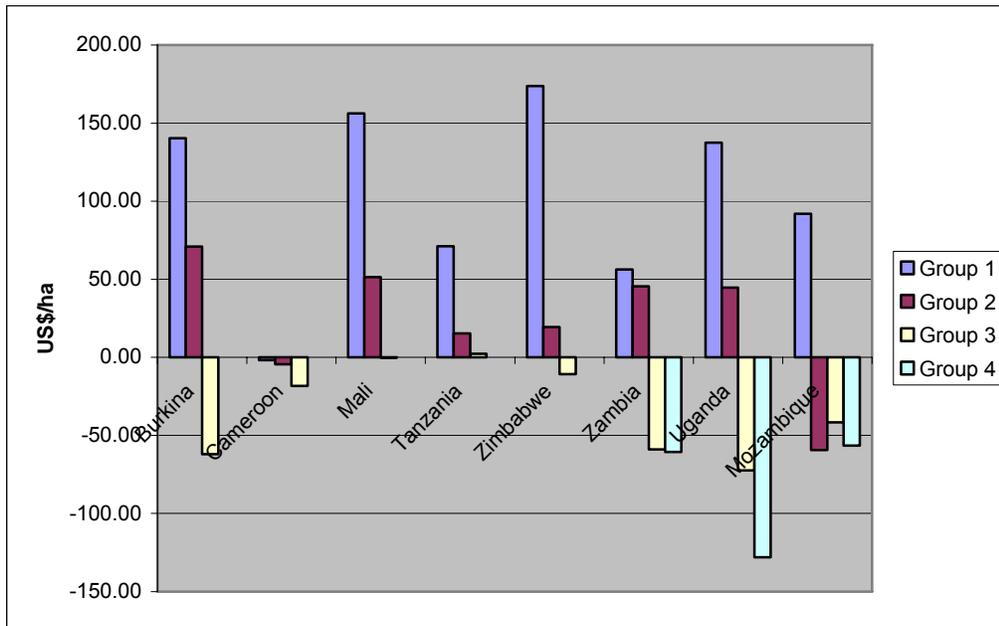
group, as this provides important insights into the potential poverty reduction effects of cotton cultivation.

241. After valuing family labor at the going casual wage rate in rural areas, group 1 households make a profit in all countries, while group 2 households make a profit in all countries except Cameroon and Mozambique (Figure 14). In both these cases, high labor input – possibly too high (data error) – cause the loss. In Tanzania and Zimbabwe the size of the profit achieved by group 2 households means that, under current conditions, cotton production can only make a modest contribution to household income and poverty reduction objectives.

242. Tanzania is the only country where group 3 households make a profit, as defined here. This means that the household obtains a higher income from applying its own labor to its cotton plot than it could from selling the same quantity of labor at the assumed casual wage labor rate. In Mali the return to labor achieved by group 3 households is identical to the assumed casual wage labor rate.

243. The stark finding from these figures is that between 25 percent (Burkina Faso) and 75+ percent (Zambia, Uganda, Mozambique)⁵⁴ of cotton producing households would be better off hiring out their labor than applying it to their own cotton plots. Why do they persist in producing cotton?

Figure 14: Net Margins after all Costs (including Labor), US\$/kg



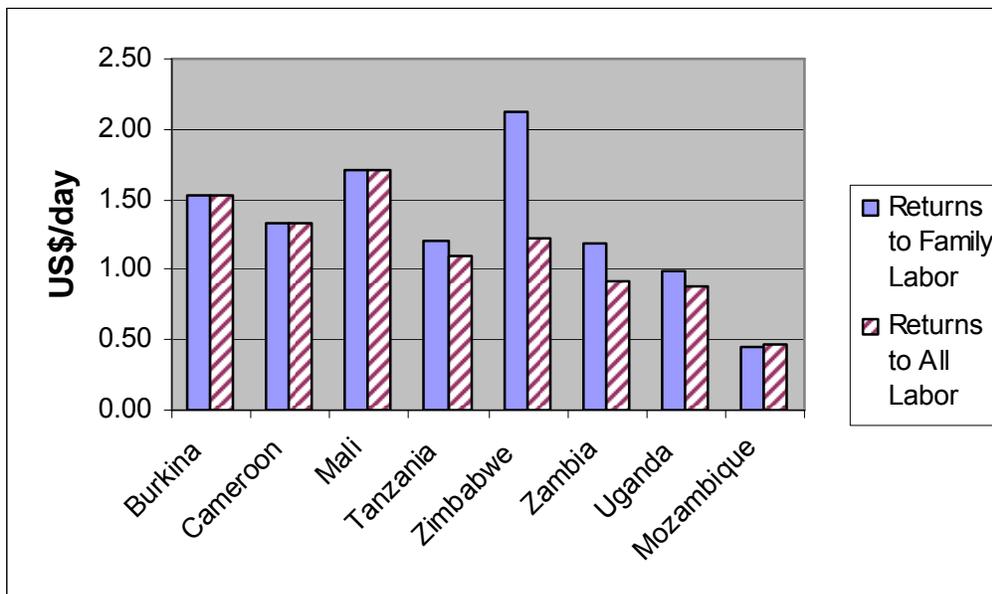
244. Two main answers emerged from the focus group discussions:

⁵⁴ These percentage figures for Zambia, Uganda and Mozambique are probably on the high side due to the high estimated costs for labor or hired services included in the group budgets. However, the basic point that a large proportion of producers in these countries achieve low returns to their labor input into cotton production is a robust one.

- First, many group 3 and 4 households prioritize the hiring out of their labor, then fit in cultivation of their own cotton farms when they are not working elsewhere. This is a major reason why these groups perform many of their critical cultural practices late and hence why they achieve such low yields.
- Focus group participants argued that cotton is the most remunerative cropping activity available in their areas. A critical factor here is the reliable market provided by cotton companies, which means that farmers can be sure of obtaining at least some cash income (a scarce commodity in group 3 and 4 households) from cotton production.

245. Weighted average returns to family labor and to all labor are presented in Figure 15, with the weightings being the proportion of farmers by farmer group shown in Figure 13. (See Table 14 for the returns figures for each group). The two returns figures are identical for the WCA countries, since all labor was recorded as family labor (and, in fact, very little hired labor is used). As a group, the WCA countries stand out, with three of the four highest returns to family labor, and the three highest returns to all labor. This result is driven by the success of these systems in moving farmers into groups 1 and 2 over time. Zimbabwe delivers the highest return to family labor, again in part reflecting the efforts made first by CMB and then by Cottco and Cargill in supporting producers with extension support and input access over a sustained period. All other ESA countries lie below the three WCA countries. Mozambique performs especially poorly, reflecting the small share of households in group 1 and the very low prices paid to farmers.

Figure 15: Weighted Average Returns to Family Labor and All Labor in Study Countries



10.2.3. Alternative Scenarios

246. For varying reasons, in Burkina Faso, Mali and Tanzania the “base case” budgets actually represent a fairly optimistic scenario. Thus, in addition to the “base case” budgets, we will also present findings on returns under the following alternative scenarios:

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- Burkina Faso and Mali: large debts incurred by the cotton companies imply that seed cotton prices in 2005/06 were at an unsustainably high level. We thus re-estimate the budgets assuming a seed cotton price of FCFA 150 per kg (all other variables held constant);
- Tanzania: we apply a downward adjustment to the seed cotton yields reported by the focus groups, so as to reflect national average yields in the 2005/06 drought season. We combine these with actual seed cotton prices received in this year. We also adjust harvest labor (but not other labor or cash inputs) to reflect the lower yields.

247. All other variables in the budget are kept constant. Predictably, returns to labor fall for all groups. Critically, returns to labor become negative for group 3 in Burkina Faso, which means that cotton would be completely non-viable for this group, even if labor input into cotton did not compete at all with opportunities for off-farm labor. Recalculating the weighted returns to labor under these alternative scenarios, the figure for Burkina is now comparable to that achieved by Zimbabwe. This suggests that, under a more “sustainable” pricing regime, WCA sectors could still deliver returns to labor that are comparable to the best achieved in ESA.

248. The alternative scenario for Tanzania involved lower yields, but higher prices (i.e. the prices actually observed in 2005/06) and lower harvesting labor. The country report noted that national yields in 2005/06 were only 58 percent of those recorded in 2004/05, so the “base case” yield for each group was adjusted by this factor. Actual seed cotton prices paid in Tanzania in 2005/06 were extremely attractive – the highest outside of the (subsidised) WCA sectors and comparable to the “sustainable” prices just noted for Burkina Faso and Mali. However, even with lower harvest labor, these high prices do not compensate for the reduced yields experienced as a result of the 2005/06 drought. All producer groups achieve returns to family labor that are clearly lower than the estimated casual wage rate, whilst the weighted average returns now approximate to those realized in Mozambique. This shows the vulnerability of ESA cotton farmers to rainfall fluctuations.

10.2.4. Conclusions

249. The starting point when comparing across sectors is that there will always be some farmers who, by superior skill or hard work and asset accumulation (and/or higher starting asset endowment), do well, producing high yields and thereby achieving good returns. How well these top producers do will depend in part on soil fertility. Sector performance should not be judged on the basis of the performance of this top group alone.

250. Companies (hence sectors) can contribute to overall farm-level performance by:

- Assisting input access through credit provision, thereby allowing more farmers to achieve high yields and allowing good farmers to expand production (at given yield level);
- Providing extension advice, thereby assisting (more) farmers to raise productivity;
- Paying high prices, thereby raising returns for a given technical performance;
- Facilitating asset accumulation, especially animal traction. This can be done either passively (through assisting producers to obtain good returns over a sustained period) or actively (by promoting uptake of the assets in question). Asset accumulation allows more producers to move into groups 1 and 2 over time.

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251. An important lesson from this section is that assisting more farmers to move into groups 1 and 2 is critical both for sector competitiveness (see figures on costs of production in Table 14) and for poverty reduction (see Figure 14). WCA sectors have assisted more farmers to do this over time through their investments in the promotion of animal traction, which have allowed farmers both to increase their area planted to cotton and also to increase yields. The majority of farmers in WCA sectors also enjoy access to inputs that only the top households in selected ESA sectors enjoy. At the same time, recent strong “political” pressures have contributed to high (though unsustainable) seed cotton prices for WCA producers. These broad-based successes on input provision and animal traction, together with the recent high prices, are reflected in the relatively high weighted average returns to farmers in all three WCA countries. There is scope to reduce the high farmer prices, so as to allow WCA cotton companies to break even, and still realise returns that are at least as high as those paid by most ESA sectors.

252. The analysis also suggests that Zimbabwe is the best performer amongst ESA countries from a farmer’s perspective, with Zambia and Tanzania hard to separate. However, given that the Tanzania figures are based on a very good year and that the Zambia labor input data are perhaps on the high side, thus underestimating returns, Zambia probably has the edge. Thus, another key finding of this section is that, although competitive sectors within ESA have outperformed more coordinated ones on pricing (Chapter 5), from a farmer’s perspective they have not done so to such an extent as to outweigh their disadvantages in terms of service provision.

253. Some doubts linger over input data for Mozambique (labor) and Uganda (hired services). However, apparently unattractive returns for the majority of farmers are consistent with disappointing medium-term production growth in both countries. A better regulated local monopoly model should be able to deliver better services to more farmers than has so far been the case in Mozambique.

254. The question then comes as to how far current performance at farm-level reflects the current state of the sector and how much it reflects the lagged impact of past sector performance. Our observation is that the lagged impact of past performance is large. This is clear both in WCA and in Zimbabwe, where Cottco’s assistance through the early- to mid-2000s is still being felt. WCA sectors continue to benefit from past investments, but have seen stagnant productivity growth since the mid-1980s (area planted has risen, but yield and net margins have remained static or fallen).

255. It is, of course, difficult to predict future trends. The most confident prediction is that there will be limited change in the findings of this type of analysis over the next five years.

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Table 15: Summary of Average Yield and Return per Labor Days

Country	Current Sector Type	Average Yield	Weighted Average Return per Labor Day (US\$)	Comments
Burkina	Local monopoly	1088	1.54	WCA sectors generate highest yields and returns. Returns still comparable to best in ESA when seed cotton price adjusted to “sustainable” level.
Cameroon	National monopoly	1167	1.34	Return figure probably underestimated due to high labor input derived from SODECOTON data.
Mali	National monopoly	1030	1.70	WCA sectors generate highest yields and returns.
Tanzania	Competitive	556	1.09	Competitive sector struggles to raise yields. Yields and returns both highly susceptible to rainfall.
Zimbabwe	Concentrated	910	1.23	Best performer in ESA due to efforts over time to raise proportion of households in top producer groups.
Zambia	Concentrated	671	0.91	Return figure probably underestimated due to high labor input derived from focus groups. Average yield rising steadily since liberalization.
Uganda	Hybrid	562	0.88	Return figure probably underestimated due to high cost of hired services derived from focus groups.
Mozambique	Local monopoly	575	0.48	Return figure underestimated due to high labor input derived from focus groups, but low labor productivity and low wage rates are features of rural Mozambique.

Notes: The yield figures provided here are the weighted average values derived from focus group discussions (group figures derived from SODECOTON monitoring data in the case of Cameroon).

CHAPTER 11: COST EFFICIENCY OF COMPANIES, OVERALL SECTOR COMPETITIVENESS, AND MACRO IMPACT

256. This chapter brings together detailed data from ginning companies, along with farm level data from the previous chapter, to calculate three of five outcome indicators: for company performance, overall sector competitiveness, and the impact of the cotton sector on the countries' macro economies. The proposed typology generated clear predictions for only one of these indicators: ginning companies are expected to be the least efficient in monopolies, and the most efficient in competitive sectors. Other indicators depend on factors in which no single sector type is expected to consistently perform better.

257. The cost structures of cotton companies are based on accounting data disclosed by the companies in WCA countries, and on interviews with a number of representative ginners in ESA countries⁵⁵. To allow comparisons, costs do not include capital costs, as capital may be, depending on the ginner, financed either through equity or long- and medium-term loans. Cost estimates in most cases are from 2006, converted to US\$ at the prevailing exchange rate (calendar year 2005 for Mozambique). For Cameroon and Burkina Faso, however, costs correspond respectively to the 2004/05 and 2003/04 seasons, as more recent data are not available (except producer prices, which are the 2006/07 actual prices). It has, however, been verified that costs have not dramatically changed in recent years in these countries, as domestic and imported inflation were more or less balanced by cost reductions.

11.1. Company Cost Efficiency

258. The indicator for company performance is the adjusted cost from farm gate prices to FOT. This adjusted figure does not include taxes and critical functions, because these depend on policy and other factors unrelated to the efficiency of company operations. We also do not deduct from the total cost figure the value of seed, since the performance of the seed market (and the value the companies can therefore get from seed sales) is also beyond the influence of the companies. These factors are brought back into our analysis when we consider overall competitiveness and macro impacts of the cotton sector.

259. This section focuses first on ginning costs, as perhaps the key cost element in this indicator. Ginning costs in WCA (all national or local monopolies) range from US\$0.134 to US\$0.234 per kg of lint (Table 16 and Figure 16). In ESA, these costs are much lower—ranging from US\$0.081 to US\$0.123—for countries operating at reasonably high capacity utilization rates (Zambia, Zimbabwe, and Tanzania). For Mozambique and Uganda, which operate at around 20 percent of capacity, costs are comparable to those in WCA, at US\$0.20 per kg and US\$0.237 per kg, respectively. These are the only two countries in the region that do not allow open competition between ginners: Mozambique operates a local monopoly system, and Uganda operates a hybrid system with purchase quotas. Both these systems protect ginners from most competitive pressures and thus reduce incentives for cost containment. At 100 percent capacity utilization rates in all countries, there would be no overlap in ginning costs between the two regions: WCA countries would range from US\$0.13 to US\$0.20 per kg, while those in ESA would range from US\$0.07 to US\$0.12 per kg.

⁵⁵ In Mozambique, only one ginner, considered as representative of the least efficient companies, agreed to provide cost information.

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Table 16: Comparative Analysis of Ginning Costs (US cents per kg of lint cotton)

	Burkina ^a	Mali ^b	Cameroon ^c	Mozamb. ^d	Zambia ^e	Zimbab. ^f	Tanzania ^g	Uganda ^g
Type of system	Local Monop	National Monop	National Monop	Local monop	Concentrated	Concentrated	Competitive	Hybrid
Exchange rate to US\$	505	505	505	23.5	3,600	Variable	1,200	1,800
Type of gins	saw	saw	saw	saw	Saw	saw/roller	roller	roller
Avg unit ginning capacity	45,000T	40,000T	31,000T	13,500T	20,000T	25,000T	6,300T	5,000 T
% capacity utilized	100%	65%	100%	20%	100%	64%	80%	20%
Fixed costs/kg of lint	5.84	8.00	4.03	17.15	4.69	3.29	1.84	12.29
Depreciation	3.31	4.59	3.06	7.81	2.50	1.90	0.65	6.02
Salaries	1.18	1.08	0.77	9.29	2.08	1.35	1.19	6.27
Other	1.35	2.32	0.20	0.05	0.11	0.05	0.00	0.00
Variable costs/kg of lint	9.99	15.39	9.39	6.51	7.61	4.76	6.31	7.66
Energy	2.50	4.40	3.07	2.36	0.50	0.04	0.94	3.04
Packaging	3.49	3.45	3.49	3.91	3.50	2.17	4.17	3.05
Other (incl maintenance)	4.00	7.54	2.84	0.24	3.61	2.56	1.20	1.58
Total cost	15.83	23.39	13.42	23.66	12.30	8.06	8.15	19.96
... at 100% capacity	15.83	20.59	13.42	9.94	12.30	6.88	7.78	10.12
... at mean 1995-2006 exch. rate ^h	13.62	17.71	11.55	---	---	---	---	---

Notes:

a. SOFITEX actual accounts for 2003/04.

b. CMDT budget for 2006/07.

c. SODECOTON actual account for 2004/05.

d. Estimate for 2005 calendar ear (see country study).

e. Estimates by Estur for 2005/06 (ginners contend they are underestimated).

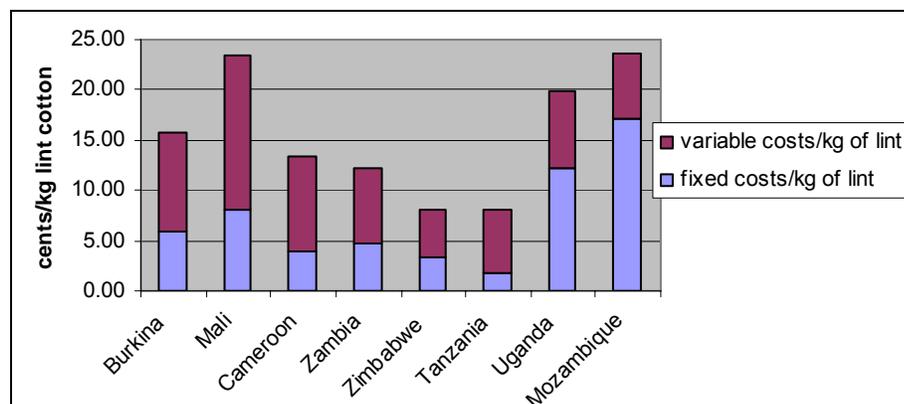
f. Estimates for 2005/06 (see country study).

g. Estimates based on 2006/07 costs but 2004/05 capacity utilisation (see country study)

h. CFA587/US\$; costs at actual capacity.

Note that both Zambia and Uganda use some second-hand ginning equipment.

Figure 16: Estimated Average Ginning Costs at 2006 Capacity Utilization Rates in Study Countries



Source: Authors' calculations from country case studies

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260. A combination of technical and structural factors likely contributes to this stark difference in ginning costs between the two regions. First, WCA uses only saw gins. Investment costs (and hence depreciation costs) for this type of gin are substantially higher than for roller gins. The latter are predominantly used in Tanzania and Uganda.⁵⁶ In addition, a number of ginners in Tanzania and Uganda import equipment from India, often secondhand. Some Zambian ginners install used saw gins. All this equipment is much less expensive than the US or European equipment purchased by WCA cotton companies. Second, energy is much cheaper in Zimbabwe (less than US\$0.01 per kg of lint), Zambia (US\$0.005 per kg) and Tanzania (US\$0.09 per kg), than in WCA countries (around US\$0.025 per kg). Finally, maintenance and other variable costs are, as a general rule, substantially lower in ESA, reflecting a higher cost efficiency at the processing stage.

261. The gap between ginning costs in WCA and ESA countries would be reduced, but not eliminated, if the CFAF/US\$ exchange rate came back to its 1995-2006 mean, which corresponds to the period since the 1994 devaluation (see final line of Table 16): costs in Cameroon would be at the upper end of those in ESA, but Burkina Faso and, especially Mali, would remain much higher. This suggests that, while the current CFAF/USD exchange rate does contribute to the current financial crisis in the region, a more fundamental reason, at least in Burkina Faso and Mali, is very high costs of operation. This conclusion becomes even stronger when one realizes that figures for the highest cost ginner in ESA – Zambia – are heavily affected by the sharp appreciation of the Kwacha during 2005/06. Zambia's ginning cost in USD would be below USD0.10/kg lint if the Kwacha were at its 2005 level.

262. Table 17 builds in additional costs from farm gate to FOT to develop our overall indicator of company cost efficiency: total farm gate to FOT costs excluding taxes and critical functions. The main discriminating factor for collection costs appears to be the size of ginning units; transport costs appear lower in countries with smaller ginning units (particularly Uganda), as the purchasing area for each unit is smaller, and higher in countries with large-scale ginning units (Zambia and WCA).

⁵⁶ In Zimbabwe and Zambia, a number of new roller gins are being installed. However, the majority of ginning capacity in these countries are still saw gins.

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Table 17: Company Performance Indicator: Adjusted Costs, Farm Gate to FOT

	Burkina	Mali	Cameroon	Mozamb.	Zambia	Zimbabwe	Tanzania	Uganda
Type of cotton industry	National Monop	National Monop	National Monop	Local Monop	Concentrated	Concentrated	Competitive	Hybrid
Date of data collection	2003/04	2006/07	2004/05	2005	2005/06	2005/06	2006/07	2006/07
Collection of seed cotton	10.3	7.3	9.7	9.7	13.6	8.1	9.4	7.9
Transport	6.5	5.2	5.0	8.8	7.7	6.1	5.1	3.2
Other	3.8	2.1	4.7	0.9	5.9	2.0	4.1	4.8
Ginning costs	15.8	23.4	13.4	23.7	12.3	8.1	8.2	20.0
Overhead	4.6	6.0	6.5	3.0	4.0	4.9	1.8	2.5
<i>(of which DAGRIS fee)</i>	1.2	0.3	1.2					
Short term financing cost	6.7	8.0	1.3	2.0	2.0	3.6	2.0	1.6
Total Adjusted Costs	37.4	44.6	30.8	38.4	31.9	25.5	21.4	31.9

Note:

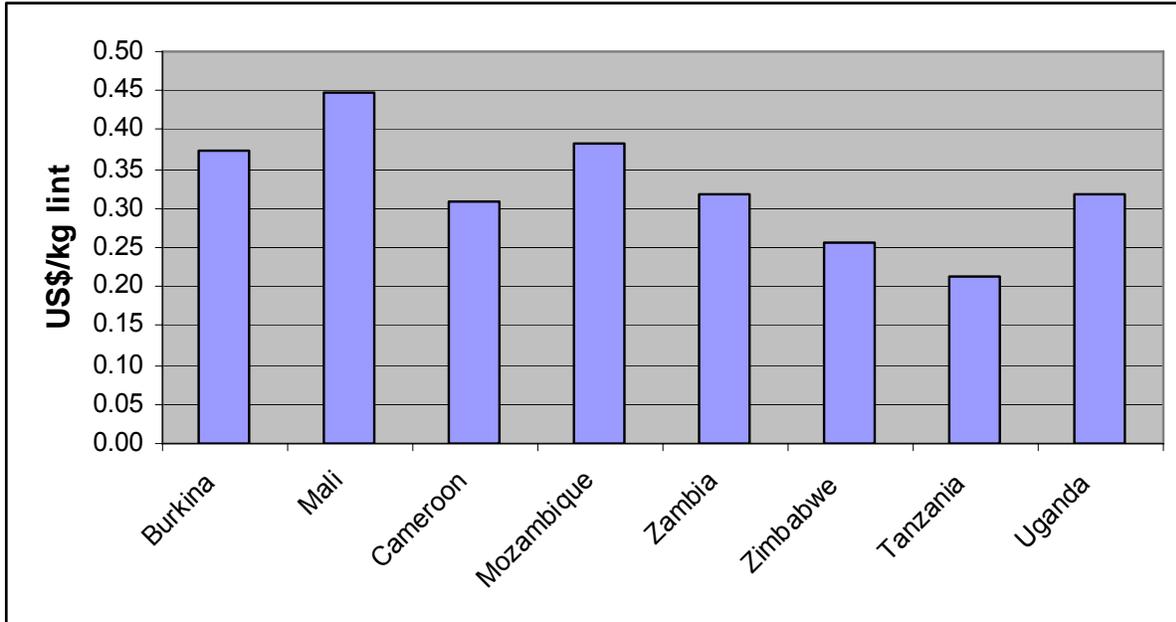
a. Cost of input borne by cotton company

263. Short term financial costs are higher in monopolistic systems (except Cameroon) for managerial reasons. In such systems, cotton companies tend to buy seed cotton immediately after harvest, and to sell throughout the year, thus holding high average stock levels. Ginners in competitive systems tend to minimize their stocks by selling immediately after processing. Cameroon is unique for monopolistic systems, as most of the stock, at least through the end of the 2006 season, was financed by cash reserves of the company and the farmer organization.

264. Overhead costs are consistently higher in the WCA monopoly systems, where cotton companies are larger, combine a broader scope of functions and a lack of incentives to minimize costs. Overhead costs are lower in competitive and concentrated systems, where companies have more incentives to minimize costs.

265. Focusing now on our final indicator of company performance (final line of Table 17 and Figure 17), companies in concentrated and competitive systems show clear evidence of greater efficiency, especially in the more competitive sectors. Mali, Mozambique, and Burkina, all monopoly sectors, show the highest adjusted farm gate to FOT costs, with costs in Mali being especially high. Costs in Tanzania's competitive sector and Zimbabwe's increasingly competitive sector are substantially below all other countries, although the Zimbabwe figure is heavily influenced by the dramatic depreciation in the real exchange rate since the onset of economic crisis in 2001. Based on the high share of roller gins in Uganda, it should have costs at least as low as Tanzania, but instead is comparable to Zambia (which uses saw gins) and Cameroon. Very low capacity utilization, perpetuated by the hybrid regulatory structure, drives this result. Zambia's figure, which is the highest of the market-based systems, includes costs involved in achieving a very high quality premium. Cameroon shows what a national monopoly can achieve when well managed and left relatively free from political influence, yet these costs are still well above those in Zimbabwe and Tanzania.

Figure 17: Company Performance Indicator: Adjusted Total Cost, Farm Gate to FOT, 2006/07



11.2. Overall Competitiveness

266. The overall competitiveness indicator is the ratio of total FOT costs to total FOT value in each sector. We develop this on the cost side by starting with the adjusted farm gate to FOT costs of Table 17, and adding purchase price, profit taxes, and payment for critical functions such as extension, input subsidies paid by companies (if any), and anything paid by the companies for research, road maintenance, and other public goods. Any taxes included in these costs are not deducted. Company revenues can only be theoretically estimated, as information is not publicly available on actual selling prices and costs except in WCA’s national monopolies. We base our calculations on Index A prices, quality premia as estimated in Chapter 7, and information on the value of seed sales from interviews in each country.

267. Results are shown in Table 17. Ratios above 1.0 indicate that the sector is generating deficits, unable to cover costs at estimated realized export prices and sales prices of seed. Here the WCA monopolies look very poor, with even Cameroon less competitive than any of the ESA countries. High producer prices and high costs for critical functions (lower only than Uganda), combine with the high operating costs already documented in Table 17 to drive this result. Remarkably, Mozambique now looks very competitive, but this is due in large measure to the very low prices that this poorly regulated local monopoly sector pays to its farmers. Zambia emerges as perhaps the most competitive sector, due in large measure to the very high price premium it now earns on international markets. Zimbabwe’s revenues are reduced by the requirement that 30% of output be sold on the local market at lower prices; yet that sector still emerges as relatively competitive.

268. In seven of the eight countries in this analysis, cotton companies pay for all or a significant portion of extension. The one exception is Tanzania, which is the only competitive type; companies spending money on extension would be at a competitive disadvantage in such a

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system and so do not provide this service. Uganda has a competitive structure, but its regulatory framework (which classifies its sector as a hybrid) allows companies to cooperate in supporting extension (supplemented by donor money). These company costs are certainly recovered from farmers through the buying price, as they must be in other ESA countries. The sector deficits in the WCA region suggest that these (and other) costs are not being fully recovered. Extension costs are higher in WCA than in ESA (US\$0.025 to US\$0.040 compared to zero to US\$0.027 in ESA), and are highest in Mali, because the scope of extension includes rural development functions beyond cotton. Extension in Cameroon also covers rural development, but its cost is shared between the cotton company and the farmer association. The monopoly of cotton companies also contributes to road maintenance and research costs, though probably less in Mozambique than in the WCA countries.

Table 18: Overall Competitiveness Indicator: FOT Costs/FOT Revenue, 2006/07 (all costs and revenues in US\$/kg lint)

	Burkina	Mali	Cameroon	Mozamb.	Zambia	Zimbabwe	Tanzania	Uganda
	Local Monop	National Monop	National Monop	Local Monop	Concentrated	Concentrated	Competitive	Hybrid
Costs								
Producer price/kg lint	0.78	0.75	0.78	0.51	0.64	0.67	0.69	0.71
Adjusted farm gate to FOT costs (from Table 17)	0.37	0.446	0.308	0.384	0.319	0.255	0.214	0.319
Direct Taxes			0.004	0.022	0.012	0.006	0.037	0.026
Critical functions								
Extension	0.025	0.040	0.027	0.007		0.029		0.027
Roads, research, other	0.004	0.010	0.015				0.019	
Input subsidies		0.018						0.084
Total FOT costs	1.18	1.26	1.13	0.92	0.97	0.96	0.96	1.17
Income								
FOB value (C+R minus FOB to C+R)	1.18	1.18	1.18	1.18	1.19	1.05 ^a	1.19	1.19
FOT to FOB costs	0.15	0.15	0.19	0.03	0.14	0.11	0.1	0.13
FOT Value	1.03	1.03	0.99	1.15	1.05	0.94	1.09	1.06
Quality premium	0.04	0.02	0.07	-0.04	0.11	0.06	-0.01	0.04
Sale of seed/kg lint	0.06	0.05	0.09	0.05	0.11	0.13	0.08	0.16
Total Income, FOT	1.13	1.10	1.15	1.16	1.27	1.13	1.16	1.26
FOT Cost/FOT revenue	1.05	1.15	0.99	0.80	0.76	0.85	0.83	0.93

Note:

a. Taking into consideration sales on domestic market (30% of sales) at a lower administered price

11.3. Macro Impacts

269. Our two macro impact indicators are per capita total value added from the cotton sector and per capita net budgetary contributions of the sector. Value added at the farm level is calculated by subtracting non-labor production costs from the farm gate value of seed cotton production. In the

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absence of mean figures across all farmers, we use the data for the farmer group that contains the median farmer (see Table 14 and Figure 13).

270. Value added is calculated using two different definitions of non-labor production costs. In the first case, input costs are deducted from the gross value of seed cotton production. In the second case, costs of animal traction and motorized services are also deducted, although the latter are extremely rare. The most appropriate definition can be debated. The argument for deducting animal traction costs from value added is that they include rental or amortization of equipment, plus veterinary and feeding costs for oxen. These intermediate inputs account for around 80 percent of the estimated animal traction costs in WCA sectors. The argument for not deducting animal traction costs is that oxen (and indeed equipment) are assets that farm households have accumulated in large part through their engagement with cotton production. Deducting animal traction costs would have the perverse effect of lowering the estimates of the value added generated by WCA sectors, because these sectors have proceeded further with animal traction than ESA – when this progress owed much to cotton.

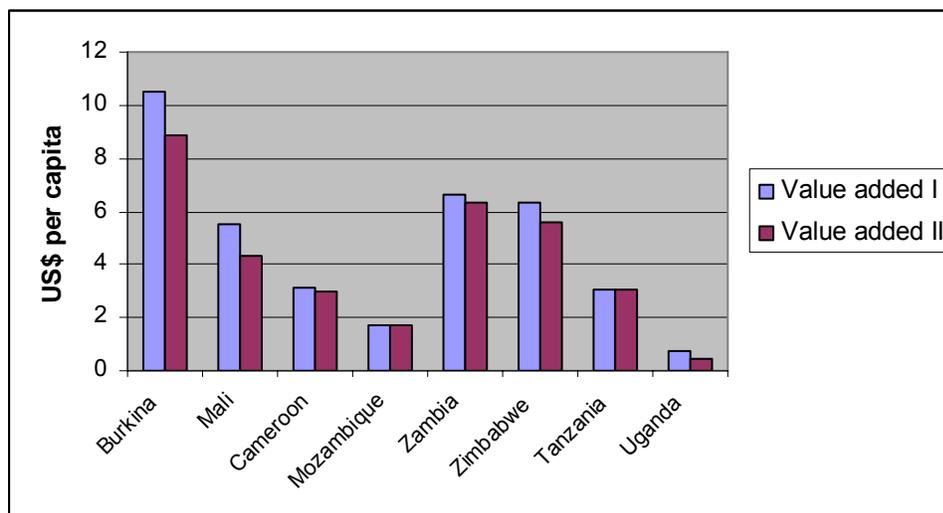
271. Value added at the ginnery stage can be estimated by subtracting all non-labor and non-tax costs for purchase and collection of seed cotton, and for processing and marketing of lint cotton from the total FOT value of lint and seeds. The two value added figures are then summed and the result is converted to per capita figures by multiplying by production and dividing by total country population (Table 19, Figure 18).

272. WCA countries perform relatively poorly on value added per kg of lint. Yet Burkina and Mali perform quite well when this figure is adjusted to the country's total population, and our two different treatments of animal traction costs have no impact on overall conclusions. The high value added per capita in Burkina and (to a lesser degree) Mali flows directly from the orientation of the national monopolies (now local monopolies in Burkina) to extend cotton cultivation to all farmers in areas deemed adapted to cotton cultivation. In ESA, Zambia and Zimbabwe perform very well because they achieve high value added per kg and also reach a relatively high share of the population (though much less than in WCA). Tanzania's sector, in contrast, reaches far fewer farmers as a share of population, and its value added per capita thus falls to about half that in Zambia and Zimbabwe. Mozambique and Uganda perform the poorest, due to chronically low production in each country.

Table 19: Total Value Added per capita from Cotton Sector, 2006

	Burkina	Mali	Cameroon	Mozamb.	Zambia	Zimbab	Tanzania	Uganda
Value added at farm level								
Seed cotton yield (kg/ha)	1100	1011	1120	565	600	800	438	563
Seed cotton price (US\$/kg)	0.33	0.32	0.32	0.21	0.25	0.29	0.24	0.25
Gross value per ha (US\$)	359	324	358	119	150	232	105	141
Minus ...								
... Input costs (US\$/ha)	165	160	133	14	20	90	6	8
... Hired services (US\$/ha)	35	31	16	1	10	25	1	71
Value added/ha, I (US\$)	195	164	225	105	130	142	99	133
Value added/ha, II (US\$)	160	133	209	104	120	117	98	62
GOR	42%	42%	41%	39%	40%	41%	36%	35%
Value added/kg lint, I (US\$)	0.42	0.39	0.49	0.47	0.54	0.43	0.63	0.67
Value added/kg lint, II (US\$)	0.35	0.31	0.46	0.47	0.50	0.36	0.62	0.31
Value added at ginning level (US\$/kg lint)								
Total FOT Value (Table 18)	1.13	1.1	1.15	1.16	1.27	1.13	1.16	1.26
Minus ...								
... price paid to farmer/kg lint	0.78	0.75	0.78	0.51	0.64	0.67	0.69	0.71
... other non-tax, non-labor costs	0.3	0.39	0.23	0.29	0.22	0.22	0.16	0.24
Value added /kg lint	0.05	-0.04	0.14	0.36	0.41	0.24	0.31	0.31
Total value added								
Total value added/kg lint, I (US\$/kg lint)	0.47	0.35	0.63	0.83	0.95	0.67	0.94	0.98
Total value added/kg lint, II (US\$/kg lint)	0.40	0.27	0.60	0.83	0.91	0.60	0.93	0.62
Production, '000 mt lint	311	186	89	43	80	123	126	22
Total Value Added I ('000 US\$)	146,513	64,188	56,146	35,902	76,133	82,770	118,265	21,641
Total Value Added II ('000 US\$)	123,222	50,609	53,045	35,707	72,800	73,395	117,466	13,714
Population, 2005 ('000)	13,933	11,611	17,795	20,533	11,478	13,120	38,478	28,947
Total value added pc, I (US\$)	10.52	5.53	3.16	1.75	6.63	6.31	3.07	0.75
Total value added pc, II (US\$)	8.84	4.36	2.98	1.74	6.34	5.59	3.05	0.47

Figure 18: Total Value Added per capita by Cotton Sector, 2006/07



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273. The final indicator shows that in Burkina and Mali these results currently come at a very high cost to the national budget (Table 20). Mali's negative budgetary contribution is especially striking when compared to the value added figures in the previous table: for every dollar of value added generated, the Malian government had to pay roughly US\$0.50 from its budget in 2006. Burkina's figure may be less alarming in total and when compared to value added figures, but caused major problems for the country and its ginning companies this past year. Within ESA, the concentrated and competitive sectors (Zambia, Zimbabwe, Tanzania) clearly make the greatest contribution to the state budget.

Table 20: Table: Net per capita Budgetary Contribution of Cotton Sector, 2006

	Burkina	Mali	Cameroon	Mozamb	Zambia	Zimbab	Tanzania	Uganda
Total direct+indirect taxes paid ('000 US\$)	4,261	2,883	1,388	1,471	1,904	2,312	5,531	719
Budgetary transfers received, ('000 US\$)	-15,550	-31,620	0	0	0	0	0	0
Net budgetary contribution	-11,289	-28,737	1,388	1,471	1,904	2,312	5,531	719
Population, 2005 ('000)	13,933	11,611	17,795	20,533	11,478	13,120	38,478	28,947
Net budgetary contribution, per capita	-0.81	-2.47	0.08	0.07	0.17	0.18	0.14	0.02

Note: Budgetary transfers assumed equal to losses of public companies - CMDT in Mali, SOFITEX in Burkina

274. Over all three macro indicators, the concentrated and competitive systems in Zambia, Zimbabwe, and Tanzania emerge as the strongest performers: company costs are among the lowest, overall competitiveness is strong (without punishing farmers with very low prices, as in Mozambique), they generate substantial value added per capita, and they do all of this while making by far the highest contributions to the national budgets.

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SECTION V: CONCLUSIONS

CHAPTER 12: CONCLUSIONS

275. This final chapter presents some of the major opportunities and challenges currently faced by African cotton sectors, draws some general lessons learned from reform experience, summarizes the study's main findings on the links between sector-types and performance outcomes and finally suggests possible ways forward for each sector type.

12.1. Opportunities and Challenges for African Cotton

276. Despite the dire financial crisis facing a number of cotton sectors in WCA in the short-term, experts tend to agree that there is still an important growth potential for African cotton on the world market in the long run. However, remaining competitive and increasing market share will require considerable efforts geared at narrowing existing gaps (productivity, quality management, etc) and building more on comparative advantages. These efforts can be articulated around the following three major objectives:

- (1) Achieving greater value through improved quality, marketing, and valorization of by-products.
- (2) Bridging performance and competitiveness gaps through farm-level productivity and ginning efficiency.
- (3) Improving the sector's sustainability through institutional development and capacity-building of stakeholders, as well as strengthening of governance structures and management systems.

277. These objectives are important notwithstanding factors that are beyond the direct control of SSA governments and stakeholders such as the evolution of the euro/\$ exchange rate and market distortions due to OECD subsidies.

12.1.1. Achieving greater value

278. Efforts to achieve greater value in SSA cotton sectors should focus on three priority areas. These are quality, marketing, and valorization of by-products.

Quality

279. African cotton has two comparative advantages in the world market: the intrinsic quality of its fiber (the fiber properties) and the fact that it is handpicked. Quality improvement—especially the elimination of contamination—could therefore result in selling prices of up to US\$0.10 per pound over the Cotlook A Index. At typical producer prices of US\$0.25 - 0.32 per kg, a US\$0.10 per lb increase in the price of lint that is fully passed on to farmers would increase farmer prices by 30 to 40 percent. As a result, quality management should be considered one of the most important areas of improvement for SSA cotton exporting countries.

280. Though most African cotton is suitable for the medium-high level of ring spinning, progress on quality during the last decade has been slower than in competing origins and not as fast as required by the spinning industry. The trend in spinning technology toward more automation and higher speeds makes improvements in quality and consistency a vital issue for the future of

African cotton sectors. Management of lint quality has become more important as spinners have imposed more stringent demands for quality and for greater accuracy of measurement of fiber properties. Yet the impact of quality on pricing of cotton is generally not well-known by ginners and even less by producers.

281. Greater awareness and a general mobilization are necessary to reestablish Africa's main comparative advantage stemming from the manual harvesting of seed cotton. This advantage has been eroded primarily by contamination from foreign matter; reducing such contamination through capacity building, price incentives, and other approaches must therefore be the chief focus of quality improvement efforts⁵⁷. Quality improvement requires a concerted effort from researchers, producers and ginners in SSA to improve fiber characteristics through research and better production practices, reduction in variability of lint quality through more rigorous seed cotton grading and lint classification, control of contamination through capacity building and price incentives⁵⁸, and optimization of quality management in ginning. Efforts must also be made to generalize the use of cotton cloth wrappers for bales, develop container loading at the gins, and optimize export logistics.

282. Yet the typology developed in Chapter Four highlights a key conundrum in African cotton systems; while concentrated or monopoly sectors are more likely to achieve the coordination needed to improve quality, they are not necessarily ready to pass on the price premia to farmers. For example, the comparative analysis in previous chapters showed that farmers in Tanzania tend to receive slightly higher prices than farmers in Zambia, despite the much higher price premium in Zambia. Solving this riddle—how to capture the very significant price premia available to African cotton while sharing some of that benefit with farmers—probably requires much stronger farmer organizations than are currently found in SSA. In concentrated systems, these organizations would have to bargain with the large ginners for remunerative prices on the basis of solid knowledge of world prices, realized export prices quality premia obtained and cost structure borne by ginners. In competitive systems these organizations would need to focus on training farmers regarding the benefits of increased quality, and monitoring prices paid by companies to ensure transmission of quality premia.

Marketing Practices

283. Many options exist for independent ginners in SSA to improve marketing performance. Forward sales, the most common marketing method in the cotton business, are the easiest and most effective marketing strategy to cover risks. The flexibility and effectiveness of such sales can be enhanced if they are supplemented by the use of market instruments such as futures and

⁵⁷ Technical solutions to eliminate contamination are well-known, and have proven successful in Zambia, resulting in an increase in the premium for the top type of Zambian lint relative to the Cotlook A Index by US\$0.05 over a period of five years. There, the two dominant ginning companies have been equally successful in largely eliminating contamination, using very different approaches: Dunavant relies primarily on the manual removal of contamination at the gin, while Cargill has succeeded in changing farmer behavior to avoid contamination.

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options; the application of these instruments can be specified in the physical contract arrangements with merchants.

284. Ginners can also spread their risks by committing proportions of the total production to different marketing options: cash sales after ginning and other options requiring commitment prior to harvest: forward sales at fixed price, 'on call' at price-to-be-fixed contracts, and minimum guaranteed price contracts. Direct sales from ginners to spinners through commissioned agents can save the cost of intermediation by merchants while improving the quantity and quality of market knowledge available to the ginners.

285. Stronger farmer organizations can also work to the advantage of the sector if they allow more systematic contractual trade relationships between the two parties. Examples could include more formalized contract farming relationships which specify pre-determined volumes of seed cotton to buy/sell and with precise quality specifications (such as zero contamination). Stronger farmer organizations might also be better informed regarding world markets and able to negotiate a pricing approach that is tied to world prices and which recognizes world market premia for quality. Considerable institutional strengthening and training will be required first to reinforce producer organizations.

286. A final potential tool for improving the marketing of African cotton is electronic trading. E-trade platforms can be a very effective means of transparent price discovery brought about by real time multilateral bids and offers and online contracting can reduce transaction costs.

287. To realize improvements such as the ones recommended above, ginners in SSA need to be informed and trained to better understand the world cotton market and prices, master cotton trade rule and regulations, and understand how to use risk management techniques based on futures and options contracts.

Valorization of Seed Cotton By-products

288. As emphasized in previous chapters, the performance of the oil and cake sectors is clearly important and, for two major reasons, is something that requires more attention than it has received before so far. First judging by world standards these industries in Africa generally are - more or less depending on the model - lagging behind in terms of capturing the full market value of cotton seed by-products. Second, these markets are changing fast due to the increased demand for edible oil and animal feed related to competitive pressures on alternative uses of cereals and raw materials for biofuel production. The combination of these two factors is likely to create new market opportunities for seed cotton companies in the future. Improving the valorization of cotton seed has a number of important policy implications, and can take different forms. For example:

- Movement toward open and transparent market-based systems may be able to deliver better prices for the seeds and better outcomes through increased competition (such as improved investment climate, selection of professional investors, and stronger enforcement of the rules and regulations on imported oil, etc.).
- Focused efforts to develop strategies with stakeholders for cotton oil and cake are also important. Despite the economic weight of these activities and strategic importance, few countries have developed a strategy for cotton seed industries and this is an area donors might

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want to consider supporting, not only at the domestic, but also sub-regional and international market level.

12.1.2. Improving the productivity and competitiveness of cotton production in Africa

289. Bridging productivity and competitiveness gaps is also critical for strengthening African cotton sectors. The main areas of focus for these efforts are productivity at the farm level and efficiency of ginning industries.

Productivity of Cotton Cultivation at Farm Level

290. Increasing productivity at farm level is critical to improve the sector's overall competitiveness and to make the cotton crop more profitable for farmers. There are several possible areas of intervention to make progress toward this objective:

- ***Improvements in the delivery of extension services and technical assistance.*** This study has shown that traditional single-channel systems, which directly or indirectly provide extension services to all cotton growers delivered remarkable results until the mid-1980s. In contrast, competitive systems are struggling to deliver such services to a wide range of farmers. To improve the prospects of productivity improvement in cotton farming systems, programs should focus on a) targeted technical assistance to improve the efficiency and relevance of technical advice to farmers, b) improvement of the incentives for, and support to, farmers to intensify cotton farming systems, c) incentives for companies to pass on quality premia to producers and improve farm profitability, d) large-scale training programs on quality improvement, e) improvements in technology generation and transfer, and f) facilitation of access to inputs and equipment (animal traction).
- ***Improvements in research.*** While publicly funded cotton research in Africa appears weak it nevertheless has a vital role to play in helping to ensure the competitiveness and sustainability of the continent's cotton sectors over the long run. This claim is supported by three arguments. First, many (possibly the majority) of Africa's cotton farmers are, and will likely remain, too resource-constrained to close the yield gap with existing technology through more effective (timely) management of pests (weeds and insects) on *both* their food and cotton crops. Second, if cotton prices continue to decline as a result of productivity increases in other cotton producing areas of the world, and/or real food crop prices increase as result of global demand for plant-based energy feedstocks (a trend that will be aggravated further by outmigration from rural areas), farmers will find cotton less and less attractive over time with current technology. Finally, soil fertility management has become a critical issue in several West African countries, and is also affecting even the better endowed soils of ESA countries as evidenced by high levels of striga infestation. Improved cotton production technology therefore needs to be embedded in sustainable cropping systems to be socially and economically viable in the long run.
- ***Technology transfer.*** Two key technologies could potentially address the needs of cotton growers in Africa over the near to medium term: (i) genetically modified (Bt) cotton and (ii) low-volume herbicides. In the near term, access to Bt varieties is likely to come either through partnerships with private sector patent holders or, potentially, through collaboration with public research agencies in China. Bt cotton has arguably been the major source of yield gains in rainfed cotton in India and China over the past five years. While not without technical,

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organizational and public policy challenges that would need to be addressed if introduced in Africa, there is no reason to believe that Bt cotton varieties could not generate similar productivity gains given the technical inefficiencies and health costs arising from the use of current pesticide technology. Currently only Burkina Faso and South Africa have completed testing of Bt cotton varieties, with Burkina Faso in the negotiation phase with patent holder Monsanto. Most African countries have yet to begin testing Bt cotton varieties to evaluate the potential gains, and some even have a moratorium on such testing in place. Clearly researchers are only one group among many actors who must come together to create a technology delivery chain for Bt cotton, and many dimensions (e.g., biosafety labs, risk assessment) will have significant regional economies of scale.

291. Improvements in all of the above will depend on strengthening internal and external linkages between research and extension. Internal linkages are those that help articulate demands from the users of improved cotton technology (farmers on the production side and spinners on the consumption side), via the intermediaries who deliver technologies to users (ginning companies, extension workers) to researchers. Although various fora for consultation exist, expectations for and uptake of results are often very limited and as a result these internal linkages need to be strengthened. External linkages are equally necessary to achieve critical mass and maximize potential spillovers among researchers addressing common technology constraints and opportunities. Currently no formal cotton research networks exist in ESA and those in WCA are in urgent need of rejuvenation (CORAF / WFECARD).

Efficiency of Ginning Industries

292. The efficiency of ginning industries is critical to competitiveness and sustainability of the sector overall. In competitive and concentrated systems, companies demonstrate significantly lower operating and overhead costs. In national or local monopolies there are too few incentives to improve performances and efficiency of operations and reduce costs. Achieving significant productivity gains may imply some structural changes going well beyond the usual and fairly unproductive pressure put on these monopolies. For example:

- Reducing the cost in ginning and other off-farm activities would probably entail revisiting policies addressing issues such as the choice of technology (for ginning but also for cotton seed processing), the size of the industrial units, the (fiscal) incentives given to minimize investment costs by allowing the import of second-hand equipment, and the profile of strategic investors. As we have seen previously these factors are strongly linked to the sector's organizational model.
- Helping develop real cotton industry clusters – where related services (maintenance, transport, financial services) and inputs can be procured at competitive prices – could also contribute to improving the performance and costs in cotton sectors.

12.1.3. Improving sustainability, governance and management of cotton sectors

293. The final section of general recommendations for SSA cotton sectors concerns the sustainability of cotton sectors, and improving governance and management. There are two main findings related to improvements in this area:

- The financial sustainability of cotton sectors is very much linked to sector organization. The traditional single-channel systems of WCA (Burkina, Benin and Mali) have experienced

severe and recurrent problems of financial crisis, due as much to the lack of adjustment capacities of these systems as to world cotton price fluctuations and changes in the dollar/euro exchange rate. More realistic price setting mechanisms, improved risk management and new marketing strategies can help mitigate such problems in the future. Alternatively, competitive and concentrated systems in ESA have been operating on their own without requiring public subsidies or creating fiscal liabilities since the liberalization of these sectors in the early 1990s.

- Improving the management and governance of cotton sectors partly depends on institutions. Institutional strengthening should therefore remain high on the agenda and entail for example a) building up of inter-professional committees and farmer organizations, with special emphasis on the operational abilities of the latter, b) reforms of research organizations to make sure they are responsive to inter-professional committees and c) definition and enforcement of clear rules for evaluating and re-tendering concession areas.

294. The specific recommendations reviewed here relate to cotton sector performance in SSA generally, regardless of sector type. The remainder of this chapter turns back to the issue of sector type and the insights that can be gleaned from analyzing cotton sector performance through this lens.

12.2. Lessons from Reform Experience

Before drawing the conclusions of the analysis of performance and outcomes by sector type, three broad lessons can be highlighted as a result of this review of cotton sectors in Africa.

(1) There is clearly no one sector type that serves as the benchmark for overall performance.

295. This study aimed at performing a rigorous analysis on cotton sector structure and situations in the sample of countries, without any initial bias. The review has revealed strengths and weaknesses in various systems, particularly when one looks at them over a long time period. Two major conclusions must be highlighted at this point: (i) no one model has proven superior to all others in all respects over time, and (ii) none of the systems under review offers a comprehensive and sustainable response to the challenges of future competition in the world cotton market.

296. Some African cotton sectors may be faring better than others but on a global scale all of them are lagging behind the best performers in the world on one or several dimensions. Global competitiveness must therefore be kept in mind because it is a challenge common to all African sectors. Though they have succeeded in expanding their share of the world lint market over the past three decades, they face increasing competition, hence low future prices. This means that they must (continually) cut costs, raise productivity and add value if they are to maintain attractive returns to producers and to make a positive contribution to national poverty reduction goals.

(2) While there is no model of a cotton system, there is a lot to be learnt from the diversity of experiences in cotton sector reform in Africa.

297. As demonstrated in this study, many lessons can be drawn from comparisons of reform experiences between countries in order to inform future policies. Successful experiences – such

as the involvement of farmer organizations in primary marketing in WCA, the introduction of the passbook system in Tanzania, the quality management initiatives in Zambia and Zimbabwe, – contrast with errors and failures – such as the unregulated entry of private sector in ginning in Benin in 1994, the implementation of performance contracts in WCA systems in the early 1990s, the evaluation and re-tendering of concession areas in Mozambique, the overbidding of tenders for local monopoly zones in Burkina, and the privatization of the cotton seed industry in Mali in 2004.

(3) **Cotton sectors are complex sectors** to deal with.

298. Cotton sectors are intertwined with struggling rural economies and carry great weight in the national economies of many African countries. This adds a dimension of socio-political economy with potentially highly sensitive issues. For these reasons, there are generally no off-the-shelf solutions or quick fixes to short-term problems that have been arising in a number of countries. Each sector must seek ways of correcting its weaknesses whilst preserving and/or building on its strengths. To this end, the next section summarizes the main lessons to be drawn by sector type and the possible way forward for each type.

12.3. Summary of Expected and Realized Performance across Key Indicators

299. The final section of this chapter brings together information on the selected performance indicators, comparing expected to realized performance. This brief review will highlight two key points. First, as mentioned above, no one sector type performed sufficiently well on all performance indicators to be considered unambiguously “best”. Second, the expectations generated out of Chapter Four’s typology, regarding the strengths and weaknesses of different sector types, were borne out in a number of ways, if not in all cases. Relatedly, while specific policies and programs must emerge from the current and historical circumstances particular to each country, many key challenges are strongly related to sector type. This finding, along with the detailed empirical information that has been developed for the study countries, provides the basis for suggesting key elements of the possible and desirable way forward for each country.

Table 21 summarizes expected and realized performance across key indicators.

Table 21: Summary of Expected and Realized Performance across Key Indicators

Type of Indicator	Indicator	Expected Performance	Realized Performance	Comments
Process Indicators				
Quality and marketing	Estimated average realized premium over Index A on world markets (US\$/lb lint)	Best in concentrated, market-based sectors; Lowest in competitive; Indeterminate in national and local monopolies, depending on management culture and regulatory effectiveness.	Expectations largely confirmed in ESA market-based sectors; Zambia (most concentrated) +0.05/lb, Zimbabwe +0.03/lb, Uganda +0.02/lb, Tanzania (most competitive) -0.01/lb; State Monopolies in WCA lower than concentrated sectors in ESA, at par to +0.03/lb; Mozambique (local monopoly) worst at -0.02/lb.	Mozambique performance is highly variable across companies. Ineffective regulation and previous dominance of original investors (with little focus on productivity and quality) still affecting overall premia; Zimbabwe performance has fallen with new entrants; Mali is the poorest performer in WCA due to management issues.
Pricing	Mean % FOT paid to farmers	Best in competitive systems; Lower in concentrated, market-based sectors; In national and local monopolies, depends on political factors and bargaining strength of farmer organizations.	Expectations largely confirmed outside monopoly sectors: Tanzania (most competitive) 70%, Uganda 68%, Zimbabwe (more concentrated) 49%, Zambia (most concentrated) 55%; National monopoly systems all paid 71%-76% in 2000-2005, but lower levels in 1990s. Mozambique, with least powerful farm groups and local monop system is lowest at 48%.	High prices to farmers in WCA are not sustainable, but could come down to break-even levels for companies and still exceed prices in most ESA countries.; Prices exceptionally low in Zimbabwe in early 2000s, have risen with new entrants.
Input provision	a) % of cotton farmers receiving input credit, b) Adequacy/quality of input credit package, if provided c) Repayment rate	National and local monopolies best on provision and repayment, indeterminate on adequacy/quality; Concentrated, market-based sectors next best on provision, possibly with better incentives on adequacy/quality; Competitive sectors unable to provide inputs on credit.	Expectations largely confirmed: - % receiving input credit: ~ 100% in all WCA countries, Mozambique and Zambia; 90%-95% in Zimbabwe (2006/07); ~100% Uganda (subsidized cash sale); 0% in Tanzania. - Adequacy worst (though variable) in Mozambique; best in WCA, Zimbabwe (prior to 2003), and Uganda (under hybrid system) - Repmt rates consistently >90% in WCA; highly variable in Mozambique, Zambia; 90% but falling in Zimbabwe; NA Uganda and Tanzania	WCA, Zimbabwe, Uganda provide fertilizer; Uganda's provision enabled by hybrid system imposed on competitive structure; Adequacy falling in Zimbabwe, very low among new entrants; Tanzania able to provide small amounts of inputs through forced savings mechanism.
Extension	d) Provision of assistance e) Qualitative assessment of quality	Same as input provision (above)	Expectations largely confirmed, with exception of Mozambique, where some companies provide almost no extension	Measurement very difficult, and distinction between providing inputs and extension advice is not always clear

Type of Indicator	Indicator	Expected Performance	Realized Performance	Comments
Research	# of varieties released and taken-up, past 10 years	No clear prediction, though monopoly and concentrated systems may have better company input into breeding work	No clear pattern. Mali (6) and Zimbabwe (4) have most releases. WCA has seen much greater organizational stability in research, due to persistence of national monopoly approach.	
Valorization of by-products	Value of cotton seeds	Best in competitive systems; Lower in concentrated, market-based sectors; Abnormally low in Mali and Burkina	Expectations largely confirmed	
Intermediate Outcome Indicator				
Farm level performance	a) Mean yield past 5 yrs (kg seed cotton/ha) b) Trend, past 10 yrs	Expected performance on yield level strongly related to expectations for input provision and extension, but heavily influenced by past investments, especially in research; so typology alone does not deliver clear predictions; No clear prediction for yield trend	Mean yields remain highest in WCA; within ESA concentrated sectors perform best. However, yield stagnation in WCA since mid-1980s. Zambia (concentrated) provides best example of yield growth in ESA, but overall ESA yields have failed to close gap on world average.	
Overall Outcome Indicators				
Farmer welfare	Returns per day of family labor (US\$/day)	No clear prediction	Generally highest in WCA national/local monopolies, \$1.30-\$1.70; highly variable in ESA, \$0.79 in TZ (Competitive) to \$2.11 in Zimbabwe (Concentrated); worst in Mozambique (local monopoly) at \$0.44. (Past investments in animal traction important.	Not sustainable in WCA,
Company performance	Adjusted farm gate to FOT cost (US\$/kg lint)	Worst in monopolies, best in competitive sectors	Expectations largely confirmed: US\$0.31-0.45 in WCA monopolies, US\$0.38 in Mozambique; in market sectors, US\$0.21 in Tanzania to US\$0.32 in Zambia and Uganda.	Hybrid regulatory structure in Uganda protects inefficient companies. Roller gins and competition in TZ keep costs down.
Overall competitiveness	Ratio, total FOT cost to total FOT value	No clear prediction	WCA monopolies least competitive, 0.98 (Cameroon) to 1.15 (Mali); ESA concentrated and competitive much more competitive at 0.76 (Zambia) to 0.88 (Zimbabwe). 0.79 in Mozambique.	Low (i.e., competitive) figure in Mozambique due in part to very low prices to farmers; low figure in Zambia due in part to not passing quality premium to farmers; WCA has high farm prices and high ginning costs.

Type of Indicator	Indicator	Expected Performance	Realized Performance	Comments
Macro impact	a) Total value added per capita b) Net budgetary contribution per capita (taxes paid minus transfers received)	No clear prediction, as coverage of farmers may be greatest in national monopolies, but efficiency expected to be low	<p><i>Total Value Added:</i> no clear pattern by sector type, though concentrated market-based systems in ESA clearly best in that region, with Zambia and Zimbabwe ~ US\$6 per capita; Burkina highest of all at US\$9.15 per capita; Uganda and Mozambique lowest due to low production</p> <p><i>Net Budgetary Contribution:</i> Very poor in non-market based systems: Mali government paid net US\$2.47 per capita to sector in 2006, Burkina paid US\$0.81; sectors in Cameroon, Mozambique, and Uganda made positive but small contributions (US\$0.02-0.08); Market based sectors (Tanzania, Zimbabwe, Zambia) all made positive contributions of US\$0.14-0.18 per capita.</p>	<i>Value Added:</i> Tanzania (Competitive) has highest VA/kg lint, but highly variable production means macro contribution will also vary greatly. Zambia and Zimbabwe (Concentrated) show much less variation.

12.3.1. Performance on core activities and service delivery: “the Process Indicators”

300. The typology presented in this paper generated clear expectations regarding five of the six selected process indicators, and in all five cases, expectations were largely confirmed (Table 21). Concentrated sectors perform best on quality, and also provide input credit and extension advice to large shares of cotton farmers. Farmer coverage on inputs and extension in concentrated sectors is not as complete as in national and local monopolies, though the quality of extension assistance in the national monopolies has probably declined over the past twenty years. Credit repayment rates in concentrated systems, while typically high, are less stable than in national monopolies.

301. Mozambique’s local monopoly system generally underperforms expectations, with the highest quality discount on world markets and, in several concession areas, the poorest input supply outside of Tanzania. This performance is less surprising when one considers that the country emerged from a devastating civil war only in the early 1990s, and that its regulatory capacity remains very low. Tanzania’s competitive sector has been unable to provide any input credit or extension advice, and also performs poorly on lint quality, as predicted. National and local monopolies, as expected, show quite variable performance on lint quality.

302. Evidence is strong in Tanzania that, within market-based systems, competition increases prices paid to farmers. Recently the highest prices have been paid by the WCA monopoly systems, due to political factors and the strong negotiating abilities of farmer associations, but at great cost to the national budget and the broader economy. Taking a 20-year perspective, WCA sectors have been outperformed on price by Tanzania and Uganda.

303. Finally, we note that the relationship between the performance of seed processing industries and the type of cotton sector organization is complex. Our analysis shows that competitive and concentrated systems generated consistently higher prices for seed during 2006 than did national and local monopolies⁵⁹. It appears likely that these higher prices in the (market-based) competitive and concentrated systems are functionally related to the liberalization that has occurred in those sectors, but more data and analysis are needed to substantiate this conclusion.

304. Research system performance has the weakest links to our typology, in part because research systems do not lend themselves well to assessment through one or two key indicators. The effect of past investments is probably highest in this area. Mali, with many years of support from French research institutions, was able to carry on some of that momentum, and released six varieties over the past 10 years. However, an emphasis on improved ginning out-turn over higher seed cotton yields may have reduced the contribution that research could otherwise have made to reversing the yield stagnation seen in WCA countries. Zimbabwe, which featured close collaboration for many years between its own national monopoly, the research institute, and commercial farmers, has also been able to maintain some capacity in this area and released at least four varieties over the past decade. Other countries have been less successful in this regard, though Zambia has been quite effective purifying existing varieties and exploiting more of their yield potential.

⁵⁹ At the end of the 1990s in Mali cotton seeds were sold by the cotton company at a price of CFA 11/Kg, i.e. around 18 cts/Kg.

12.3.2. Performance on global outcomes: “the Outcome Indicators”

305. The typology generated clear expectations about one of the five overall outcome indicators: that company efficiency would be worst in monopolies and best in competitive sectors. This expectation was strongly confirmed. Adjusted farm gate to FOT costs in Tanzania’s competitive sector (the best performer) are less than half those in Mali’s national monopoly (the worst performer). In all national and local monopolies, costs are near or above the highest costs in market-based systems, and within these market-based systems, concentrated sectors show higher costs than competitive sectors (Tanzania).

306. The combination of high farmer prices and relatively inefficient companies – i.e. with relatively high operating costs - means that the WCA monopolies are, by a substantial margin, the least competitive sectors in the study. FOT cost:value ratios there range from 0.98 to 1.15, compared to a range of 0.76 to 0.88 in all other countries except Uganda. In the latter, the hybrid regulatory system has kept a large number of ginners in the sector without successfully increasing production, leading to a cost:value ratio of 0.93, the worst in ESA. Tanzania’s competitive sector and Zimbabwe’s concentrated sector, both of which subject companies to significant competitive pressure, both perform well. However, it is worth noting that the two most competitive sectors by our measure, Zambia at 0.76 and Mozambique at 0.79, have achieved these ratios in part due to the prices they pay their farmers. Mozambique’s price has been 20% to 30% lower than all other prices in ESA. Zambia’s price is substantially higher than Mozambique’s and not far below Tanzania’s, but reflects little if any of the substantial quality premium that Zambian companies receive on the international market.

307. Returns to farmers have been the best in WCA monopolies (plus Zimbabwe). These high returns are heavily influenced, of course, by the high prices paid in recent years, which have been coming down and still have to come down if these sectors are to become more competitive and sustainable. However, the main reason for the high returns to farmers is that, by facilitating access to animal traction, fertilizer, and training over many years, these countries have been able to move large shares of farmers into high yielding producer groups: an average of over 70% of WCA farmers are in groups 1 and 2 (see Chapter 10), compared to a range of 20% to 30% in all other countries except Zimbabwe. The latter looks more like WCA countries, with 60% in these top two groups. Mozambique, a poorly regulated local monopoly, shows the lowest returns, driven by relatively poor yields and very low farmer prices.

308. Turning finally to our macro indicators, concentrated systems clearly perform the best in ESA on value added per capita, driven by the financial capacity of firms to provide an adequate input package to large numbers of farmers. Tanzania shows high total value added during good production years, but has the largest population in the sample, which lowers the per capita indicator, and also has considerable unexploited cotton production potential in the country (a fact that lead stakeholders are well aware of). Despite their relative inefficiency, WCA cotton sectors (especially Burkina Faso, which has by far the highest per capita value added) perform well on this indicator because they attract very large shares of farmers into the sector and help most of them achieve relatively high yields.

309. However, in Burkina Faso and Mali this performance has come at a steep cost to the rest of the economy, and especially to the state budget, in recent years. Following the 2006 season, Mali’s cotton sector will require a net budgetary transfer of US\$2.47 per capita to cover its losses,

while Burkina's will require US\$0.81. Alone among the WCA countries, Cameroon was able to cover recent sector losses through surpluses generated in earlier years. Overall, and even excluding Mali and Burkina, the market-based sectors (Zambia, Zimbabwe, Tanzania) made net per capita budgetary contributions in 2006 at least twice as large as the monopoly or hybrid systems (Cameroon, Mozambique, Uganda).

310. Summarizing, we find that the WCA national monopoly model has generated strong returns to very large numbers of farmers, but that poor incentives for cost efficiency have undermined the sectors' competitiveness, even if the recent high producer prices were reduced to be more in line with the market-based systems of ESA. It seems clear that the appreciation of the euro vs the dollar in recent years has contributed to the current lack of competitiveness, but poor cost control within the parastatal companies is also significant. Substantial cost reductions are needed, particularly in Mali, but also in Burkina and even in relatively well performing Cameroon. These cost reductions seem unlikely to come without fundamental change in the systems. For that policy-makers and stakeholders should look at the full range of options, institutional but also in terms of technologies both at field and processing levels (ginning and cottonseed processing). The major lesson of recent years shows that the producer price cannot be treated any more as the adjustment variable without jeopardizing the sector's financial sustainability.

311. Competitive sectors are cost efficient and pay attractive prices to farmers, but their inability to provide input credit and extension, or to raise quality, means that they are unlikely to make substantial contributions to poverty reduction as long as input and credit market failure remain prominent features of rural Africa. It also seems likely that Tanzania's competitive system has been able to perform as well as it has due in part to favorable agro-ecological and population settlement characteristics, and that the performance of a competitive model would be somewhat poorer in less well endowed areas such as WCA. Concentrated sectors have performed well in quality and service delivery (input and extension), have been more efficient than the monopolies, and have also generated attractive value added per capita while making the highest contributions to state budgets through taxes and fees. Yet since 2000 their performance on seed cotton pricing has been disappointing. These systems also appear to be unstable; their future prosperity is likely to require a supportive approach to regulation, something that has yet to be achieved within an African cotton sector (see below for more details on key elements of such regulation).

12.3.4 Ways Forward for Particular Sector Types

National and Local Monopolies

312. We suggested in our typology that change in national monopolies depends on policy choice, and that such change was likely to be towards local monopolies or concentrated, market-based systems. History and cultural norms in WCA suggest that initial change in the region will dominantly be towards local monopolies, and recent policy decisions in Burkina and Mali support this conclusion. In the context of possible continued high level of the dollar/euro exchange rate, the biggest challenges in these sectors includes improving cost effectiveness of the cotton companies, tackling stagnant productivity at farm level, raising quality, developing pricing formulae make price setting more connected and responsive to world market prices and identifying ways for cotton companies to improve management of the intra-seasonal price risk they incur because of the panterritorial, panseasonal price setting mechanism. What, then, must these countries do to tackle these problems in a local monopoly setting?

313. To answer that question we turn to the experience of Mozambique. Mozambique has shown that performance under such systems can be quite poor. Yet this country is probably a poor predictor of the performance of the WCA systems for several reasons. First, Mozambique at the time of reform had almost none of WCA's history of substantial farm level input use, investment in animal traction, technical advice to farmers and regular release of new varieties. WCA thus starts at a much higher level than Mozambique and needs to renew productivity growth rather than start it from zero. Second, the inter-professional approach to sector coordination that has emerged in most WCA countries provides much greater promise of consensual sector management than in Mozambique. Finally, and related to the last point, farmer organizations are much more developed in WCA than in Mozambique, though their technical capacities remain very uneven.

314. That being said, recent positive developments in new concession areas of Mozambique do hold a lesson for WCA. First, private sector capital and management must have a prominent role in the reformed sectors. Second, not all private capital will perform well. Policy makers need to choose these private investors carefully to ensure that they have the knowledge, commitment, and financial capacity to deliver high quality services to farmers.

315. If these countries do move to local monopoly arrangements, key factors which they need to take into account include the following:

- Cost reduction from farm gate to FOT needs to be a top priority. To achieve this, private companies need a greater role than they have been given in Burkina Faso. There, the fact that SOFITEX controls 85% of the market, combined with its apparently soft budget constraint and the sector-wide price setting mechanism, has done little if anything to spur sector wide cost reductions. If government is to maintain a role in a cotton company, it must do so at a substantially lower market share.
- If concession zones are to be auctioned, care must be taken to avoid sales prices so high that they make it difficult for the new companies to compete. In Burkina, high auction prices in Burkina may have undermined the new companies' ability to compete with SOFITEX in a context of declining prices for lint and overvaluation of the currency.
- Price setting would need to occur in a negotiated setting, but rules must continue to be reformed to provide reasonable assurance to companies that, if they operate efficiently according to international standards, they will be able to earn a reasonable return on their investment over time. Some level of price flexibility over the course of the marketing season may need to be a part of the revised pricing approaches. Cotton companies need to recognize and improve the management of their exposure to cotton price and exchange rate volatility.
- Inter-professional committees and farmer organizations need to continue to be developed, with special emphasis on the operational abilities of the latter.
- Clear rules for evaluating and re-tendering concession areas need to be developed, as this has been a key failure in Mozambique.
- Reforms in research organizations continue to be needed to make sure that they are responsive to these inter-professional committees.
- Investment in the oil sector should be encouraged in order to create more competition. Burkina and Mali are land-locked, at a deficit in edible oil, and have strong demand for cake

from local livestock sectors, yet prices paid to cotton companies for seed are the lowest of the eight countries due to monopoly power in the oil sectors, whether public or private. In Uganda, a competitive oil sector makes a significant contribution to ginning company profitability due to the strong prices paid for cotton seed. Small scale investment in Tanzania has also led to more attractive prices for cotton seed. Similar investment is starting to take place in Mali, and should not be discouraged.

316. Three findings from this research are especially relevant if WCA countries instead consider moving to a concentrated, market-based system. First, these systems are unstable, potentially with tipping points in which the entry of two or three additional companies can dramatically reduce the prospects of coordination for input supply, extension, and quality control. Second, WCA's agro-ecological conditions (especially, the low fertility of its soils) suggest that a competitive sector (the likely outcome of such instability) may perform quite poorly unless farmer organizations are strong enough to ensure broad-based access to inputs themselves. Finally, though farmer organizations in most WCA countries are much stronger than in ESA, few if any appear strong enough to take on this challenge in the near future. Moving to a fully privatized market that allows competition among companies, even if the market is initially very concentrated, is thus a risky proposition for WCA countries. If, instead, these sectors can use the local monopoly approach to build up the operational capacity of farmer organizations, concentrated and eventually competitive systems could perform well.

317. Meanwhile, the key challenge in Mozambique's local monopoly sector is how to create incentives for good company performance within the concessions. In the absence of strong farmer associations, these incentives have to come from some combination of improved rules governing (re-)tendering of concessions, procedures for monitoring performance by concessionaires, and careful selection of companies. Recently, it appears that Mozambique has done a good job on the latter, with newer companies clearly outperforming original concession holders. Prices to farmers remain very low however, and are unlikely to improve without improved regulation.

Concentrated Sectors

318. In the absence of explicit policy choice, concentrated systems can move over fairly short periods of time towards more competitive systems (see Box 3 in Chapter 4). This tendency is driven by modest economies of scale in processing (especially where investors are familiar with roller gin technology), by the ready supply base awaiting new investors (thanks to the investments of existing firms in input credit and extension), and by the absence of regulatory regimes that attempt to maintain the concentrated structure. Governments can also contribute to these changes by promoting new investment, often without regard to the new investors' commitment to productivity and quality; existing companies may also unwittingly attract new investors by paying excessively low prices to farmers, as in Zimbabwe in the early 2000s. Such change may improve prices to farmers (though the evidence on this is limited) but can also have very negative implications for credit repayment (and therefore for future input credit provision) and quality. Zimbabwe has seen problems in both these regards since 2003, while Zambia's problems in 2006/07 affected credit repayment and provision but are too recent to have had observable effects on quality. In both cases, new entrants have been too small in size to exert much price pressure on existing companies.

319. The key challenge for concentrated sectors, therefore, is to develop a flexible and commercially supportive regulatory regime that understands the strengths and weaknesses of the concentrated model. Specifically:

- Concentrated sectors need barriers to entry (licensing rules that specify strict capabilities and conduct of firms wishing to participate in the sector) to defend the ability of firms within the sector to coordinate on input supply, extension, quality control, and perhaps other matters.
- Concentrated sectors must retain some contestability to provide incumbents with an incentive to maintain attractive seed cotton prices. As in the case of local monopolies, it is important for those in charge of policy for the sector to form a clear idea of the types of company that they wish to allow into the sector, so as to be able to formulate rules accordingly. Given these sectors' tendency to slide towards unrestrained competition and credit default crises, a strong commitment to raising farmer productivity and improving quality within the chain should be given high priority in the selection criteria
- Given the problems of relying entirely on the threat of entry to discipline incumbent firms within concentrated sectors, it may also be desirable to develop price setting mechanisms that are more formalized than the price leadership that has prevailed in concentrated systems so far. As piloted in WCA sectors, farmer organizations have a potentially very important role to play within such mechanisms. However, this role needs to be informed by a solid understanding of world markets to avoid the problems so far seen in WCA.

Competitive Sectors

320. As could be expected, there are fewer concerns over pricing within competitive sectors than in other sectoral types. Instead, the weaknesses are in the areas of service delivery and quality control. Given the pervasive failures in credit and input markets in rural Africa, our typology suggested that competitive sectors may face pressure to move towards more coordinated sectors and that, if movement were to occur, it would most likely be to a local monopoly or hybrid system. Uganda began experimenting with solutions to input and seasonal finance market problems nearly as soon as it emerged from reform with about 30 active ginners. In 2003 it moved to a hybrid sector model that included zoning and seed cotton quotas, as a way of providing incentives for investment in input supply. By contrast, Tanzania has evolved an approach to input supply that features an important role for government, but has always looked for arrangements that allow it to preserve its strong competition among firms in the market for seed cotton. (Chapter 6 suggests reasons for these different approaches in the two countries).

321. Key insights from this work regarding competitive systems include:

- Within a competitive sector, such coordination as does occur is likely to come from a central body. Given the difficulty of obtaining consensus amongst large numbers of competing ginners, the state is likely to have to play a key role within this body. This is in contrast to local monopoly or concentrated systems, where inter-professional committees dominated by ginners and farmers have more potential to adequately manage the sector. The risk with allowing a state agency to play such a central role is that they can make mistakes, even if well-intentioned, and could do worse if rent-seeking or other motivations prevail. Thus, there is a need to strengthen the accountability of regulatory bodies towards both ginners and farmers.

- Incentives within competitive sectors for individual ginners to support long-term programs, such as initiatives to enhance soil fertility or promote animal traction, are extremely limited. Thus, the Cotton Board and/or the ginners' association may have to work with other actors (e.g. local government or donors) to develop programs, which enhance the asset base of farmers and also generate benefits beyond the cotton sector. In the same way, they could possibly explore seasonal financing models (e.g. SACCOs in Tanzania) that over time might allow some farmers to access greater quantities of purchased inputs for cotton production.
- Uganda's hybrid approach to solving the input credit problem in competitive systems has kept all ginners in the market but has, after four years, failed to increase total production despite improved service delivery. The system has therefore entrenched the sector's chronic overcapacity, leading to operating costs that are much higher than they would otherwise be, especially considering the heavy use of roller gins in the country. Generalizing, we suggest that hybrid approaches within competitive sectors need to avoid protecting ginners from competitive pressure from within the country.
- Tanzania's agro-ecological and population settlement characteristics have so far protected it from the need to take the type of radical measures that Uganda has taken for input credit provision. However, if yields begin to fall due to declining soil fertility (or possibly one day to increasing pest pressure), and if it wants to more fully realize its potential, the country may need to move to a more coordinated approach.

12.4. Final Reflections on Sector Types

322. The analysis has demonstrated that key outcomes are dependent upon – and can be predicted by – the type of sector organization. The typology offers a fairly strong and reliable framework to provide insights about possible evolutions of African cotton sectors. In the short to medium term, the most likely change within African cotton systems is an increase in the number of local monopoly systems. Over time, however, local monopolies could be a transition towards market-based sector types such as concentrated and competitive systems. If so, the most desirable type is probably a concentrated system. Concentrated systems have desirable properties if regulatory challenges can be overcome (see above) to make them more stable. For example, if clear licensing rules can be developed, total regulatory costs under a concentrated system may be lower than with regional monopolies⁶⁰, while incentives for cost reduction are greater. Assuming that appropriate regulatory models can be developed, the strength of farmer associations in WCA (relative to most countries of ESA) could mean that the local monopoly stage could be a reasonably short one. However, additional attention must still be paid to educating associations about the realities of the world cotton market and to increasing their operational capacities.

323. More competitive systems are (perhaps) the long-term future. However, there is a need both for stronger farmer associations to take over some critical functions (e.g. extension) and for improvements in rural input and financial markets before competitive systems can support genuinely high performing cotton sectors in most countries. For the foreseeable future,

⁶⁰ Dominant firms have incentives to cooperate with each other in concentrated sectors, whereas in local monopolies there is a major onus on the regulatory body to monitor concessionaire companies that may be reluctant to disclose information. The costs of (re-)tendering concessions may also be higher than the costs of issuing licenses under a concentrated system and the (re-)tendering process may encourage firms to invest more in maintaining relations with the regulator than in improving performance in their monopoly areas.

competitive systems will have a hard time increasing productivity and quality to such an extent that they make a major contribution to reducing poverty. Therefore, stakeholders, policy makers, and donors cannot avoid dealing with the details of institutional design to cope with input- and credit market failure. This design needs to be tailored to the current market structure and historical patterns of the country in question.

324. Overall, we may expect some degree of convergence in the forms of cotton sector organization seen in Sub-Saharan Africa over the next decade, with emphasis on a degree of private sector competition, an important role for farmer associations, and a multi-stakeholder approach to sector regulation.

APPENDICES

APPENDIX 1: METHODOLOGY FOR FOCUS GROUP DISCUSSION ON FARMER TYPES

In several of the study countries, formal household surveys provide data on cotton yields and input use that can be stratified to show the performance of different categories of farmers. However, the difficulties of collecting reliable labor data in such surveys means that most of them do not contain information on labor use by different categories of cotton farmers.

To provide insights into labor use at modest cost, focus group discussions were undertaken in seven of the nine study countries (all except Cameroon and Benin). Discussions were undertaken in two (Burkina Faso, Mali) to six (Mozambique) villages per country, with efforts made to compare across regions or districts where there were considered to be important geographical differences in performance (Mozambique, Tanzania, Zimbabwe, Zambia) and also between more and less accessible villages within an area (Tanzania, Mozambique).

In all cases except Mozambique, a single group of informants provided information on cotton farmers in their village. There were commonly 5-10 informants per village. In Mozambique, a larger number of respondents was divided into groups (based on level of cotton production) with each group providing information on its own activities, albeit in the presence of people from other groups.

The first activity in each focus group discussion was a participatory ranking exercise based on the principles of wealth ranking. Where possible⁶¹, the name of every head of household in the village was recorded, then informants were asked to place the cards in piles based on the level of cotton production achieved by the household in a “normal” year. In most cases, this produced three or four piles. If one pile (typically the lower producers) was much larger than the others, the researchers asked for a further disaggregation of this group. In Mozambique, farmers were asked to divide themselves into groups and, after verification of each farmer’s yield, each group responded in turn.

1. Once the groups had been identified, the informants were asked to describe the characteristics of households in each group, covering demography, income sources and food production, as well as cotton production. This gave a picture of a “typical” household in each group. A crop budget was then drawn up for each group for one hectare (or acre) of cotton in a “typical” recent season⁶².
2. The overall assessment is that the focus group discussions were a cost-effective way of collecting reasonably reliable data on cotton production activities by different groups of farmers. However, we do note the following issues:
3. The method tends to accentuate inter-group differences at the expense of intra-group variation. Thus, top groups are characterised as being able to rise above

⁶¹ In Tanzania, each of the four villages contained 500-1000+ households, so it would have been too time-consuming to use the full list. In addition, while village leaderships could always give a figure for the number of households in their village (based on the previous census and subsequent adjustments), complete lists of all household heads were not always available. In the latter case, names were drawn at random from the lists for individual “wards” that were available.

⁶² The entire exercise took three or more hours per village. Researchers thus provided food part way through the process.

many of the problems that constrain poorer households and the impression is given that they uniformly achieve the best yields. Similarly, the dominant narrative for poorer households is that cotton yields and profitability are compromised by equipment, cash or labor shortages.

- Current local issues may receive undue attention. One example was the legal requirement for Zimbabwean farmers to cut down their standing crops by August 15th, following the harvest, which farmers in one area claimed far too expensive to do, given labor shortages.
- If farmers are feeling dissatisfied with cotton (which many are for various reasons), then they may inflate estimates of labor input to make a point. Facilitators need to have some grasp of comparative data from elsewhere to interrogate initial statements from focus group members where these appear questionable. With probing questions, plus comparisons across different groups within the village, informants will often arrive at a more considered final estimate.
- Where an extension agent is present during discussions, respondents may give the “correct” – but untrue – answers that are in line with extension recommendations. Questions on input use appear particularly susceptible to this, as observed in Burkina Faso, Mali and Zimbabwe. In one Zimbabwe focus group, researchers challenged the initial statements from group members about input use by the poorest groups. Eventually respondents admitted that the lower groups do not follow official recommendations and gave a “true” picture, which prompted the extension agent to confess to the researchers afterwards that he had never realized this!
- Finally, there is a question of what constitutes a “normal” year. In Tanzania, 2003/04 and 2004/05 were bumper harvests, with national yields around 50percent above the long-term average. Focus group estimates of normal performance reflected these recent good years. However, 2005/06 had been a drought year, with national production a third of its level in the previous two seasons. As a result, seed cotton prices were driven up by companies scrambling to obtain scarce supplies. It is clear that an indicative budget should not combine the good yields of 2003/04 and 2004/05 with the high prices of 2005/06. In Mozambique a similar situation prevailed, with a near record harvest in 2005/06.

We handle the issue of what constitutes a “normal” year in two ways: by some initial data adjustments, combined with the construction of alternative scenarios for some countries. The data adjustments for our “base cases” are as follows:

- In Tanzania, we use reported yields (consistent with national performance in 2003/04 and 2004/05) in our budgets, but adjust seed cotton prices downwards (from those recorded in 2005/06) to reflect plausible prices in a good year. This is achieved by setting the average seed cotton price to 65percent of the f.o.t. lint equivalent price (the share received by farmers in 2004/05). Seed cotton pricing in Tanzania works by companies agreeing an opening price, based on a cautious estimate of their costs and desired profits, with market competition then driving the price up as the season progresses. The opening price is not heavily affected by the season, but when the harvest is good the price will be driven up less than in a drought season when companies are desperate for seed cotton to fulfill contracts. Thus, in adjusting prices to reflect a good season, we have lowered the average price received by the top producers (who sell more of their produce late in the season) by more than the average price received by the poorer producers (who are forced to sell much of their produce as soon as the season opens in order to meet pressing cash needs).

- In Mozambique, budgets were constructed for four groups of farmers. A nationally representative annual household survey allows us to examine the distribution of cotton yields in both 2004/05 (a drought year) and 2005/06 (a good rainfall year). The national yield spread is roughly imitated by the following combination of focus group budgets: 2005/06 – group 1 (40percent), group 2 (20percent), group 4 (40percent); 2004/05 - group 1 (20percent), group 3 (20percent), group 4 (60percent). Unlike the case of a competitive cotton sector such as Tanzania's, however, prices in Mozambique vary less between good and bad seasons. In this report, therefore, we consider just one scenario (Figures 8.5 and 8.7) where the balance of producers across groups is assumed to be as follows: group 1 (5percent), group 2 (25percent), group 3 (30percent), group 4 (40percent).
- In Mali, information on actual yields for the past three years in the villages where focus group discussions were held were available from the local extension agent. The average village-level yield was similar to the average national yield (approximately 1100kg/ha), but higher than the weighted average yield generated by focus group discussions (approximately 1000kg/ha). For the budgets, therefore, the yields reported by the focus groups were adjusted upwards by 10percent.

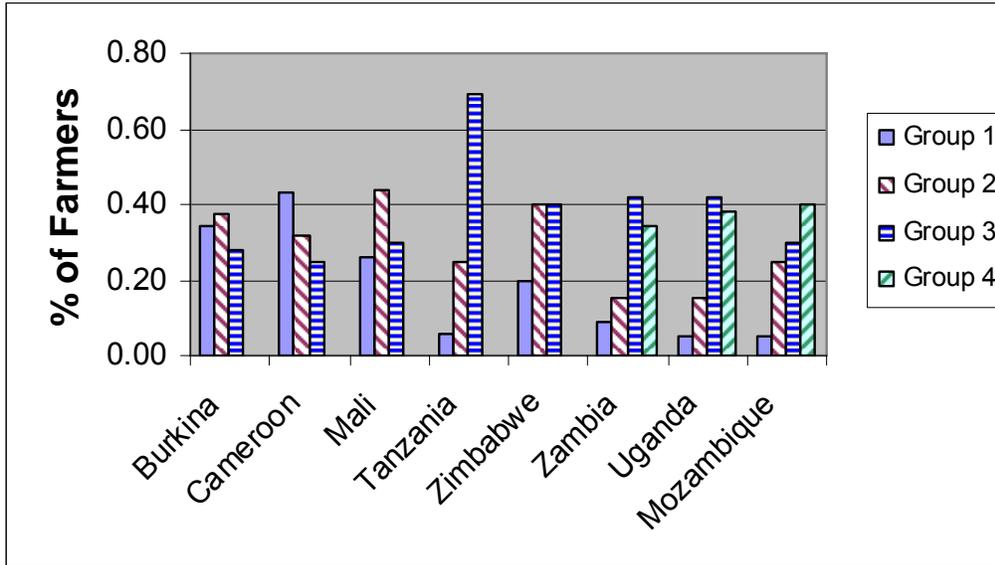
Distribution of Producers Across Groups

Figure 19 shows estimates of the proportion of cotton farmers found within each group. We determined these figures in a number of ways. In Mali, Zimbabwe and Zambia, the numbers are taken from the focus group exercises. In these countries, all farmers from each village were assigned to one group or another. The data are thus strictly only representative of the focus group villages and at best only illustrative of the picture more widely. Yet in each case, the weighted average yield figures which result from these proportions are plausible in light of other information for the country. In Burkina Faso and Cameroon the data are from monitoring reports by SOFITEX and SODECOTON, respectively. In Tanzania, the numbers are taken from a 2004 cotton farmer survey (Maro and Poulton, 2005)⁶³, while those in Mozambique are based on a 2005 cotton farmer survey in two provinces spanning a wide range of typical yields in the country.

A striking observation from Figure 19 is that WCA sectors have a much higher proportion of households in groups 1 and 2 than ESA sectors. This reflects investments made over the years in the promotion of animal traction and use of fertilizer. The significance of this difference across sectors becomes apparent in the next section.

⁶³ In the one Tanzania focus group where respondents divided farmers into four groups and where the number of households per group was recorded, the proportions were as follows: group 1, 7%; group 2, 20%; group 3, 28%; group 4, 46%. This is very similar to the proportions shown in Figure C.

Figure 19: Proportion of Cotton Farmers by Farmer Group



APPENDIX 2: PROPOSED AREAS FOR FURTHER RESEARCH

The following are areas worthy of additional research:

(1) Zambia and Zimbabwe currently present outstanding opportunities for increasing understanding of whether and how concentrated (market-based) sectors can develop co-regulatory approaches that strike an effective balance between limiting and shaping entry to the sector while enhancing incentives for companies to pay attractive prices to farmers. This opportunity is especially important, as it is anticipated that concentrated sectors may be a logical follow-on to local monopolies in WCA's reform process, and that some conditions suggest local monopolies need not last too long in that region.

(2) Within WCA, Côte d'Ivoire's sector has reformed more than any of the study countries, with the possible exception of Benin (though the latter's current situation is so complex that generalizable lessons are quite difficult to draw from it). As the country stabilizes following the end of its civil war, a careful assessment of its reform process may be warranted.

(3) An improved understanding of the economics of roller ginning is needed. This involves analyzing the low investment cost and apparent scalability of roller gins and investigating what this approach implies for – a) the contestability of markets, b) the ability of any kind of concentrated system to maintain itself, and c) the ability of farmer groups to enter as ginners.

(4) Since the cotton market is a highly volatile one, and exchange rate movements also have an impact on the sustainability of the sector, it is important to improve risk management mechanisms in SSA. Panterritorial, panseasonal price mechanisms pass extremely high levels of financial risk to cotton companies, who are often ill-equipped to monitor and manage such them. In many countries, farmers, cotton companies, and banks can benefit from capacity building on this issue, particularly since it includes information about the global market, relationships between local and international prices, and quality premiums. To ensure that training programs are designed with individual country situations in mind, it will be useful to conduct a more comprehensive review of the current pricing, financing, and marketing strategies of cotton companies and ginners in both regions.

(5) There is a need to understand the behavior and dynamics of different cotton farm groups/categories. For example, it would be very useful to know, for each main category, the main structural constraints that they are facing, how they react to incentives, what are the margins of technical progress and what kind of support programs could help them benefit more from cotton cultivation.

(6) It would be useful to carry out a review of existing long-term forecasts of price impact of cotton prices since if they continue to decline as a result of productivity increases in other cotton producing areas of the world, and/or real food crop prices increase as result of global demand for plant-based energy feedstocks (a trend that will be aggravated further by outmigration from rural areas), African farmers will find cotton less and less attractive over time with current technology.

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