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Cotton-Textile-Apparel Sectors of Pakistan

Situations and Challenges Faced

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The two other main reports from this project are a corresponding Discussion Paper focused on the cotton–textile–apparel industries of India and a research report in which we evaluate the intersectoral linkages among these sectors and their effects on rural and urban poverty in Pakistan in the framework of a CGE model. The results of one or more of the components of this study have been presented at two professional meetings (American Agricultural Economics Association, July 2006; Pakistan Society of Development Economists, December 2006); at several policy outreach/discussion meetings with industry, academic, and government representatives in Pakistan (Islamabad Club, Islamabad, December 2006; Punjab Ministry of Commerce, Lahore, December 2006); at seminars at IFPRI (January and April 2007 in Washington, D.C., and April 2007 in New Delhi, India), NCAER (2007), the World Bank (September 2007), and the University of Guelph (June 2008); at the Conference on Rural Development and Poverty hosted by Pakistan Institute for Development Economics in Islamabad, Pakistan (April 2007); at the World Bank Workshop on Effects of Agricultural Price Distortions on Growth, Income Distribution and Poverty, West Lafayette, Indiana, (June 2007); at a conference of the Poverty Reduction, Equity and Growth Network, Berlin, Germany (September 2007); and at an NCAER-IFPRI conference in New Delhi (July 2008). We thank participants at these presentations and meetings for helpful suggestions and comments.

ABSTRACT

Cotton, textiles, and apparel are critical agricultural and industrial sectors in Pakistan. This study provides descriptions of these sectors and examines the key developments emerging domestically and internationally that affect the challenges and opportunities they face. One-quarter of Pakistani farmers, of whom about 40 percent have household incomes below the poverty line, grow cotton. Export controls and taxes kept cotton prices below international levels until the mid-1990s but have subsequently tracked export parity international levels following reforms to trade and pricing policies and a greater role for the private sector. Pakistani farmers have not formally adopted genetically modified Bt cotton but there is some field evidence of its unregulated use.

Despite constraints in its production, storage, and ginning sectors, the production of cotton yarn increased at an annual rate of 4.7 percent during 1990–2005 and Pakistan's share of world output increased to nearly 10 percent. Cotton-related products account for nearly 60 percent of Pakistan's export earnings. The textile industry still produces mostly fabrics of relatively low count (low quality) although it has been successful in expanding its exports of some higher-value products. The industry will need further entrepreneurial initiatives to remain competitive in international markets.

Among the farm households that produce cotton, about 40 percent of total income comes from its production. The decline in world prices that occurred in the late 1990s adversely affected these households. Household-level simulations suggest that a counterfactual 20 percent increase of cotton prices, which reflects the extent to which real cotton prices declined in Pakistan during this period, would have reduced the percentage of cotton-producing households below the poverty line in 2001 from 40 percent to 28 percent. The estimated effect from declining cotton prices explains about one-sixth of the overall observed increase of rural poverty in the period.

Keywords: cotton, textiles, apparel, rural poverty, subsidies, industry policy, world markets

1. INTRODUCTION AND OVERVIEW

David Orden and Caesar B. Cororaton

Cotton, cotton-related products, textiles, and apparel are important commodities and comprise critical agricultural and industrial sectors in Pakistan and India. A number of key developments are emerging domestically and globally that potential will have profound effects on the cotton–textile–apparel sectors of the two economies. The industries face the challenge of remaining competitive in the context of the elimination of the Multi-Fiber Agreement (MFA) quotas on textile and apparel trade under the World Trade Organization (WTO), the emergence of China as a huge textile and apparel exporter, and new and potential intraregional trade agreements. Implementation of the final WTO ruling against U.S. cotton subsidies, a new U.S. farm bill in 2008, and a possible agreement to multilaterally reduce cotton subsidies and tariffs across the related textile and apparel sectors in the Doha Round WTO negotiations may also affect the cotton and related processing industries of Pakistan and India. .

This Discussion Paper presents results from one of three main outputs of a research project on the cotton-related sectors of these two countries undertaken by the International Food Policy Research Institute (IFPRI) October 2005 through June 2007.¹ In the context of the issues cited above, the overall goal of the study was to assess the intersectoral linkages in production, consumption, and trade from raw cotton through final apparel and to evaluate the effects of changes in domestic policies and world trade opportunities in these products on the related agricultural and industrial sectors and on rural poverty in both countries. There were two principal objectives of the study.

- The first research component was to analyze the marketing and producer support policies related to cotton, cotton yarn, textile, and apparel production and trade in Pakistan and India, including assessment of the structure and levels of income of cotton farmers, the cost structure and flows in the cotton and processed cotton product markets; a detailed description of cotton/textile trade, pricing, and marketing policies since 1990; and the calculation of protection coefficients.
- Having assessed the responses of domestic farm-level and industry prices in Pakistan and India to changes in world price levels, the second research component was to analyze the effects of changes in world cotton and textile prices and trade opportunities on poverty among farmers, landowners, agricultural and industrial laborers, and other households.

Our assessment of the impact of cotton/textile trade policy on poverty rests on two complementary approaches. First, using available household data for each country, we characterize different types of rural households and their dependence on cotton production and cotton-related employment. We then evaluate the impact of lower cotton prices on rural poverty among cotton-producing households using partial equilibrium (single equation) simulations for Pakistan and India. This provides an analysis of both short-run (supply-fixed) and long-run (supply price–responsive) direct effects of changes in cotton prices.

Second, for Pakistan, a more comprehensive CGE analysis, which explicitly models the economic responses of producers to the price incentives they face and the consequent intersectoral effects on production and household incomes and consumption, complements the partial equilibrium poverty assessment. The CGE model captures interindustry linkages, particularly vertical product linkages, in cotton production and procurement, yarn, and textile and clothing production, building on a recently completed social accounting matrix (SAM) constructed by Paul Dorosh, M.K. Niazi, and Hina Nazli (2004). There has been substantial progress recently in the integration of household information with

¹ The project was “Pakistan-India: Cotton Trade Policy and Poverty Study” (EW-P091261-ESW-TF055329), supported by the Agriculture and Rural Development Sector Unit, South Asia Region, World Bank.

CGE model simulations, and we incorporate these innovations into our analysis to assess disaggregated effects on poverty from the policy simulations.

This Discussion Paper addresses the first project objective by presenting a description of the characteristics of the cotton–textile–apparel sectors of Pakistan and the challenges that these sectors face. We address the second objective by presenting the partial equilibrium analysis of the effects of price changes on rural poverty in Pakistan. A companion Discussion Paper provides similar analysis for India (Bedi and Cororaton, 2008). A third report presents the CGE analysis of the project (Cororaton and Orden, 2008).

1.1. Overview of the Findings

Since 1990, Pakistan and India have undertaken substantial reforms in their cotton/textile industries, increasing the role of the private sector. This Discussion Paper provides a careful review of the effectiveness of these reforms in Pakistan. Senior research staff at IFPRI and collaborators in Pakistan drafted the individual chapters. We examine the industry structure at various stages of production, processing, and marketing by reviewing recent industry literature and analyzing industry trends using secondary data. Focused interviews of major players in the industry—including farmer organizations and progressive farmers, selected cotton ginneries, textile association representatives, traders, and the manufacturers and exporters of cotton and various textiles products, as well as with policymakers—provide a key dimension. These discussions and interviews focused on sector-specific issues in the factor markets, the product and export markets, the policy environment, existing constraints and prospects facing the industries, and likely challenges and opportunities in the near future. We present original simulations assessing the effects of cotton prices on poverty among cotton-producing households.

The remainder of this introduction and overview summarizes the analysis from each chapter.

Chapter 2: Global Cotton and Textile Markets

This brief introductory chapter provides an overview of world markets in cotton, textiles, and apparel as context for the country-level analysis that follow. Global cotton production has doubled since the early 1980s and increased by about 20 percent since 1990 due primarily to yield growth. Acreage, although varying annually, shows little trend growth. The United States, China, and India are the dominant cotton-producing countries, accounting for nearly 65 percent of world production. Cotton production has increased at a faster than world average pace in India and Pakistan since 1970; and as a result their shares of total cotton output have increased over the past 35 years, with Pakistan now providing about 9 percent of world output and India about 20 percent. In India, the implementation of the Bt cotton program in 2002 increased cotton production by 106 percent from 2002 to 2006. The United States, Brazil, Africa, and Australia dominate exports of cotton. Like China, which now imports about one-fifth of the world's total cotton traded, both Pakistan and India have declined as cotton exporters, and in some years they are net cotton importers, as their domestic spinning and textile industries have expanded.

Cotton prices, and specifically the effects on world prices of the subsidy and trade policies of developed countries, have been controversial in the Doha Round of WTO negotiations. Chapter 2 traces the movement of world cotton prices, noting their decline over the past 10 years from relatively high levels in the mid-1990s. We review a set of studies estimating the impact of subsidies in driving prices lower than they would otherwise be. We put these effects in the context of other short- and long-run supply and demand forces affecting the cotton market. Cotton has lost market share to man-made fibers since the early 1990s, but relative prices do not appear to be the main driving force behind this shift.

To complete the overview, Chapter 2 briefly examines trends in world textile and clothing markets. The value of textile trade has doubled between 1990 and 2005 to over \$200 billion with an average annual growth rate of 3.9 percent. The European Union, United States, and China are both large importers and large exporters of textiles, with China a large net exporter, the United States a net importer, and the European Union having nearly balanced trade. Pakistan and India are large net exporters of textiles with very limited imports. The European Union, United States, and Japan are the three largest

clothing importers and the European Union, China, and Turkey are the largest exporters. Pakistan exports about \$3.5 billion of clothing (about half the value of its textile exports) and India over \$8 billion (about equal to its textile exports). The cotton and related processed goods sectors account for over 60 percent of Pakistan's foreign exchange merchandise earnings, whereas they account for about 15 percent of those of India. Among other important exporters of textiles or clothing are Korea, Indonesia, Mexico, Bangladesh, Romania, Thailand, Sri Lanka, Malaysia, and the Philippines.

Chapter 3: Production, Prices, and Emerging Challenges in the Pakistan Cotton Sector

In Chapter 3, Dr. Abdul Salam, former chair of the Agricultural Prices Commission of Pakistan, examines the history of production and the price support and trade policies related to cotton in Pakistan. Cotton is the principal cash crop and is second only to wheat in total acreage. About 80 percent of the production comes from Punjab Province and about 20 percent from Sindh. Cotton-planted area shows an upward trend but is also affected by lagged income from cotton production and substantial unexplained annual variability. Yields show much more annual variability than does area, and has had no significant upward trend since 1990. About 25 percent of the farmers in Pakistan, including many small farmers, grow cotton. Almost half of the cotton-producing households own less than 5 hectares, and these households account for nearly 20 percent of cotton production. Thus, both yield and price variability affect small farm incomes and rural poverty levels. We analyze this in depth in Chapter 5.

Until the mid-1990s, government price and trade policies heavily influenced cotton prices and trade. The state-controlled Cotton Export Corporation monopolized the cotton trade from 1974 through the late 1980s. Subsequently, the private sector has been allowed to purchase cotton from ginners and market it domestically and internationally. During the heavy intervention period, export taxes and domestic price policies kept cotton prices in Pakistan below world levels by as much as one third. This policy intervention was to ensure availability of low-cost primary inputs to the domestic processing industries. It had the effect of taxing farmers by depressing farm-level prices of raw cotton, which reduced incentives for production and investment. The price management system finally broke down in the mid-1990s. Subsequently, domestic market- and farm-level prices have tracked quite closely with their export parity equivalents for Index B cottons in world markets. These prices are about 20–25 percent lower than import parity; so domestic cotton production remains an important source of competitiveness for the domestic spinning, weaving, and apparel industries, even without the explicit subsidies that earlier policies gave the processing sectors. Cotton prices in Pakistan fell by about 20 percent in real terms from a three-year average around the peak price year of 1994–1995 to a three-year average around the lowest price year of 2000–2001. This was less than the decline of nearly 50 percent for equivalent world prices because of real depreciation of the Pakistan rupee.

The final subsection of Chapter 3 identifies challenges faced by the cotton sector and makes some recommendations in the context of the past experiences in production and price policy. We identify yield variability as an ongoing concern, with producers subject to boom and bust differences on this account. We examine the costs of production, including significant expenditures for pest control. We recommend steps to raise production efficiency and, particularly, to improve control of insects and diseases through integrated pest management (IPM), strengthened variety research, farmer education, and investments in testing facilities. We recommend strengthened regulatory oversight to improve the quality and consistency of the chemical products for pest, disease, and weed control available to farmers. We describe the growing but unregulated use of Bt cotton based on field observations and articulate the need for clear-cut policy and strengthened institutional capacity to evaluate biotechnology and regulate seed markets. We recognize the need for improvements in marketing practices and ginning capacity to enhance cotton quality. We also cite price variability as a concern. We advocate some fine-tuning of the price support program for cotton to mitigate adverse effects from unscrupulous traders. Yet, we recognize the limited scope for price interventions and the gains from the elimination of past state control of cotton exporting and the setting of domestic prices below international parity levels.

Chapter 4: Challenges in the Pakistan Cotton, Yarn, Textile, and Apparel Sectors

In Chapter 4, Dr. Zafar Altaf, former Pakistan federal secretary at the Ministry of Food, Agriculture, and Livestock, presents an overview of the economics and political economy of the entire value chain, including growing raw cotton, ginning into lint, spinning into yarn, weaving into fabric, producing cotton “made-ups,” such as towels and other nonapparel goods, producing apparel, and marketing. These combined sectors contributed 11 percent to Pakistan’s gross national product in 2004–2005, nearly 50 percent of manufacturing output, and more than 60 percent of the country’s foreign exchange earnings. Dr. Altaf’s analysis has an optimistic theme. He addresses the successes of Pakistan’s industries in terms of its rapid growth of yarn and textile production levels and highlights cases of highly competitive and successful entrepreneurs. But, he is also critical of the industry overall for failing to have sufficient entrepreneurial spirit, which he argues is necessary in the globalized fibers-to-apparel economy that has emerged. He lays the roots of weakness in the protected market environment in which Pakistan’s industry developed—not just the multilateral quotas of the MFA but also its own protected market, including its historically captive market in Bangladesh when that country was East Pakistan. His assessment recounts incidents of the distortions this protected market created. He raises many challenges to the industry; chief among these are the upgrade of the work force, the development of modern entrepreneurs, and greater attention to product differentiation and value, which requires marketing expertise and initiative.

In Chapter 4, Dr. Altaf also includes additional insights to complement the discussion of the cotton-producing sector. The historic tilt of pricing policies toward the domestic industry led to complacency and inefficiencies. Not only were incentives diminished for cotton production and quality, but also the spinning industry concentrated on yarn of low quality (low count yarn). The industry resisted efforts to raise quality standards and even as late as 1999 suppressed an attempt to increase competition to the benefit of farmers by introducing e-commerce bidding. At the same time, the cotton price support system, at price levels suppressed compared to international markets, kept farmers from developing mature marketing outlooks and strategies. These problems spilled over into the cotton ginning sector, which failed to make investments in modern machinery even as it expanded dramatically in the number of ginneries after deregulation in 1986–1987. The cotton ginning sector continues to use outdated storage (on open ground) and processing techniques (lack of cleaning before ginning, outdated ginning machinery) that yield a relatively low quality of cotton.

Despite these difficulties, over the period 1990–2005 production of yarn increased at an impressive annual rate of 4.7 percent. Exports peaked at nearly 50 percent of output in 1991–1992 but have subsequently declined as the domestic textile industry has grown. Pakistan’s share of world production of cotton yarn has increased to nearly 10 percent. It has increased its utilization of man-made fibers to nearly 20 percent of all fiber content but still lags behind other major yarn producers in the production and diversity of its synthetic and mixed-fiber yarns. Altaf argues that Pakistani producers have continued to concentrate on low-value yarns despite higher potential returns from producing yarns of higher value. For this, he faults the manner the industry was first established by fiat when Pakistan gained independence as well as the highly protected markets in which it operated. Similarly, the weaving sector has grown at a high annual rate but remains concentrated on unprocessed greige fabrics. Again, Altaf attributes this outcome to relatively poor quality from the weaving sector (too many faults in the cloth and too much dependence on cotton fiber) and the lack of entrepreneurship and marketing knowledge for more specialized products by the Pakistani entrepreneurs.

In terms of final products, Pakistan has been highly successful in several cotton made-ups, particularly towels and cotton bed wear. Altaf discusses how one firm that exported towels to the European Union succeeded by not compromising on quality, cataloguing its designs and products to guide the purchasers’ selections, and making heavy investment in high-quality imported machinery. Yet beyond such micros successes, Altaf notes the concentration of Pakistan exports in a few markets. He raises the concern that Pakistan has received some preferential market access in the aftermath of the 9/11 terrorist attacks in the United States and that its ability to gain entrance into new nonquota markets remains largely untested.

The notion that the better the textile product quality, the more marketing needed applies especially in the apparel sector. Pakistan's share of world apparel trade has been stagnant and is concentrated on a few narrow categories. The apparel industry is dispersed into many cottage-based small units. Losses arise from a lack of a trained workforce, and Pakistani exporters are argued to lack flexibility in the apparel production process. Altaf recommends that public institutions, such as a fashion school, could help develop a more competitive and market-focused industry.

The concluding sections of the chapter address the challenging market environment in which the Pakistan textile and apparel industries have operated since 2005 due to both increased competition facing its exports and the opening of its domestic market to increased import competition. The industry has responded with a multipart call for assistance from the government. Some of the assistance the industry needs is direct subsidies for investment or production cost offsets, which it argues are warranted because its competitors receive similar support. The industry also suffers from missing public institutions and a weak infrastructure, the improvement of which would generally enhance the competitiveness of the industry. Altaf fears the industry may fall back on its past lackluster ways of operating if the government bails it out again. But he recognizes that for these critical industries to prosper, in a cricket phrase, the Pakistan wicket must make some major changes.

Chapter 5: The Impact of Global Cotton Markets on Rural Poverty in Pakistan

Rural poverty increased in Pakistan during the late 1990s after declining during the 1980s and early 1990s, raising concern that agricultural growth was not being translated into poverty reduction. In Chapter 5, David Orden and co-authors examine the effects of cotton prices on rural poverty, particularly poverty among households producing cotton, using data from the 2001–2002 Household Integrated Economic Survey (HIES). Identifying the effects of prices on cotton incomes and poverty is an empirical issue of importance to policymakers, who need to understand the causes of the rise in rural poverty levels.

At the national level, about 70.6 percent of households in Pakistan are classified as rural and about 40.7 percent are engaged in farming. Among farmers, about one quarter produce cotton and almost all these farmers also produce wheat. Nearly 70 percent of the cotton farmers are landowners, whereas 30 percent are sharecroppers or have other tenancy arrangements. Cotton production is concentrated in a number of primary cotton-producing districts of Punjab and Sindh.

Household incomes are lower for rural than for urban households; and farmers who produce cotton have incomes slightly below the average. Sharecroppers are a particularly disadvantaged group, with over 65 percent of those producing cotton falling in the lowest two quintiles (40 percent) of the national income distribution. Income from cotton is quite important to the cotton-producing households in Pakistan and accounts for nearly 40 percent of total household income among landowners and nearly 45 percent among sharecroppers.

We evaluate the effects on poverty among cotton-producing households of cotton prices rising by 10 percent to 40 percent from their low levels at the time of the 2001–2002 HIES by simulating the increase in net income this would generate for each household. Assuming that the additional income would be used for consumption expenditures, we evaluate these direct effects using the recognized national poverty line and the Foster-Greer-Thorbecke measures of poverty. Our analysis focuses on the effects of a 20 percent increase in prices, which reflects the extent to which real cotton prices declined in Pakistan during the late 1990s.

We determine that at the national level 40 percent of cotton-producing households are in poverty. With a 20 percent increase in prices, this percentage declines to 28 percent and the depth (poverty gap) and intensity (poverty gap squared) also decline. In Punjab, the decrease due to a 20 percent rise in cotton prices is from 36 percent to 27 percent, and in Sindh it is from 50 percent to 32 percent. Among sharecropper cotton-producing households, poverty declined from 57 percent to 42 percent nationally.

Two final parts of the analysis provide further context. First, at the regional level within the primary cotton-producing districts, the direct effects on poverty among cotton-producing households lower overall rural poverty by 3 percent in Punjab and 6 percent in Sindh. This concentrated effect

explains a 2 percent decline in rural poverty nationally compared to a reported increase in rural poverty of 12 percent in the late 1990s. Thus, low cotton prices need to be taken into account in designing antipoverty strategies and are important on a regional basis but are only one among several explanations for the overall observed increase in rural poverty. Second, more households produce wheat than cotton in Pakistan; but net incomes of these households are less dependent on wheat production, and wheat prices affect net household income only for that portion of the crop that is sold commercially. In addition, global wheat prices did not decline as much as global cotton prices did in the late 1990s. For these reasons, the effects of cotton prices on those households producing cotton are sharper than the effects of changes in wheat prices on households producing wheat during this period. Because more households produce wheat, the overall effects of a given percentage change in wheat prices on poverty levels among all farmers, and on poverty measured at the provincial or national levels (also taking into account the effects on non-wheat-producing households), are similar to the deeper but more concentrated effects of an equal percentage increase in cotton prices.

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2. GLOBAL COTTON AND TEXTILE MARKETS

Caesar B. Cororaton

2.1. Introduction

To provide a basis for the sections that follow, this section provides a review of world cotton, textile, and apparel markets with some focus on Pakistan. In Section 2.2, we describe broad trends in production, consumption, trade, and prices in the international market for cotton and highlight some factors as determinants of the movements in the international price of cotton. Section 2.3 examines trends in textile and clothing trade since 1990.

2.2. Global Cotton Markets

2.2.1. Trends in Production, Consumption, and Trade

The total global area devoted to cotton production changed little over the period 1965–2004. Its average growth is 0.1 percent (Table 2.1). However, productivity in terms of yield (kilogram per hectare) improved by an average of 1.8 percent. Thus, the average output growth of 1.9 percent was largely due to the improvement in yield.

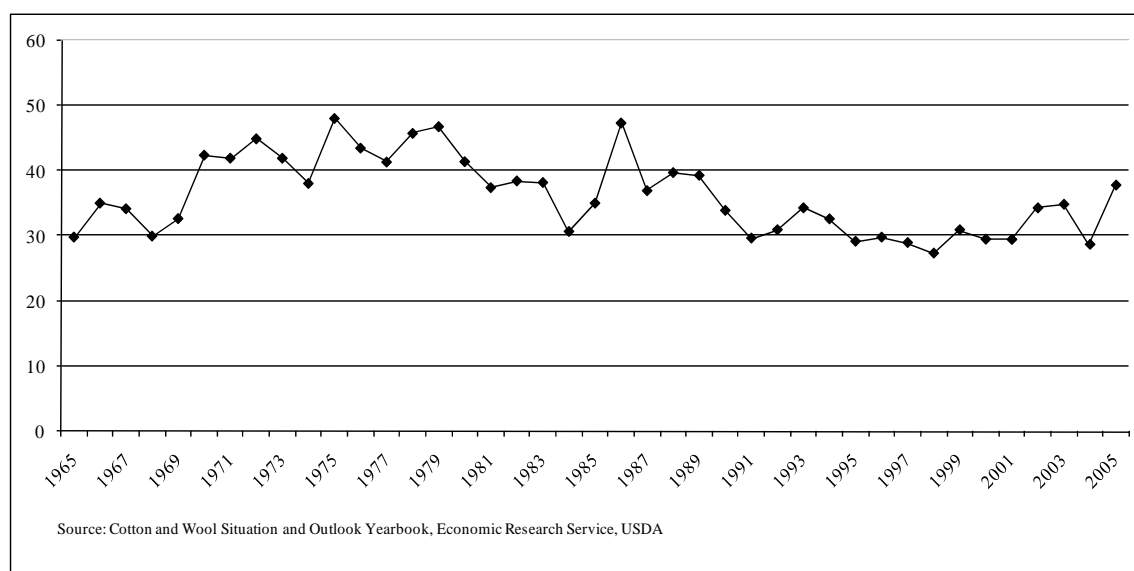
International trade is a major component of the cotton market. However, whereas exports and imports of cotton grew relatively faster (average rate of 2.5 and 2.4 percent, respectively) than production and consumption (average rate of 1.9 and 2 percent, respectively) over the period 1965–2006, the export-to-production ratio exhibits a declining trend after the mid-1970s, when it reached a peak of nearly 50 percent (Figure 2.1).

Table 2.1. World cotton supply and use

Year Beginning 1 Aug	Harvested Area (millions of hectares)	Yield (kilogram/ hectare)	Supply			Use		
			Beginning Stocks	Production	Imports	Consumption	Exports	Ending Stocks
(million 480-pound bales)								
1965	33.3	372.5	29.0	56.9	17.4	53.8	17.0	32.6
1970	31.8	380.5	22.4	55.6	24.6	57.1	23.6	21.8
1975	29.9	393.4	33.4	54.0	26.1	61.6	26.0	25.9
1980	32.4	426.3	21.2	63.4	27.3	65.0	26.3	20.6
1985	31.6	552.5	42.1	80.2	28.7	75.3	28.1	47.6
1990	33.2	572.2	25.0	87.1	30.4	85.5	29.6	27.4
1995	36.0	567.2	31.9	93.7	27.4	85.8	27.4	39.9
2000	32.0	604.0	49.2	88.9	27.3	92.2	26.4	46.8
2001	33.7	637.4	46.8	98.8	29.9	94.3	29.0	52.1
2002	30.4	631.0	52.1	88.3	30.6	98.3	30.3	42.3
2003	32.1	646.0	45.4	95.3	34.8	98.1	33.2	44.3
2004	35.8	742.9	44.3	122.1	34.6	108.7	35.0	57.4
2005	34.9	734.5	57.4	117.7	45.9	116.0	44.5	60.4
2006	34.7	765.1	60.4	121.9		123.3		
Average growth*	0.1	1.8	1.8	1.9	2.5	2.0	2.4	1.6

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, United States Department of Agriculture (USDA).
Note: *1965–2006 geometric growth, %; 1965–2005 for imports, exports, and ending stocks.

Figure 2.1. Trade ratio—exports/production, %



The largest producer of cotton is China, which captures about a quarter of world production (Table 2.2). Historically, the United States has long been the second major producer of cotton, but in the past two years, India has surpassed it. Over the past 35 years, cotton production in India has grown 4.6 percent on average. Since 2000, cotton production in India has grown rapidly at 11.6 percent. The surge in cotton production in India is mainly due to the introduction of Bt (*Bacillus thuringiensis*) cotton in 2002.² On the other hand, over the same period, the average cotton production growth in Pakistan was 3.7 percent. This relatively high growth enables Pakistan to double its share in the overall world production of cotton. At present, it is the fourth major producer.

Table 2.2. Major sources of world cotton production (% share)

Period	China	United States	India	Pakistan	Brazil	Former Soviet Union	Turkey	Others
Average								
1970–1974	17.3	19.4	8.5	4.8	4.6	18.4	3.9	23.1
1975–1979	16.8	19.4	9.3	4.1	4.0	20.4	3.8	22.2
1980–1984	25.7	16.9	9.6	4.9	4.5	16.0	3.4	18.9
1985–1989	23.1	16.5	10.7	8.0	4.3	15.6	3.3	18.7
1990–1994	24.3	19.9	11.8	8.6	3.0	11.7	3.3	17.4
1995–1999	22.4	19.2	14.4	8.4	2.4	8.0	4.2	21.1
2000–2003	24.1	19.6	13.4	8.8	4.8	7.2	4.1	17.9
2004	25.4	19.0	15.6	9.1	4.8	6.6	3.4	16.1
2005	25.1	20.3	16.2	8.6	4.0	7.1	3.0	15.7
2006*	29.1	17.7	17.9	8.1	5.7	6.7	3.2	11.5
2007†	29.7	15.8	19.7	8.2	5.9	6.9	2.8	11.0
Average growth‡	3.3	1.7	4.6	3.7	2.6	–0.7	1.6	0.1

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

Note: *Estimates; †forecast; ‡1970–2007 geometric growth of volume production.

² Bt cotton contains a gene, derived from soil bacteria (*Bacillus thuringiensis*), that protects cotton crop against bollworm by producing a special protein. The bollworms feeding on Bt cotton leaves become sleepy and lethargic and thus cause less damage to the crop plants.

Table 2.3 shows the data on harvested area and yield for the four major cotton producers. Except for the variability around a flat trend, there is not much change in area in either China or the United States. Nevertheless, there are some noticeable increases in India and Pakistan. The yield in China and the United States is higher than the world average and lower in India and Pakistan. However, some catching up has occurred. Over the period 1970–2006, whereas the improvement in world yield was 76 percent, the improvement in China was 149 percent, in India 193 percent, and in Pakistan 101 percent. The improvement in yield for the United States over the period was 66 percent.

Table 2.3. Harvested area and yield

Period Average	World		China		United States		India		Pakistan	
	Harvested Area (millions hectare)	Yield (kilogram/hectare)	Harvested Area (millions hectare)	Yield (kilogram/hectare)	Harvested Area (millions hectare)	Yield (kilogram/hectare)	Harvested Area (millions hectare)	Yield (kilogram/hectare)	Harvested Area (millions hectare)	Yield (kilogram/hectare)
1970–74	32.9	400.2	5.0	458.6	4.9	526.8	7.6	147.1	1.9	330.5
1975–79	31.8	409.4	4.8	450.7	4.7	540.3	7.7	158.2	1.9	280.6
1980–84	32.3	476.1	5.8	680.4	4.4	594.0	7.8	190.5	2.2	342.7
1985–89	31.4	548.4	5.0	797.0	4.1	701.1	7.1	257.0	2.5	548.3
1990–94	32.7	570.3	5.9	773.5	5.0	741.3	7.6	287.6	2.8	594.2
1995–99	33.7	580.1	4.6	966.3	5.4	706.9	9.0	311.2	3.0	568.9
2000–01	32.9	621.7	4.4	1095.7	5.4	750.9	8.7	292.1	3.0	601.0
2002–06	33.6	704.1	5.4	1141.4	5.2	875.0	8.4	431.3	3.1	665.9
Average 1970–2006		532.1		771.1		673.7		256.7		479.9
Average growth*		76.0		148.9		66.1		193.1		101.5

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

*Between two subperiods: 1970–1974 and 2002–2006, %

Table 2.4. Major exporters of cotton (% share)

Period Average	China	United States	India	Pakistan	Brazil	Former Soviet Union	Africa*	Australia	Others
1970–74	0.5	17.8	0.6	2.9	3.7	37.3	2.4	0.1	34.7
1975–79	0.4	21.1	0.7	1.7	0.6	41.3	2.9	0.4	30.9
1980–84	1.4	23.6	1.4	4.2	1.3	38.4	3.5	1.8	24.5
1985–89	7.0	18.4	1.6	8.7	1.5	34.5	5.7	3.7	18.9
1990–94	2.3	25.9	1.8	3.6	0.8	32.6	8.0	6.0	19.0
1995–99	1.9	25.0	1.7	1.7	0.1	22.9	13.0	9.8	23.9
2000–03	1.5	36.0	0.7	1.0	2.0	17.6	12.6	10.2	18.3
2004	0.1	41.2	1.9	1.6	4.4	17.0	11.8	5.7	16.3
2005	0.1	39.4	7.8	0.6	4.4	16.3	10.0	6.5	14.9
2006 [†]	0.2	34.6	13.5	0.7	3.5	18.3	10.1	5.7	13.5
2007 [‡]	0.1	39.4	12.2	0.6	6.8	16.8	7.4	3.5	13.1

Note: *Includes Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Mali, Niger, Senegal, Togo, and Central African Republic;

[†]Estimates

[‡]Forecast.

The major source of world cotton exports is the United States (Table 2.4). From the average of 17.8 percent in 1970–1974, its share increased to 36 percent in 2000–2003. In 2004, the share increased to 41.2 percent but declined slightly to 39.4 percent in 2007. The former Soviet Union used to capture a large part of cotton exports in the 1970s, but its share has dropped significantly, especially in the first half of the 2000s. Exports from the African region have improved through the years, as have those from Australia, except in some recent years. Cotton exports from China, India, and Pakistan are relatively limited although there is substantial annual variability in their exports.

The size of the textile industries largely determines consumption of cotton. China, being the world’s leading producer of textiles is also the major cotton user. At present, it consumes more than a third of world production (Table 2.5). India and Pakistan have increasingly become major cotton users as well, due to their relatively larger textile industries.

Table 2.5. Major users of cotton (% share)

Period Average	China	United States	India	Pakistan	Brazil	Former Soviet Union	Turkey	Others
1970–74	19	13	9	4	3	15	2	37
1975–79	20	11	9	3	4	14	2	37
1980–84	24	8	9	3	4	12	2	36
1985–89	24	9	10	4	4	11	3	35
1990–94	24	12	11	8	4	7	4	31
1995–99	23	12	15	8	4	3	6	29
2000–04	30	8	14	9	4	4	6	25
2000–03	29	19	14	9	4	4	6	14
2004	35	19	14	10	4	3	7	8
2005	39	20	14	10	4	3	6	4
2006*	41	15	15	10	4	3	6	8
2007†	43	16	15	10	3	3	6	5

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

Note: *Estimates; †Forecast.

Some years, the cotton production in China does not meet domestic consumption, thus, it relies on importation. Cotton imports to China were significant in the middle of the 1990s and in the first half of the present decade (Table 2.6). Cotton imports in the former Soviet Union, EU-25, and Japan dropped steadily over time, whereas they increased in Indonesia and Thailand. Cotton imports into both India and Pakistan have increased in the past 10 years.

Table 2.6. Major importers of cotton (% share)

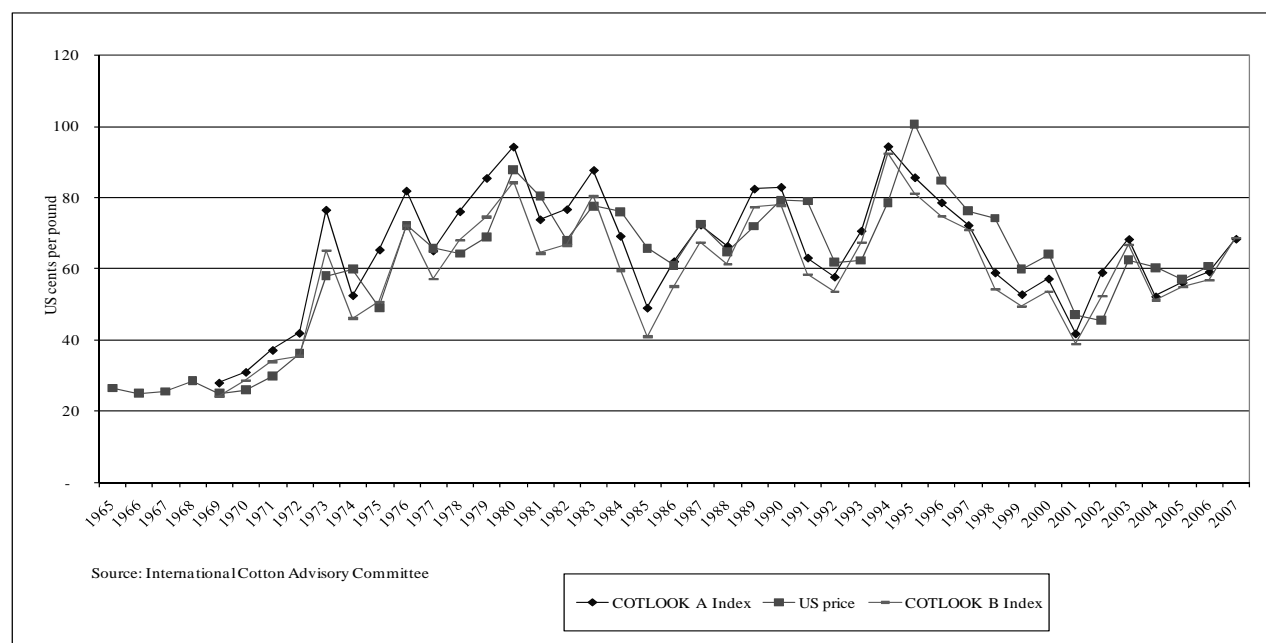
Period	China	United States	India	Pakistan	Brazil	Former Soviet Union	Russia	EU-25	Japan	Indonesia	South Korea	Thailand	Taiwan	Others
Average														
1970–74	4.4	0.2	1.6	0.0	0.0	28.2	0.0	28.6	14.2	0.9	2.4	1.1	2.8	15.7
1975–79	6.7	0.1	0.8	0.0	0.0	27.9	0.0	25.2	11.9	1.4	3.8	1.5	3.7	17.1
1980–84	5.7	0.1	0.0	0.2	0.1	25.6	0.0	25.7	12.4	2.0	3.8	1.7	4.2	18.5
1985–89	2.1	0.0	0.2	0.0	1.1	25.0	10.8	25.1	10.7	3.2	3.2	3.4	5.5	9.8
1990–94	6.0	0.0	0.7	0.7	4.5	15.7	11.7	21.2	8.0	6.6	3.5	5.4	4.6	11.3
1995–99	6.2	1.0	1.7	1.4	6.5	6.0	4.2	19.8	5.0	7.8	3.7	5.2	4.9	26.5
2000–02	4.2	0.1	5.9	2.6	1.6	7.0	5.8	15.0	3.7	8.3	3.5	6.1	4.3	31.9
2003	25.3	0.1	2.3	5.2	1.6	5.0	4.2	9.5	2.2	6.2	3.7	4.8	2.9	27.0
2004	18.5	0.1	3.0	5.1	0.6	4.9	4.2	9.3	2.4	6.4	3.9	6.6	3.9	31.4
2005	42.0	0.1	0.9	3.5	0.7	4.0	3.1	5.3	1.4	4.8	2.2	4.1	2.5	25.5
2006	26.8	0.0	1.0	5.8	1.3	4.8	3.6	5.4	1.5	5.6	2.7	4.9	2.9	33.4

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

2.2.2. Trends in International Cotton Prices

Figure 2.2 shows three indicators of international cotton prices: the COTLOOK A and COTLOOK B Indices,³ and U.S. price. Together, these indices move generally in the same direction. The COTLOOK A index is generally higher than the COTLOOK B Index, and the U.S. price index is either below or above the two indices. Cotton from Pakistan is grouped within the COTLOOK B Index.

Figure 2.2. Nominal cotton price: COTLOOK A and B indices and U.S. price



Source: International Cotton Advisory Committee

Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

Note: Number converted from 480-pound bale to metric tons.

³ COTLOOK A Index is the average of the five lowest quotations of 16 styles of cotton (middling 1-3/32 inches) traded in North European ports from the following origins: Australia, Brazil, China, Francophone Africa, Greece, India, Mexico, Pakistan, Paraguay, Spain, Syria, Tanzania, Turkey, the United States, and Uzbekistan. COTLOOK B Index is the average of the three lowest quotations of eight styles of coarser grades of cotton from Argentina, Brazil, China, India, Pakistan, Turkey, the United States, and Uzbekistan.

There is a high degree of variability in the international price of cotton. Although an increasing trend in nominal prices is observed from the second half of the 1960s through the 1970s, there was no clear direction in the 1980s. The early 1990s saw a sharp hike in cotton prices until 1994, then a significant drop is observed in the second half of the 1990s until 2001. During these years, international cotton prices (COTLOOK A and B indices) fell nearly 60 percent, whereas U.S. cotton prices fell by 40 percent. Wide swings in cotton prices continued from 2002. After a recovery in 2002 and 2003, prices dropped in 2004. However, the past three years saw improvement in cotton prices.

2.2.3. Some Factors Influencing Movements in International Cotton Prices

Various factors, such as expectations, production, and inventories affect short-term fluctuations in the international price of cotton. For example, natural calamities coupled with a significant drop in stocks in China resulted in a sharp increase in prices in 2003. Lower than expected consumption and the expected bumper crop resulted in a decline in domestic price in 2004 (Food and Agriculture Organization, 2006).

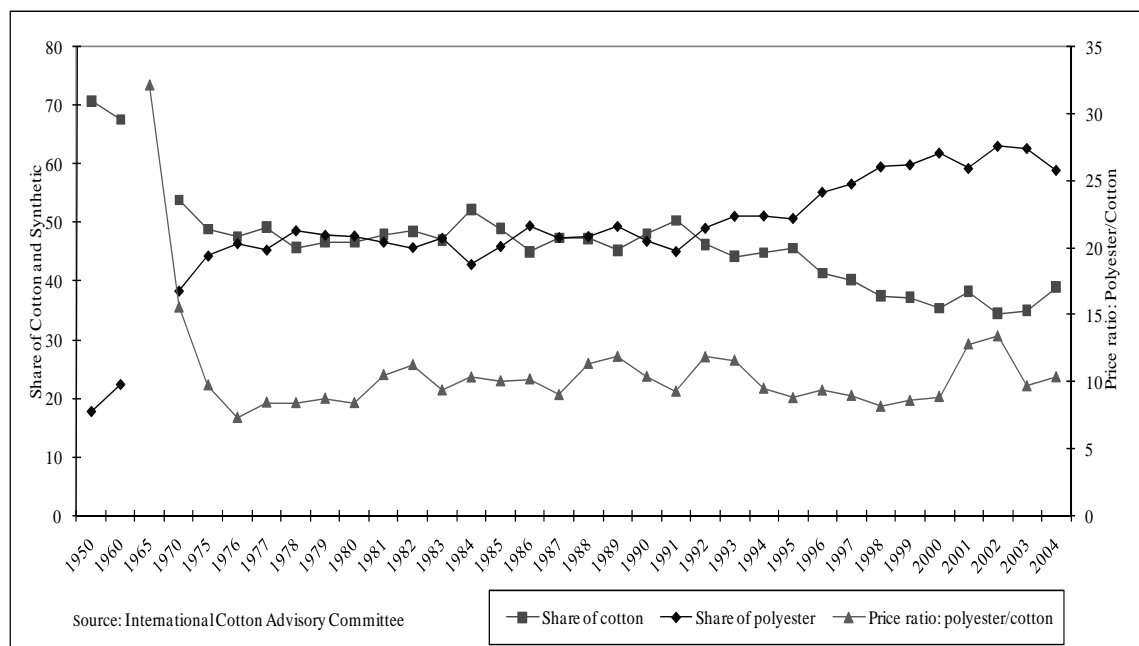
Over the long term, improvements in yield affect international prices of cotton due to improved inputs, such as expanded use of irrigation, fertilizers, and chemicals. Other technological developments that reduce the cost of production, such as the introduction of genetically modified (GM) varieties, also affect prices. Competition from substitute fibers and trade-distorting policy shifts in major cotton-producing and exporting countries also affect international prices.

One recent development in cotton production is the focus on cost reduction through the less intensive use of chemicals (Baffes, 2004). Contributing to this development has been the introduction of GM seed technology. The technological developments of the 1990s that resulted in the introduction of Bt cotton present potential for reducing cost and thereby for increasing profitability. The leading cotton-producing countries that have introduced this technology include China, India, and Mexico in the Northern Hemisphere, and Argentina, Australia, and South Africa in the Southern. Brazil, Indonesia, Israel, Pakistan, and Turkey are presently in the trial stage.⁴ However, the largest user of Bt cotton is the United States, where it is estimated that 70 percent of its cotton area was sown with GM varieties in the 2003–2004 season. In Australia, 44 percent of its cotton area was sown to such varieties in the 2002–2003 season. In China, more than 20 million hectares were planted with such varieties in 2002. Indeed, the introduction of this technology is significant. At present, it is estimated that 22 percent of the world's cotton planting is now in GM varieties, up from 2 percent in 1996–1997 (Baffes, 2004).

Synthetic fibers such as rayon and polyester are substitutes for cotton fibers. Since the early 1990s, there have been major structural shifts in the share of cotton and polyester fibers (Figure 2.3). In the 1980s, cotton and polyester shares were each around 50 percent. However, from 1992 onward, the share of polyester improved to about 60 percent, whereas that of cotton dropped to about 40 percent. The synthetic/cotton price ratio does not appear to be the main factor behind the shift in consumption. Over the past two decades, their prices generally move in the same direction. One of the most likely reasons behind the shift is the durability of polyester-based (or polyester mixed with cotton) clothing compared to pure cotton based.

⁴ In Pakistan the Ministry of Food, Agriculture, and Livestock announced plans on January 5, 2007 to release the first home-grown insect-resistant BT cotton variety during the next sowing season “to maximize the production of cotton crop for domestic needs and exports.” (http://www.checkbiotech.org/blocks/dsp_document.cfm?doc_id=14159)

Figure 2.3. Cotton versus polyester fibers



Source: Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA.

Note: Number converted from 480-pound bale to metric tons.

In the early 1990s, Townsend and Guitchouts (1994) estimated that countries that implement some form of trade-distorting government policies such as taxes and subsidies produced about two-thirds of cotton. Recently, the International Cotton Advisory Committee (ICAC) found that eight countries provided direct support to cotton production: Brazil, China, Egypt, Greece, Mexico, Spain, Turkey, and the United States (Table 2.7). By far the largest direct government assistance to cotton producers is in the United States, which reached nearly \$4 billion in 2001–2002. The government support in the United States comes in various policy instruments (Table 2.8).

Table 2.7. Direct government assistance to cotton producers, 1997–1998 to 2002–2003 (millions of US\$)

Country	1997–98	1998–99	1999–2000	2000–01	2001–02	2002–03
United States	1,163	1,946	3,432	2,148	3,964	2,620
China	2,013	2,648	1,534	1,900	1,196	750
Greece	659	660	596	537	735	718
Spain	211	204	199	179	245	239
Turkey	n.a.	220	199	106	59	57
Brazil	29	52	44	44	10	0
Mexico	13	15	28	23	18	7
Egypt	290	n.a.	20	14	23	33

Source: Quoted from Baffes (2004). Original sources are ICAC (2003) and USDA.

Note: n.a. = not available.

Table 2.8. Government assistance to U.S. cotton producers, 1995–1996 to 2002–2003 (millions US\$)

Policy Instruments	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02	2002–03
Coupled payments	3	n.a.	28	535	1,613	563	2,507	248
PFC/DP	n.a.	599	597	637	614	575	474	914
Emergency/CCP	n.a.	n.a.	n.a.	316	613	613	524	1,264
Insurance	180	157	148	151	170	162	236	194
Step-2	34	3	390	308	422	236	196	n.a.
Total	217	759	1,163	1,947	3,432	2,149	3,937	2,620

Source: Quoted from Baffes (2004). Original sources are USDA (assistance), ICAC (production).

Note: n.a. = not available; PFC = production flexibility contracts; DP = direct payments; CCP = countercyclical payments.

A number of studies have attempted to quantify the impact of government support on world prices and production, particularly focusing on the 1994–2002 period in which prices dropped sharply. Orden et al. (2006) and the Food and Agriculture Organization (FAO, 2004) surveyed those studies and found that, generally, the elimination of the subsidies would likely improve international prices of cotton. However, the magnitude of the impact depends on the method used, such as the CGE model, the partial equilibrium model, and econometric estimates of supply response.

To cite some conclusions from individual studies, the estimates of the Overseas Development Institute (Gillson et al., 2004) indicate that if the cotton market were to be liberalized, production in the United States and the European Union would fall and world prices of cotton would increase between 18 and 28 percent. This would increase export earnings of all developing countries by \$610 million. West and Central African countries could gain between \$94 million and \$355 million in earnings from cotton production. ICAC (2003) finds that the removal of subsidies will result in lower production in countries concerned and will, therefore, increase world prices of cotton by 21 percent in 2000–2001 and 73 percent in 2001–2002. The study of Goreaux (2003) indicates that export earnings of West and Central Africa were reduced by \$250 million owing to cotton support policies. The removal of subsidies is estimated to increase world prices of cotton by 18 percent. The study of Reeves, Vincent, and Quirke (2001) finds that the removal of production and export subsidies by the United States and the European Union could lead to a 20 percent reduction in U.S. cotton production and 50 percent fall in U.S. cotton exports. This in turn could increase prices by 10.7 percent from the observed benchmark. The study carried out by the Australian Center for International Economics (Townsend, 2002) indicates that the removal of subsidies would increase world cotton prices by 10.7 percent. Sumner (2003) finds that without U.S. cotton subsidies during 1999–2002, world cotton prices would have been higher by 13 percent. At the lower end of estimates, Tokarick (2003) finds that multilateral trade liberalization across cotton and other agricultural markets will improve cotton prices only by 2.8 percent, whereas Poonyth et al. (2004) find the improvement in cotton prices would range between 3.1 and 4.8 percent.

From these studies, the impact of trade-distorting policies in major producing and exporting countries on world cotton prices is significant, with many estimates in the range of 10–20 percent. This would have far-reaching effects on rural farm households, especially in cotton-producing developing countries. Estimates from the Food and Agriculture Organization (FAO, 2001) indicate that as many as 100 million rural households may have been directly or indirectly involved in cotton production.

2.3. Prices of Cotton Yarn and Cotton Fabric

Cotton is processed into yarn and then fabric, both of which are also heavily traded internationally. Unlike the COTLOOK A and B indices, no similar price indices for cotton yarn and cotton fabric are readily available. To provide an idea of how world prices of cotton yarn and fabric move with the world prices of cotton, we derived the traded price indices of these cotton products using data from the United Nations

Commodity Trade Statistics. We selected major world exporters of cotton yarn and tracked their data on value and quantity traded from 1990 to 2005. Similarly, we tracked the data on value and quantity traded of cotton fabric of major exporters. We computed price series for these products and express them, including the COTLOOK B, in index form with index 2000 = 100 in Table 2.9. For the period 1990–2005, the coefficient of variation of COTLOOK B is 22.9 percent, whereas cotton yarn is 13 percent and cotton fabric 7.7 percent. Figure 2.4 also shows that COTLOOK B is more volatile than cotton yarn prices and cotton fabric prices.

The period 1994–2001 saw a drop in COTLOOK B of 57.8 percent. Over this period, the price of cotton yarn dropped by 27.4 percent and by 38.8 percent from lagged peak-to-trough yarn prices in 1995 to 2002. The drop of the price of cotton fabric is not as dramatic at 6.4 percent over the 1994–2001 period and by 19.4 percent from the peak textile prices in 1996. Using these reduced 1994–2001 form relationships, the “elasticity” between COTLOOK B and the price of cotton yarn is 0.47 and the that between the price of cotton yarn and the price of cotton fabric is 0.23 during the 1994–2001 period.

Table 2.9. World prices of cotton, cotton yarn, and cotton fabric

	COTLOOK B	Cotton Yarn ^a	Cotton Fabric ^b
1990	144.9	100.8	125.8
1991	108.9	104.3	124.3
1992	100.0	116.6	111.7
1993	125.3	106.4	99.8
1994	171.9	123.4	107.0
1995	150.9	136.8	121.7
1996	139.4	125.8	124.2
1997	132.2	116.9	115.0
1998	101.1	111.7	113.3
1999	92.3	105.1	106.9
2000	100.0	100.0	100.0
2001	72.5	89.5	100.2
2002	97.6	83.8	116.0
2003	124.1	97.5	111.1
2004	95.3	101.9	118.4
2005	95.3	94.9	116.9
Mean	115.7	107.2	113.3
SD	26.5	14.0	8.7
C.V. %	22.9	13.0	7.7
1994–2001			
Change, %	–57.8	–27.4	–6.4
Ratio ^c		0.47	0.23

Source: United Nations Commodity Trade Statistics and International Cotton Advisory Committee (ICAC).

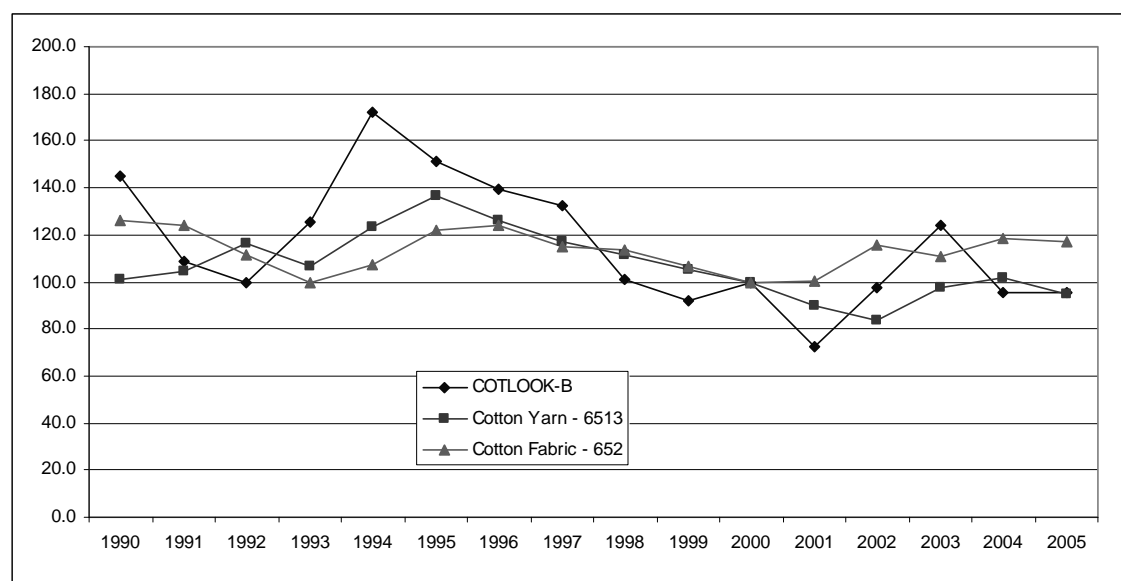
Note: C.V. = coefficient of variation; SD = standard deviation.

^aCotton yarn: Standard International Trade Classification Revision 3-6513 (Countries: China-Hong Kong-Special Administrative Region (SAR), China, India; Pakistan, United States, and Italy).

^bCotton fabric, woven: Standard International Trade Classification Revision 3-652 (Countries: China-Hong Kong-SAR, China, India, Pakistan, United States, Italy, Germany, Japan, France, Republic of Korea, Belgium, Netherlands, and United Kingdom).

^cFor cotton yarn: change in the price of cotton yarn over change in COTLOOK B; for cotton fabric: change in the price of cotton fabric over change in the price of cotton yarn.

Figure 2.4. World prices of cotton, cotton yarn, and cotton fabric



2.4. Global Trends in Markets for Textile and Clothing

2.4.1. World Markets

This subsection presents trends in the world markets for textiles and clothing, the position of Pakistan in these markets, and some information on Pakistan's world exports of textiles and sources of its imports.

In 2005, the size of the world market for textiles was \$203 billion (Table 2.10). It has grown strongly in the past 15 years. In the 1990s, the average annual growth of the market was about 5 percent. In 2003 and 2004, its annual growth was more than 10 percent, slowing in 2005 to 3.9 percent.

The European Union (EU-25) captures a third of the total world export of textiles. This is mainly intra-EU trade. Its textile trade with the rest of the world accounts for less than 12 percent of the total. China has a rapidly growing share in the world textile market. In 1990, China accounted for 6.9 percent of the world export of textiles. Its exports surged after 2000. By 2005, China had a share of 20.2 percent of the world market. The shares of the other major producers of textile are generally stable, implying falling shares for several other countries. Hong Kong's share, which is mostly due to reexporting, is about 7 percent, and the United States has about the same level. The share of India was about 4 percent in 2005 and Pakistan's was 3.5 percent.

Table 2.10. Textile exports of selected economies

	1990	2000	2003	2004	2005
World (billion US\$)	104.4	157.1	173.7	195.4	203.0
Average annual growth, %		5.1	10.6	12.5	3.9
	% World				
European Union (EU-25)	n.a.	35.9	37.4	37.0	33.5
Intraexports	n.a.	24.9	25.2	24.5	21.9
Extraexports	n.a.	14.7	9.7	7.4	11.6
China	6.9	10.3	15.5	17.1	20.2
Hong Kong	7.9	8.6	7.5	7.3	6.8
Reexports	5.8	7.8	7.1	7.0	6.5
United States	4.8	7.0	6.3	6.1	6.1

Table 2.10. Continued

	1990	2000	2003	2004	2005
Republic of Korea	5.8	8.1	6.2	5.5	5.1
Taipei, China	5.9	7.6	5.4	5.1	4.8
India	2.1	3.8	3.9	3.6	3.9
Pakistan	2.6	2.9	3.5	3.1	3.5
Turkey	1.4	2.3	3.0	3.3	3.5
Japan	5.6	4.5	3.7	3.7	3.4
Indonesia	1.2	2.2	1.7	1.6	1.7

Source: International Trade Statistics, 2006.

Note: n.a. = not available. Textile: Standard International Trade Classification, Revision 3-65.

Table 2.11 presents the structure of the world market for clothing. In 2005, the total world exports of clothing amounted to \$275.6 billion, somewhat larger than the world market for textiles. It is also growing strongly, with an average growth of 8.3 percent in the 1990s, rising to 17.6 percent in 2003, 11.4 percent in 2004, and then slowing to 6.4 percent in 2005.

Similar to the world market structure for textiles, the European Union has the largest share in the world market for clothing, and, again, this is mostly intra-EU trade. There is remarkable growth in China's exports of clothing with its share of the world market increasing from 8.9 percent in 1990 to 26.9 percent in 2005. India's share is stable at about 3 percent. The share of Pakistan is also stable at about 1 percent.

Table 2.11. Clothing exports of selected economies

	1990	2000	2003	2004	2005
World (billion US\$)	108.1	197.8	232.6	259.1	275.6
Average annual growth, %		8.3	17.6	11.4	6.4
	% of World				
European Union (EU-25)		26.9	29.4	29.7	29.2
Intraexports		20.1	22.0	2.2	20.9
Extraexports		6.8	7.4	7.4	8.2
China	8.9	18.2	22.4	23.9	26.9
Hong Kong, China	14.2	12.2	10.1	9.7	9.9
Reexport	5.7	7.2	6.4	6.5	7.3
Turkey	3.1	3.3	4.3	4.3	4.3
India	2.3	3.1	2.8	2.6	3.0
Mexico	0.5	4.4	3.2	2.9	2.6
Bangladesh	0.6	2.0	2.1	2.2	2.3
Indonesia	1.5	2.4	1.8	1.7	1.9
United States	2.4	4.4	2.4	2.0	1.8
Romania	0.3	1.2	1.7	1.8	1.7
Thailand	2.6	1.9	1.6	1.5	1.5
Pakistan	0.9	1.1	1.2	1.2	1.3
Sri Lanka	0.6	1.4	1.1	1.1	1.0
Republic of Korea	7.3	2.5	1.6	1.3	0.9
Malaysia	1.2	1.1	0.9	0.9	0.9
Philippines	1.6	1.3	1.0	0.8	0.8

Source: International Trade Statistics, 2006.

Note: Clothing: Standard International Trade Classification Revision 3-84.

2.4.2. Liberalization of International Trade in Textiles and Clothing

Three major shifts in the rules have governed the international trade of textiles and clothing during the past 30 years. From 1974 to 1994, the rules set in the MFA provided the parameters for bilateral negotiations of how quotas on textile and clothing trade were determined. Under the MFA, discriminatory quotas were allowed in areas where the increase in imports had the potential to cause domestic market disruptions. The European Union, Austria, Canada, Finland, Norway, and the United States applied quotas exclusively to developing country exports.

With the advent of the WTO in 1995, the WTO Agreement on Textiles and Clothing (ATC) was designed to provide a transitional phase between the MFA and the full integration of the textile and clothing industry into the multilateral trading system. Under the ATC, Canada, the European Union, Norway, and the United States retained some quota restrictions until January 1, 2005, when the quotas on textile and clothing trade were lifted and replaced by tariffs only.

Before the lifting of the quotas, a number of studies estimated the potential effects of liberalized international trade of textiles and clothing. Nordias (2004), for example, argued that China and India would come to dominate world trade. The share of China alone was predicted to reach more than 50 percent during the post-ATC period. Tables 2.10 and 2.12 indicate the rapid increase in the world share of China in both textiles and clothing. Although the world share of India has not shown significant enlargement thus far, India's share in the world market will likely improve in the near future with the surge in cotton production because of the implementation of the Bt cotton program and the ongoing policy reforms in the textiles and apparel sectors in India (Bedi and Cororaton, 2008).

Martin (2004) examined the possible effects of quota elimination on Pakistan and argued that improvement in productivity is the key issue if Pakistan is to gain shares in the world markets. This is because the international markets will be more price responsive after the abolition of the quota. This will present opportunities for suppliers with high productivity, whereas suppliers that lose competitiveness can expect to suffer losses in market shares. Thus, for Pakistan, Martin concludes that "raising productivity—either by improving the efficiency of the production process or the range and the quality of the products produced—is key to reaping the benefit from the abolition of the MFA." The same implication may hold for India as well.

Even with the abolition of the MFA, Pakistan's exports of textile yarn, fabric, etc. that goes to the restricted markets have not declined relative to its overall exports of these items. In the data presented in Table 2.12, the share of Pakistan's exports of textile fibers that go to markets of the European Union, United States, Canada, and Norway has declined from 34.4 percent in 2002 to 20.7 percent in 2006. This is due to Pakistan's efforts to increase value added by processing fibers into yarn, fabric, garments, and textile made-ups as discussed in the next section. However, the shares of textile yarn, fabric, etc. and clothing and accessories remain high. The combined ratio increased from 52.9 percent in 1990 to 70 percent in 2005 and 68.6 percent in 2006. This indicates that Pakistan remains particularly competitive in some specific textile product lines.

Table 2.12. Pakistan exports of textiles and clothing to restricted markets, %

	Textile fibers ^a	Textile yarn, fabric, etc. ^b	Clothing and accessories ^c	Combined ^d
1990	28.9	43.9	88.4	52.9
1995	22.4	37.6	89.9	50.8
2000	24.9	49.6	90.1	61.4
2002	34.4	54.5	84.5	63.6
2004	16.1	55.9	86.7	65.1
2005	19.8	63.7	85.1	70.1
2006	20.7	58.7	88.7	68.6

Source: United Nations Commodity Trade Statistics.

Note: Restricted markets include European Union, United States, Canada, and Norway.

^aStandard International Trade Classification Revision 3-26. This is the ratio of Pakistan exports of textile fibers to these markets and the overall Pakistan exports of textile fibers.

^bStandard International Trade Classification Revision 3-65. This is the ratio of Pakistan exports of textile yarn, fabric, etc. to these markets and the overall Pakistan exports of textile yarn, fabric, etc.

^cStandard International Trade Classification Revision 3-84. This is the ratio of Pakistan exports of clothing and accessories to these markets and the overall Pakistan exports of clothing and accessories.

^dThis is the ratio of Pakistan exports of fibers, textile, and clothing to these markets and the overall Pakistan exports of fibers, textile, and clothing.

2.5. Conclusion

There are major developments in the world markets for cotton, textiles, and apparel. The increase in world production of cotton was largely due to the improvement in yield arising from improved inputs such as the expanded use of irrigation, fertilizers, chemicals, and the introduction of Bt cotton. The leading cotton-producing countries that have introduced the Bt cotton technology include China, India, and Mexico in the Northern Hemisphere, and Argentina, Australia, and South Africa in the Southern. There has been a notable expansion in cotton production in India since the implementation of its Bt cotton program in 2002.

Although, recently, there are improvements in world cotton prices, historically prices have fluctuated wildly around a generally declining trend. Various studies have indicated that declining world cotton prices are not favorable to poor cotton-exporting countries. Several factors affect world cotton prices, including the improvement in productivity, the increase in the use of synthetic fibers, and subsidies from governments of developed countries.

The world market for textiles and clothing is enormous and has been growing strongly. Recently, China has dominated the market. The world market share of the European Union is also substantial. As part of world trade liberalization, the MFA was dismantled at the start of 2005, rendering the world market for textiles and clothing more price responsive and competitive and presenting opportunities for supplies with high productivity. Suppliers that lose competitiveness can expect to suffer losses in market shares.

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3. PRODUCTION, PRICES, AND EMERGING CHALLENGES IN THE PAKISTAN COTTON SECTOR

Abdul Salam

3.1. Introduction

Pakistan is the fourth largest producer of cotton. Table 2.2 in Section 2 indicates that Pakistan contributed 8 percent to the world production of cotton in 2004–2006. It produces about 2.3 million tons of cotton. Cotton is the principal cash crop of Pakistan. It is second to wheat, which is the country's staple food, in terms of area. Area annually planted under cotton is around 3 million hectares and accounts for 15 percent of the total cropped area. In 2005–2006, it contributed 24 percent to the total value added of agricultural crops (Pakistan Economic Survey, Statistical Supplement 2005–2006 [Government of Pakistan, 2006.]). Textiles, Pakistan's largest industry and a major source of employment in manufacturing, depends on cotton farming for its supply of raw material. Cotton and its made-ups contribute 65 percent of the foreign exchange earned from merchandise goods. Increased cotton production in the recent past has helped in curtailing imports of edible oils, as cottonseed yields valuable vegetable oil for the domestic industry. It also provides feed for livestock and dairy farming. Cotton picking, a highly labor-intensive activity, is an important source of employment for rural women, providing supplementary income to rural farm and nonfarm households.

In view of its extensive forward and backward linkages, the cotton crop occupies a unique position in the rural economy of Pakistan. Its performance holds the key not only for the growth and development of agriculture sector but also for the robust growth in the overall economy. A good cotton crop is imperative for the sustainable development of agriculture, food security, and poverty alleviation efforts at the micro- and macrolevels.

We review the important features, basic characteristics, and performance of cotton—its production, marketing, and prices from 1991 to 2005—in this section to learn from experience and draw lessons for the future course of action. We present the historical data on cotton area, production, yields, the cotton harvest season, and cotton staple length in Section 3.2. We describe the salient features of cotton-growing farms in Section 3.3. We discuss the changes in cotton trading policy and marketing overtime and their impact on prices in Section 3.4. We examine the balance sheet of cotton, its composition, and changes in Section 3.5. We discuss behavior of cotton prices in the domestic and world markets in Section 3.6. The wedge between domestic and international prices and implications thereof for intersectoral resource transfers is also highlighted. We explore the implications of varying cotton incomes on its cultivation in Section 3.7. Emerging challenges in cotton cultivation in Pakistan, which include reducing variations in annual cotton production, the role of plant protection, and the need for IPM, the cultivation of Bt cotton and its requirements, contamination in cotton, and rising prices of inputs, are highlighted in Section 3.8. The section concludes with observations and recommendations.

3.2. Cotton Production

3.2.1. Overall Pakistan

There are two major cotton-producing provinces in Pakistan. Table 3.1 indicates that the province of Punjab accounts for about 80 percent of total cotton crop area and total cotton production in the country, whereas the province of Sindh accounts for about 20 percent. The provinces of the Northwest Frontier Province and Balochistan have a combined share of less than 1 percent.

Table 3.1. Cotton area and production (% distribution)

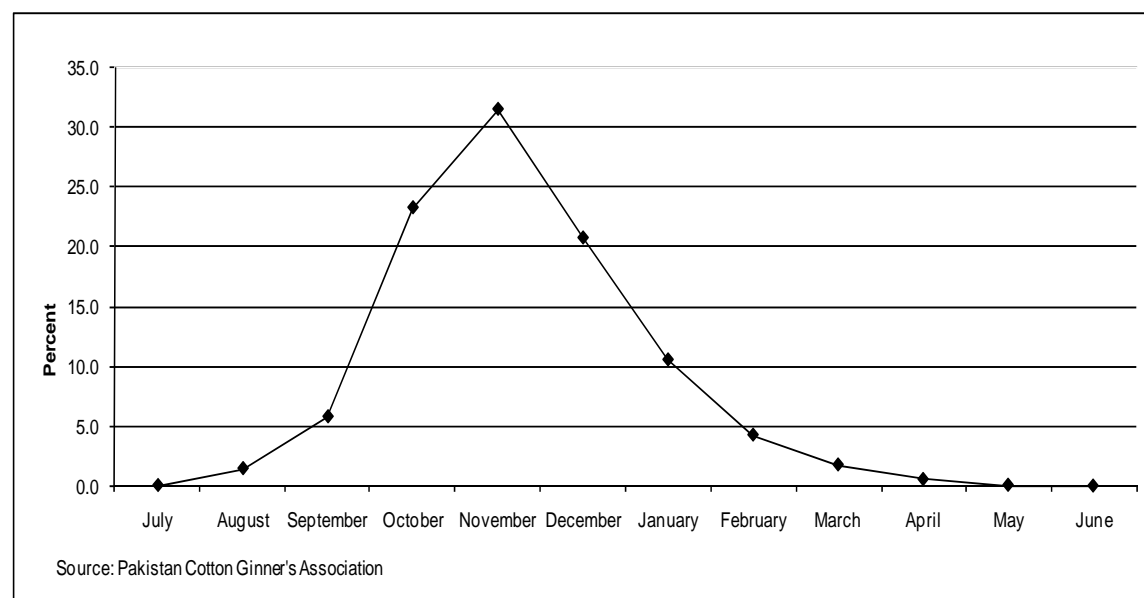
Average	Area				Production			
	Punjab	Sindh	Others*	Pakistan	Punjab	Sindh	Others*	Pakistan
1985–1990	76.1	23.8	0.1	100.0	84.3	15.7	0.0	100.0
1991–1995	82.2	17.7	0.1	100.0	86.2	13.8	0.0	100.0
1996–1999	79.1	20.5	0.4	100.0	75.9	23.7	0.4	100.0
2000–2005	80.1	18.7	1.2	100.0	77.1	22.0	0.9	100.0

Source: Calculated from the data reported in Agricultural Statistics of Pakistan 2004–2005 (Government of Pakistan, 2006).

Note: *Northwest Frontier Province and Balochistan.

Cotton is not a year-round crop. Based on the arrival of seed cotton over the period 1993–2005, Figure 3.1 shows that within the crop year between July and June, about 20 percent of the cotton harvest arrives in October. The arrival of cotton reaches a peak of above 30 percent of production in November but starts to slow down in December to 20 percent and further down to 10 percent in January.

Figure 3.1. Arrival of seed cotton (average 1993–2005)



One of the important qualities of cotton is the staple length. Until 1980, Table 3.2 shows that nearly 80 percent of cotton types produced in Pakistan were of medium staple length. This staple length ranges between 1 and 1–3/16 inches (20.64 to 25.40 mm). From the 1980s onward, the cotton staple length improved to medium long, which ranges between 1–1/32 and 1–3/32 inches (26.19 to 27.78 mm). During this period, more than 50 percent of cotton production was medium long. In the first half of the 1990s, the share of medium staple length dropped considerably, whereas that of long staple (between 1–1/8 and 1–5/16 inches or 28.57–33.34 mm) increased. However, from 1994 onward, the share of long staple has subsided and that of medium staple recovered. In this period, medium long staple dominates production.

Table 3.2. Staplewise production of cotton (% distribution)

Period	Short (<1-3/16 inches /20.64 mm)	Medium (1-1-3/16 inches /20.64– 25.40 mm)	Medium Long (1-1/32–1-3/32 inches/26.19– 27.78 mm)	Long (1-1/8–1-5/16 inches/28.57– 33.34 mm)	Total
1947–1970	13.6	82.5	7.4	0.4	100.0
1970–1980	6.2	77.5	15.3	1.0	100.0
1980–1990	2.7	26.4	55.4	15.5	100.0
1990–1991	1.0	4.1	59.5	35.4	100.0
1991–1992	1.0	9.0	61.1	29.0	100.0
1992–1993	1.0	3.1	73.8	22.2	100.0
1993–1994	1.1	23.4	71.4	4.1	100.0
1994–1995	1.3	20.1	73.0	5.6	100.0
1995–1996	0.9	53.5	45.4	0.2	100.0
1996–1997	1.1	37.1	58.9	2.9	100.0
1997–1998	1.2	14.0	72.0	12.8	100.0
1998–1999	1.2	37.2	59.0	2.7	100.0
1999–2000	0.0	33.0	63.0	4.0	100.0
2000–2001	0.0	12.4	83.4	4.2	100.0
2001–2002	0.5	28.5	67.9	3.2	100.0

Source: Pakistan Central Cotton Committee, 2006.

Table 3.3 shows the performance of cotton in terms of crop area, production, and yield in Pakistan and in the two major cotton-producing provinces. For all of Pakistan, the total area under cotton was 2.66 million hectares in 1990–1991 and increased to 3.23 million hectares in 2004–2005. However, yearly fluctuations in response to various natural, economic, and other relevant factors explain the expansion in area. Before scaling new heights in 2004–2005, the maximum area of 3.149 million hectares was recorded in 1996–1997, whereas the minimum of 2.65 million hectares was reported in 1994–1995. The coefficient of variation for cotton area during the period 1991–2005 is estimated at 5.7 percent. The average annual growth rate in cotton area during this period is 0.8 percent and is statistically significant.

Table 3.3. Area, production, and yield of cotton in Pakistan

	All Pakistan						Punjab						Sindh					
	Area		Production		Yield		Area		Production		Yield		Area		Production		Yield	
	000 hectares	% change	000 bales	% change	Kilogram/ hectare	% change	000 hectares	% change	000 bales	% change	Kilogram/ hectare	% change	000 hectares	% change	000 bales	% change	Kilogram/ hectare	% change
1990–1991	2,662		9,628		615		2,125		8,501		680		537		1,125		356	
1991–1992	2,836	6.5	12,822	33.2	769	25.0	2,287	7.6	11,417	34.3	849	24.8	548	2.0	1,403	24.7	435	22.2
1992–1993	2,836	0.0	9,054	-29.4	543	-29.4	2,438	6.6	8,237	-27.9	574	-32.3	397	-27.6	816	-41.8	349	-19.7
1993–1994	2,805	-1.1	8,041	-11.2	487	-10.2	2,249	-7.8	6,523	-20.8	493	-14.2	555	39.8	1,517	85.9	465	33.0
1994–1995	2,653	-5.4	8,697	8.2	557	14.4	2,244	-0.2	7,410	13.6	561	13.9	406	-26.8	1,282	-15.5	537	15.5
1995–1996	2,997	13.0	10,595	21.8	601	7.8	2,463	9.8	8,720	17.7	602	7.2	529	30.3	1,862	45.2	598	11.5
1996–1997	3,149	5.1	9,374	-11.5	506	-15.8	2,540	3.1	7,103	-18.5	475	-21.0	601	13.6	2,250	20.8	636	6.4
1997–1998	2,960	-6.0	9,184	-2.0	527	4.2	2,348	-7.6	6,817	-4.0	494	3.8	600	-0.2	2,336	3.8	662	4.0
1998–1999	2,923	-1.3	9,790	6.6	569	7.9	2,283	-2.8	6,628	-2.8	494	0.0	630	5.0	2,134	-8.6	576	-13.0
1999–2000	2,983	2.1	11,240	14.8	641	12.5	2,329	2.0	8,804	32.8	643	30.2	634	0.6	2,377	11.4	637	10.7
2000–2001	2,928	-1.8	10,732	-4.5	623	-2.7	2,386	2.4	8,540	-3.0	608	-5.3	524	-17.4	2,141	-9.9	695	9.0
2001–2002	3,116	6.4	10,613	-1.1	579	-7.1	2,526	5.9	8,046	-5.8	541	-11.0	547	4.4	2,443	14.1	759	9.3
2002–2003	2,794	-10.3	10,211	-3.8	621	7.3	2,208	-12.6	7,664	-4.7	590	9.0	543	-0.7	2,412	-1.3	755	-0.5
2003–2004	2,991	7.1	10,048	-1.6	571	-8.1	2,387	8.1	7,702	0.5	549	-7.0	561	3.3	2,243	-7.0	680	-10.0
2004–2005	3,229	8.0	14,600	45.3	769	34.6	2,518	5.5	11,149	44.8	753	37.2	635	13.2	3,017	34.5	808	18.8
Mean	2,924		10,309		599		2,355		8,217		594		550		1,957		597	
SD	166		1,652		82		125		1,451		104		71		602		143	
C.V. %	5.7		16.0		13.7		5.3		17.7		17.5		13.0		30.8		24.0	
Growth rate %	0.8		1.4		0.6		0.5		0.1		-0.4		1.4		6.8		5.4	
t-statistics	2.9		1.7		0.8		1.6		0.1		-0.3		1.8		5.8		7.8	
Minimum	2,653		8,041		487		2,125		6,523		475		397		816		349	
Maximum	3,229		14,600		769		2,540		11,417		849		635		3,017		808	

Source: Agricultural Statistics of Pakistan 2003–2004 (Government of Pakistan, 2003, 2004, 2005 and 2006); Long Term Trends in Area and Production of Crops, APCOM Series No. 204 (Agricultural Prices Commission of Pakistan, 2003); Pakistan Journal of Agricultural Economics, Statistical Appendix (2001); and Federal Bureau of Statistics, various issues.

Note: Growth rates calculated from the coefficient of a time variable in the semilog equation $\ln Y = a + bt$, where Y is the dependent variable; C.V. = coefficient of variation; SD = standard deviation.

The average cotton yield over the period was 599 kilogram/hectare with a coefficient of variation of 13.7 percent. The trend growth rate of cotton yield is 0.6 percent per year but is not statistically significant. The small coefficient of time trend in cotton yield also reflects the large variation in yearly cotton yield. The inadequacy of plant protection measures may partly explain this. In view of its susceptibility to a number of insect pests resulting in wide fluctuations in yield and potential output loss, cotton farming in Pakistan has become a high-risk proposition, involving heavy expenditures for pest control.

During 1991–2005, cotton yield varied from 487 kilogram/hectare to 769 kilogram/hectare. The highest cotton yield of 769 kilogram/hectare was in the 1991–1992 crop year. It led to a record production of 2.18 million tons (12.82 million bales⁵). This bumper harvest generated much optimism about the future prospects of cotton and related sectors in the country. However, the widespread breakout of CLCV in the subsequent years dampened this euphoria. The cotton yield touched its lowest level at 487 kilogram/hectare in 1993–1994. The production during this year was at its lowest level of 1.37 million tons (8.04 million bales). This sharp decline of 37 percent in production resulted entirely from the fall in yield, as the crop area, 2.81 million hectares, was only marginally less than that of 1991–1992.

The low cotton crop prompted serious effort among policymakers, planners, and researchers to screen and develop varieties with resistance or tolerance to leaf curl virus. The authorities also launched a massive educational campaign to apprise growers of various (preventive and curative) measures to protect the crop and to obtain good production. Because of the interventions launched in the wake of severe CLCV infestation and poor yield in the 1990s and the hard work of farmers, cotton yield recovered. Nevertheless, it remains vulnerable to a host of insect pests. Sustained pest control intervention is, therefore, necessary; otherwise pest infestation will inflict heavy crop losses, and cotton yield will be subjected to high annual fluctuations.

Cotton production subsequently recovered to 1.80 million tons (10.6 million bales) in 1995–1996 but fell again during the next two years and reached 1.561 million tons (9.2 million bales) in 1997–1998. However, during the next couple of years its production staged a recovery. Production reached 1.9 million tons (11.2 million bales) in 1999–2000. Falling production marked the next four years, owing to either contraction in area, fall in yield, or a combination of both. Then, an all-time production record of 2.48 million tons (14.6 million bales) was reached in 2004–2005. This represented a jump of 45.3 percent in production over the previous year. The improvement in production was due to a 34.6 percent increase in yield, from 571 kilogram/hectare in 2003–2004 to 769 kilogram/hectare in 2004–2005. The gains in yield were largely due to favorable weather and low pest infestation. Cotton area, which expanded by 8 percent, also contributed to the record production.

Additional production arising from higher cotton yield will have a significant effect on farmers' income even if prices are low. For example, notwithstanding a fall in the average domestic price of 27 percent over the level in 2003–2004, the additional production of seed cotton in 2004–2005 was worth rupees (Rs) 47.6 billion (US\$0.79 billion). Out of this amount, Rs 40 billion (US\$0.66 billion) is due to higher cotton yield largely arising from favorable weather condition and less pest infestation. This contributes to the income and well-being of farmers and others who depend on cotton production, especially the workforce engaged in cotton picking. Moreover, if the additional produce of cotton lint is valued at the average world price of Index B cottons of 51.20 US cents/pound in 2004–2005, it will translate to US\$809 million. If the value of the additional cottonseed of \$224 million (calculated at the domestic market price of Rs 375/40 kilogram) is included, the gross value of additional production will be US\$1,033 billion. The contribution of a higher cotton yield is US\$854 million. These figures show the first round and direct effects of higher cotton output in 2004–2005 to the economy, whereas their indirect and multiplier effects through the forward linkages may have additional effects on the overall national economy. Furthermore, there may be favorable effects on the balance of trade through both import substitution and higher exports.

⁵ In Pakistan, 1 bale is 170 kilograms.

To summarize, the average cotton harvest in Pakistan during the period of 1991–2005 is 1.75 million tons (10.3 million bales) with a coefficient of variation of 16 percent. The average annual growth rate in production for the past 15 cotton crop years is 1.4 percent. Given the wide fluctuations in cotton yield leading to high variability in production, the major challenge in cotton farming is how to stabilize the crop yield at a reasonable level (e.g., 650 kilogram/hectare). Fluctuations in cotton yield are due to changes in weather conditions and pest infestation. Whereas the former is beyond the control of farmers, intervention through pest control is imperative. A science/knowledge-based approach for adequate control of insect pests is therefore critical. Furthermore, improved pest scouting and dissemination of information among the farmers, along with judicious use of pest control methods and technology, can help save tremendous cotton yield reductions and prevent income losses. Pest control measures will also improve the quality of the product and bring higher prices. Thus, adequate pest control in cotton farming can make a valuable contribution in strengthening the economy and in alleviating poverty. Accordingly, it must be accorded high priority in the strategy of agricultural development in general and cotton production in particular. In addition, as will be discussed later in the section, producer incentives in the form of insurance/guarantees in producer prices at the harvesttime may be helpful, although the government cannot intervene much with world prices.

3.2.2. Punjab

There are several cotton-producing districts within the Punjab province. Table 3.4 gives a list of major cotton-producing districts in Punjab with their average percentage contribution to the overall cotton production in the province. The top five cotton-producing districts are Rahim Yar Khan (13.9 percent of cotton production), Bahawalpur (13.0 percent), Vehari (10.4 percent), Bahawal Nagar (8.7 percent), and Lodhran (8.6 percent).

Table 3.4. Major cotton-producing districts in Punjab (1996–2005 average % distribution of area and production)

District	Area	Production
Rahim Yar Khan	12.9	13.9
Bahawalpur	11.0	13.0
Vehari	10.0	10.4
Bahawalnagar	8.2	8.7
Lodhran	8.2	8.6
Khanewal	7.8	8.0
Muzaffargarh	7.6	6.8
Multan	6.9	6.4
Rajanpur	5.6	7.2
D.G. Khan	4.0	4.8
Pakpattan	3.1	2.2
Sahiwal	3.6	2.7
Okara	1.6	1.2
Jhang	2.6	1.7
T.T. Singh	1.9	1.3
Faisalabad	1.8	1.1
Layyah	1.7	1.1
Kasur	0.6	0.3
Others	1.0	0.6
Total	100.0	100.0

Sources: Averages calculated from the data were originally supplied by the Provincial Departments of Agriculture and reported in its price policy reports on seed cotton by the Agricultural Prices Commission of Pakistan (2004).

In view of the dominant shares of Punjab in area and production of cotton, its production performance has a major bearing on the overall situation in the country. The average area under cotton in the province over the period is 2.36 million hectares, with a coefficient of variation of 5.3 percent. The low value of the coefficient of variation is indicative of the small annual variation in area devoted to cotton production in the province. It also reflects the concentration of cotton cultivation in certain areas/regions, primarily the southern region of the provinces where cotton is the dominant crop. The trend growth rate in cotton area in Punjab is estimated at 0.5 percent per year.

The cotton yield in Punjab during the period ranged from a minimum of 475 kilogram/hectare in 1996–1997 to a maximum of 849 kilogram/hectare in 1991–1992. The record cotton yield in the province in 1991–1992 resulted in the highest level of cotton production: 1.94 million tons (11.42 million bales) in the province during the 1990s. However, this could not be sustained in the subsequent years, as cotton farming in the province witnessed the emergence of leaf curl virus and other pests with devastating effects on production. As a result, cotton yield experienced wide swings over the period. The average yield for the period was 594 kilogram/hectare, with a coefficient of variation of 17.5 percent, indicating wide yield variations. The trend growth rate of cotton yield over the period was –0.3 percent. However, because of wide yearly fluctuations, this is not statistically significant.

The production of cotton in the Punjab province has ranged from a minimum of 1.11 million tons (6.52 million bales) in 1993–1994 to a maximum of 1.94 million (11.42 million bales) in 1991–1992. The production level in 2004–2005, which was 1.9 million tons (11.149 million bales), almost reached the record high in 1991–1992. The average annual production during the period was 1.4 million tons (8.2 million bales). The coefficient of variation for annual production was 17.7 percent. The large size of this coefficient is primarily due to the wide fluctuation in cotton yield. The average annual growth rate in cotton production is 0.1 percent, which is not statistically significant.

3.2.3. Sindh

There are also several cotton-producing districts within the Sindh province. Table 3.5 gives a list of major cotton-producing districts in Sindh during 1996–2005. The top five cotton-producing districts are Sanghar (21.2 percent of cotton production), Ghotki (18.0 percent), Khairpur (13.0 percent), Nawabshah (11.8 percent), and Hyderabad (9.3 percent). The area under cotton production in the Sindh province has varied from a minimum of 397,000 hectares in 1992–1993 to a maximum of 635,000 hectares in 2004–2005. The average during the period was 550,000 hectares. The area under cotton in the Sindh province experienced relatively larger fluctuations than did the Punjab province. The higher coefficient of variation, which is 13 percent for Sindh versus 5.3 percent for Punjab, indicates this. The average annual growth rate in cotton area in the province was 1.4 percent and is statistically significant.

Table 3.5. Major cotton-producing districts in Sindh (1996–2005 average % distribution of area and production)

District	Area	Production
Sanghar	20.1	21.2
Ghotki	17.7	18.0
Khairpur	13.1	13.0
Nawabshah	11.4	11.8
Hyderabad	9.5	9.4
N. Feroze	8.2	8.1
Mirpur Khas	8.7	7.7
Ummarkot	5.6	5.2
Tharparkar	1.0	0.7
Sukkur	5.3	5.4
Others	2.3	1.9
Provincial sub total	100.0	

Source: Averages calculated from the data originally supplied by the Provincial Departments of Agriculture and reported in its price policy reports on seed cotton by the Agricultural Prices Commission of Pakistan (2004).

Cotton yield in the Sindh province has fluctuated widely as well, from the lowest at 349 kilogram/hectare in 1992–1993 to the all-time high of 808 kilogram/hectare in 2004–2005. In terms of annual fluctuations, after reaching the lowest yield at 349 kilogram/hectare in 1992–1993, it improved during the next five years to reach 662 kilogram/hectare in 1997–1998. It suffered a setback in the next year and fell to 576 kilogram/hectare but steadily rose in the next four years. During 2000–2005, the cotton crop in Sindh did quite well, scaling new heights, which if sustained could revolutionize cotton production in the province. Overall, the average yield for the province during the period 1991–2005 was 597 kilogram/hectare. Its coefficient of variation is 24 percent. The annual growth rate in cotton yield in Sindh was 5.4 percent and is statistically significant despite the yield variability.

Between 1999–1991 and 2004–2005, cotton output in Sindh grew at an average rate of 6.8 percent per year, which is statistically significant. In 1990–1991, cotton production in Sindh amounted to 191,000 tons (1.13 million bales). After experiencing considerable fluctuations in the intervening years, production surged to 513,000 tons (3.017 million bales) in 2004–2005. The average production during the period was 332,700 tons (1.96 million bales), with a coefficient of variation at 30.8 percent.

3.2.4. Crop Yield: Punjab versus Sindh

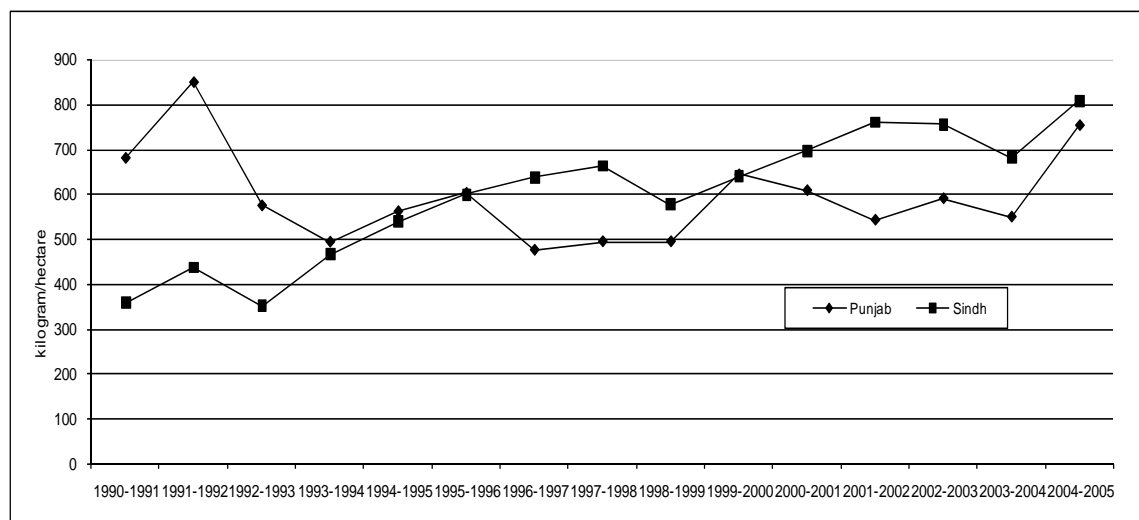
Over the period 1991–2005, the average cotton yield in Punjab was 594 kilogram/hectare (Table 3.6). This is slightly lower than the average cotton yield in Sindh, which was 597 kilogram/hectare. However, there are significant differences in cotton yield through the years in the two provinces. For better comparison, the whole period may be divided into two subperiods: 1991–1996 and 1997–2005. In the first subperiod, cotton yield in Punjab was consistently higher than in Sindh by a wide margin, especially from 1990–1991 to 1993–1994 as shown in Figure 3.2. However, in the second subperiod, Sindh outperformed Punjab in cotton yield. This may be due to a number of factors, but the two major ones are (1) the Sindh province did not experience the devastating effects of the cotton curl virus, which inflicted heavy damage in cotton production in Punjab; and (2) Sindh has hot and dry weather, which is conducive for cotton farming, especially in the districts of Ghotki, Nawab Shah, Sanghar, and Khairpur. These districts account for 64 percent of the provincial cotton area.

Table 3.6. Cotton yields (kilogram/hectare)

Year	Punjab	Sindh	Total
1990–1991	680	356	615
1991–1992	849	435	769
1992–1993	574	349	543
1993–1994	493	465	487
1994–1995	561	537	557
1995–1996	602	598	601
1996–1997	475	636	506
1997–1998	494	662	527
1998–1999	494	576	511
1999–2000	643	638	641
2000–2001	608	695	623
2001–2002	542	759	579
2002–2003	590	755	621
2003–2004	549	680	571
2004–2005	753	807	760
Mean value	594	597	594
SD	103.79	143.01	83.41
C.V. %	17.47	23.96	14.04
Growth rate %	-0.35	5.37	0.55
t-statistics	-0.34	7.82	7.26

Source: Agricultural Statistics of Pakistan 2003–2004 (Government of Pakistan, 2006); Long Term Trends in Area and Production of Crops, APCOM Series No. 204 (Agricultural Prices Commission of Pakistan, 2003); and Federal Bureau of Statistics, various issues. Note: Yields are in terms of lint. Growth rates were calculated from the coefficient of a time variable in the semilog equation $\ln Y = a + bt$, where Y is the dependent variable; C.V. = coefficient of variation, SD = standard deviation.

Figure 3.2. Cotton yield in Punjab and Sindh



However, the coefficients of variation of area and yield of cotton in Sindh are much larger than the corresponding coefficients for Punjab. Accordingly, area and yield of cotton in Sindh show higher levels of dispersion around their respective means than do those in Punjab. For the same reason, cotton production in Sindh is relatively more variable. The availability of more viable alternative crop options in the cotton-growing regions of Sindh than that of the corresponding regions of the Punjab partly accounts for higher variation in the cotton area in the province.

3.2.5. Decline in Production in 2005–2006

Buoyed by the excellent 2004–2005 crop, upbeat over policy measures, and sure of their success, policy planners set their sights on higher achievements. Accordingly, a target for cotton production for the 2005–2006 crop was set at 15 million bales. This was to be achieved from an area of 3.2 million hectares of cotton. The minimum support price of seed cotton was raised to Rs 975 per 40 kilogram, reflecting an increase of 5.4 percent over the previous year’s corresponding price.

Cotton production in 2005–2006 was 12.3 million bales (Pakistan Cotton Ginners Association). The reported production was 17.7 percent short of the ambitious target and 13.6 percent below the record harvest of 2004–2005. The area target was surpassed, as farmers having realized high incomes from cotton in 2004–2005 expanded cotton cultivation to 3.3 million hectares. Expansion in cotton area came primarily at the cost of sugarcane, as farmers facing low prices from the sugar mills switched over to cotton. Area targets set at 2.56 and 0.64 million hectares, respectively, for the major cotton-growing provinces of Punjab and Sindh were exceeded by 0.5 and 8.2 percent, respectively.

The cause of the shortfall in production was a decline in yield. Cotton yield, at the country level from the 2005–2006 crop is estimated at 630 kilogram/hectare, which is 18 percent below the previous year’s level of 769 kilogram/hectare. Crop yield in the Punjab, estimated at 650 kilogram/hectare, was only 13 percent below the yield in 2004–2005. In Sindh, where a cotton yield of 861 kilogram/hectare in 2004–2005 had raised high hopes, yield plummeted by 27 percent to 627 kilograms.

The crop harvest of 12.34 million bales in 2005–2006, although 13.6 percent short of the record harvest of 14.6 million bales in 2004–2005, seen from a long-term perspective is near normal. The decline of cotton yield highlights the crucial role of weather in farm production in general and cotton farming in particular. It has also brought to the fore the need to adopt steps that help reduce yield fluctuations as an essential component of the crop production strategy. The shortfall in cotton production in 2005–2006 at a price of 51.2 cents/pound of lint and Rs 375/40 kilograms of seed translates into a loss of \$518.7 million.

3.3. Farm Sizes

Based on the 2000 Agricultural Census data (Government of Pakistan, 2003), 25 percent of the total 6.62 million private farms are cotton farmers, as shown in Table 3.7. The proportion of cotton growers tends to rise as the farm size increases. Of the total farms with sizes up to 5 acres, 21 percent planted cotton. The share increases to 33 percent in the case of farms with sizes from 12.5 to 25 acres. The share starts to decline for larger farm sizes.

Average area sown to cotton per farm was 4.9 acres (2 hectares). Farms operating less than 5 acres, growing 1.81 acres of cotton on the average, contributed 18 percent of the total cotton area in the country. These farms accounted for 49 percent of the total cotton-growing farms in the country. Cumulatively, farms operating less than 12.5 acres account for 82 percent of the farms growing cotton. They contribute half of the total cotton area. The small and marginal farmers are a disadvantaged group in cotton farming because of the high risk involved in production due to pest infestations. The sophisticated nature of the methods and technology of pest control, the high costs thereof, and the proliferation of substandard pesticides in the market present obstacles to small farmers. High-quality pesticides are not only expensive but are also often in short supply. Small and marginal farmers are particularly at a disadvantage in such situations. These farms also often operate under liquidity constraints and are handicapped in marketing their produce. Lacking in physical facilities for storage and in financial capacity to hold onto the product for better prices, they are obliged to sell their crop immediately after harvest.

Table 3.7. Distribution of cotton-growing farms and cotton area by farm size in Pakistan

Farm Size	Cotton-Growing Farms as % of Total Farms	Share (%) in Total Cotton Farms	Average Area under Cotton (acres)	Share (%) in Total Cotton Area
Total private farms (6.62 million)	25	100	4.9	100
Farms up to 5 acres	21	48	1.8	18
Farms 5–7.5 acres	28	17	3.9	13
Farms 7.5–12.5 acres	29	16	5.7	19
Farms 12.5–25 acres	33	12	8.7	21
Farms 25–50 acres	29	5	15.6	15
Farms 50 acres and above	25	2	40.2	14

Source: Government of Pakistan (2003), Agricultural Census 2000.

In contrast, farms operating 50 acres and more constituted only 2 percent of all the cotton-growing farms. However, this 2 percent accounted for 14 percent of the total cotton area in the country, as their average area under cotton was 40.2 acres per farm. Taken together, the relatively large farms operating 25 acres or more comprised only 7 percent of all cotton-growing farms but contributed 29 percent of the cotton area.

The distributions of farms growing cotton in Punjab and Sindh generally have the same characteristics as at the national level. However, a somewhat higher percentage of all farms in these provinces grow cotton (about 33 percent). Average acreage of cotton is lower than the national average for small farms in Punjab and higher for large farms, whereas in Sindh small farms grow a larger acreage on average than grown at the national level, whereas larger farms grow less cotton acreage.

3.4. Cotton Trade Policy and Marketing

The Cotton Export Corporation (CEC), which was established in 1974, controlled Pakistan's cotton exports at that time. Its monopoly power over exports, which excluded the private sector from international cotton trade, lasted until 1986–1987. During this period, private parties bought cotton from the CEC. However, starting with the 1987–1988 season, the role of CEC diminished while the private sector reemerged. Since 1988–1989, the private sector has been able to buy cotton directly from the ginners.

Exports of cotton were subject to a minimum export price (MEP) and a system of benchmark prices. The MEP was based on the international prices of lint, domestic prices of yarn and lint, domestic requirements of the industry and the global and local supply situation. It was fixed daily by the Inter Agency Committee and announced by the State Bank of Pakistan. The benchmark price was determined based on the ex-gin price of lint plus export incidentals. The benchmark price determined the upper ceiling of the returns exporters received. The difference between the MEP and the benchmark price was the basis for calculating the export tax.

The MEP and system of benchmark price for cotton was introduced to prevent underinvoicing and to ensure a definite amount of export duty. Nevertheless, the entire export system operated effectively to suppress domestic cotton prices relative to international prices. It created a number of problems. There were shipments of cotton of higher grades than were officially declared, default in shipments, undercutting of the MEP, and delays in payments to ginners. Thus, while the CEC was committed to implementing the government's cotton-marketing policies by assuring farmers of procurement of raw cotton at fixed support prices and of prompt payments to the ginners as well as honoring its sales commitment (United Consulting Group, 1990), inherent contradiction within the system eventually made the entire process untenable.

The difference between the benchmark and MEP served as a basis for calculating the export duty. The MEP was fixed at \$0.48/pound in February 1991. As of September 9, 1991, 80 percent of the difference was charged as the export duty. The duty was increased to 100 percent of this difference with the start of a new season, effective from October 9, 1991, but lowered to 75 percent on December 5, 1991 and further reduced to 60 percent on December 12, 1991 (Agricultural Prices Commission of Pakistan, 2004). For 1990–1991, the absolute benchmark was fixed at Rs 857.36 per 40 kilogram of cotton lint and was maintained at this level during 1991–1992. Its effective level, however, was revised a few times to allow the retention of a certain proportion of duty to the exporters as the cotton season advanced. Frequent revisions in the effective benchmark, although necessitated by the changing conditions in the international and domestic markets, militated against early planning of exports.

For 1992–1993, the effective benchmark worked out to \$0.45/pound. As the export duty rates were announced in Rs per kilogram, the benchmark in terms of local currency increased with the depreciation in Pakistan Rs versus the U.S. dollar. During 1993–1994, the seasonal benchmark was \$0.44/pound of cotton, setting the cap on what exporters could receive. The MEP, announced daily, moved in sympathy with the developments in the international cotton market. A comparison of benchmark prices with the Liverpool quoted prices of Pak Afzal cotton, adjusted for transportation costs, suggested a very high rate of export duty (\$0.17/pound or about 30–35 percent of the market price). The benchmark and MEP system, by providing cheap cotton to the textile industry, encouraged development of this industry. It also curbed underinvoicing as the MEP was announced daily, in line with the trend in the export markets. The public exchequer was thus assured of export tax with little chance of duty evasion.

Notwithstanding the effectiveness of the price intervention system in achieving some of its designed objectives, it effectively insulated the domestic market from the movements in the international cotton market. Higher prices in the export markets did not much benefit the exporters, as their receipts were practically fixed. The producers did not benefit from the higher prices either. Accordingly, there was massive transfer of resources from cotton farmers to the industry and the exchequer. This is borne out by the wide margin between the export parity prices of seed cotton worked back from the international prices

of cotton and the prices ruling in the domestic markets in the early 1990s. Thus, the system failed to provide any incentive to the growers or the exporters. The domestic cotton processing industry was the principal beneficiary of the availability of cheap raw material. The supply of cheap raw material also led to complacency and inefficiency in the sector. Low cotton prices not only encouraged wasteful uses but also discouraged production.

Moreover, the system did not act to balance the demand/supply situation in the country. During 1991–1992, the domestic production of cotton was 0.85 million tons (5 million bales) in excess of the domestic requirements of the industry. However, this excess supply could not be exported profitably. Thus, the CEC ended up procuring large stocks of unwanted cotton that it had to store, which involved significant capital outlays. The storing of cotton not only involved storage and financial costs, it also resulted in quality deterioration that reduced the market value of the cotton. Then in the wake of recurring outbreak of leaf curl virus, declining cotton production, and an expanding textile sector, domestic production fell short of the burgeoning requirements of the industry. The cotton production reported at 1.36 million tons (8 million bales) in 1993–1994 was short of the requirements estimated at 1.53 million tons (9 million bales). Accordingly, the country, previously a net exporter, became a net importer; importing about 0.1 million tons (0.6 million bales) in 1993–1994 and 0.11 million tons (0.65 million bales) in 1994–1995. The increasing imports and dwindling availability of cotton for exports brought into focus the demerits of the benchmark system that had heavily taxed the cotton farmers but provided cheap raw material and encouraged inefficiency in the textile sector. There was great resentment against the system among the farmers, who demanded its abolition.

The export duty on cotton was abolished in 1994, and domestic prices in the 1994–1995 cotton season were in line with the international prices and even higher in certain cases. Subsequently both exports and imports of cotton have been within the purview of the private sector and practically duty free, allowing closer integration of the domestic and international cotton markets. Government intervention is now limited to the annual review of the support prices of seed cotton and limited public sector procurements to maintain it.

3.5. Cotton Balance Sheet Since 1990

Data on annual cotton supply (beginning stocks plus production and imports), consumption, exports, and ending stocks are summarized in Table 3.8; and exports and imports as percentages of production and consumption, respectively, are shown in Figure 3.3. Total consumption of cotton has steadily increased, from 1.36 million tons in 1990–1991 to 2.0 million tons in 2003–2004. The annual growth rate in cotton consumption works out to 3.1 percent. The annual supplies of cotton (stocks plus production and imports) in this period have ranged from 1.72 million tons to 2.4 million tons. Ending stocks of cotton, although showing a lot of interyear variation, have trended upward at the average rate of 3.2 percent per year.

Exports of cotton have experienced wide variations, ranging from as low as 1,530 tons in 1998–1999 to as high as 433,000 tons in 1991–1992 (0.10 to 20 percent of domestic production). As the domestic textile sector expanded over time, its demand for raw cotton inputs also increased. Thus, exports of cotton declined sharply at an average annual rate of 15.3 percent during 1991–2004. During 2001–2002 to 2003–2004, exports were less than 3 percent of the annual production. On the other hand, imports of cotton, which were negligible in the early 1990s, increased somewhat sporadically through 2000–2001 then rose to 9.8 percent of total consumption in the next two years and surged further to 19 percent of consumption in 2003–2004.

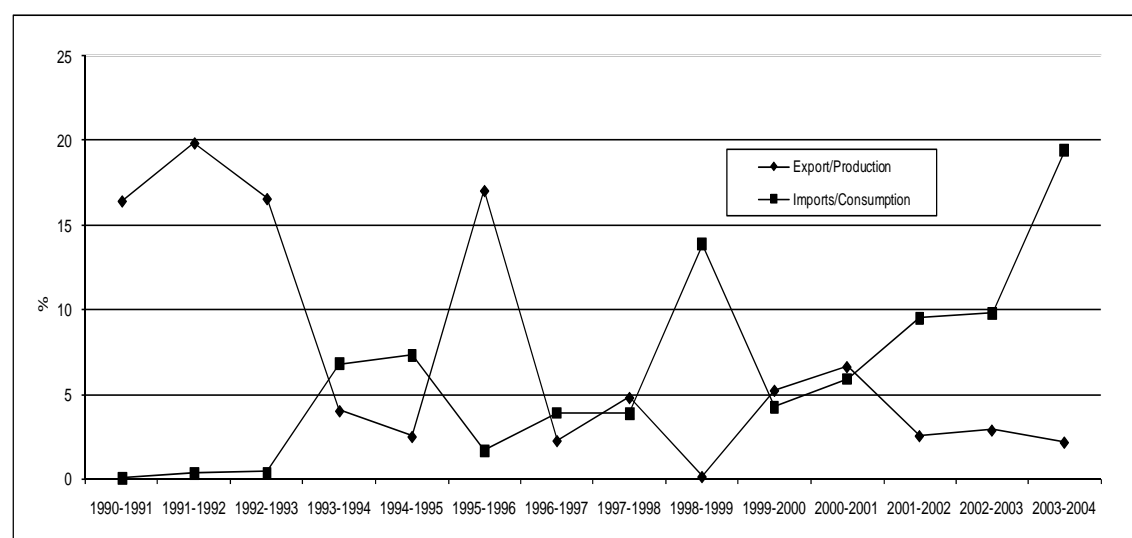
Table 3.8. Balance sheet of Pakistan cotton (thousand tons)

Year	Supply				Use			
	Stock	Production	Imports	Total	Consumption*	Exports	End Stock	Total
1990–1991	191	1,637	0	1,828	1,357	269	202	1,828
1991–1992	202	2,180	4	2,386	1,439	433	514	2,386
1992–1993	515	1,539	6	2,060	1,517	255	288	2,060
1993–1994	287	1,367	107	1,761	1,577	55	129	1,761
1994–1995	130	1,478	110	1,718	1,510	37	171	1,718
1995–1996	171	1,801	26	1,998	1,542	307	149	1,998
1996–1997	180	1,594	62	1,836	1,592	36	208	1,836
1997–1998	209	1,561	63	1,833	1,621	75	137	1,833
1998–1999	137	1,494	223	1,854	1,614	2	238	1,854
1999–2000	239	1,911	72	2,222	1,680	100	442	2,222
2000–2001	442	1,824	114	2,380	1,930	121	329	2,380
2001–2002	329	1,804	184	2,317	1,931	46	340	2,317
2002–2003	340	1,736	188	2,264	1,914	50	300	2,264
2003–2004	299	1,708	393	2,400	2,024	37	339	2,400

Source: Pakistan Central Cotton Committee, 2006.

Note: *Includes mill and nonmill consumption, unspecified consumption, and fire damage.

Figure 3.3. Exports/production and imports/consumption of cotton, %



3.6. Domestic and International Prices Since 1990

Prices of farm products usually exhibit large fluctuations, falling at harvesttime and rising off season. Prices during the harvest season tend to be at their lowest levels because of higher supply. During this period, farmers often offload their surplus in the market to meet their cash requirements. In years of good harvest, prices may even crash to dismal levels, to the disadvantage of growers. In serious situations, prices during the harvest season may not even cover the cost of production, which will result in income losses for the farmers. The small and marginal farmers, often operating under liquidity constraints, are especially handicapped in this context (Salam, 2001). To protect farmers against income losses because of low harvest prices, the government has been announcing support/minimum guaranteed prices for a number of crops, including cotton. The minimum guaranteed prices the government announced are meant to provide a floor to the market price. The farmers' sale of produce at the announced prices to the designated agencies has been voluntary.

Table 3.9 presents the support and market prices of cottonseeds, both in nominal and real prices. Real prices in 2000–2001 Rs are calculated as nominal prices deflated by the consumer price index (CPI). Nominal prices have wider fluctuations than real prices. The coefficient of variation for the nominal support price is 42.1 percent, while that for the nominal market price is 34.4 percent. The C.V. for the real support price is only 16.1 percent, whereas for the real market price it is 18.1 percent.

Table 3.9. Support and market prices of seed cotton

Year	Nominal Price		CPI	Real Price	
	Support	Market		Support	Market
1990–1991	245	327	43.2	567	757
1991–1992	280	334	47.4	591	704
1992–1993	300	384	52.1	576	737.5
1993–1994	315	497	57.9	544	858
1994–1995	400	785	65.5	611	1,198
1995–1996	400	754	72.6	551	1,039
1996–1997	500	793	81.1	616	978
1997–1998	500	843	87.5	572	964
1998–1999		914	92.5		989
1999–2000		641	95.8		669
2000–2001	725	900	100.0	725	900
2001–2002	780	761	103.5	753	735
2002–2003	800	914	106.8	749	857
2003–2004	850	1,219	111.6	761	1,092
2004–2005	925	885	122.0	758	725
Mean	540	730	83	644	880
SD	243	251	25	89	160
C.V. %	45.0	34.4	30.2	13.9	18.1

Note: Real prices are expressed in terms of 2000/2001 Rs. CPI = consumer price index; SD = standard deviation; C.V. = coefficient of variation.

Figure 3.4 compares the nominal support and market prices of seed cotton. In the past 15 crop years, there were 11 instances when the nominal support prices of seed cotton were revised upward. No support prices were fixed effectively for the 1998–1999 and 1999–2000 crops, although some published series indicate nominal support price values. The support price of Rs 925 per 40 kilogram for the 2004–2005 crop season reflects a cumulative increase of 278 percent over the support price of Rs 245 per 40 kilogram in the 1990–1991 crop year. This change represents an average annual growth of 9.3 percent. Over the same period, CPI increased by 7.2 percent annually. Thus, the support price in real terms increased by 2.1 percent per year.

Figure 3.4. Support and market prices of seed cotton

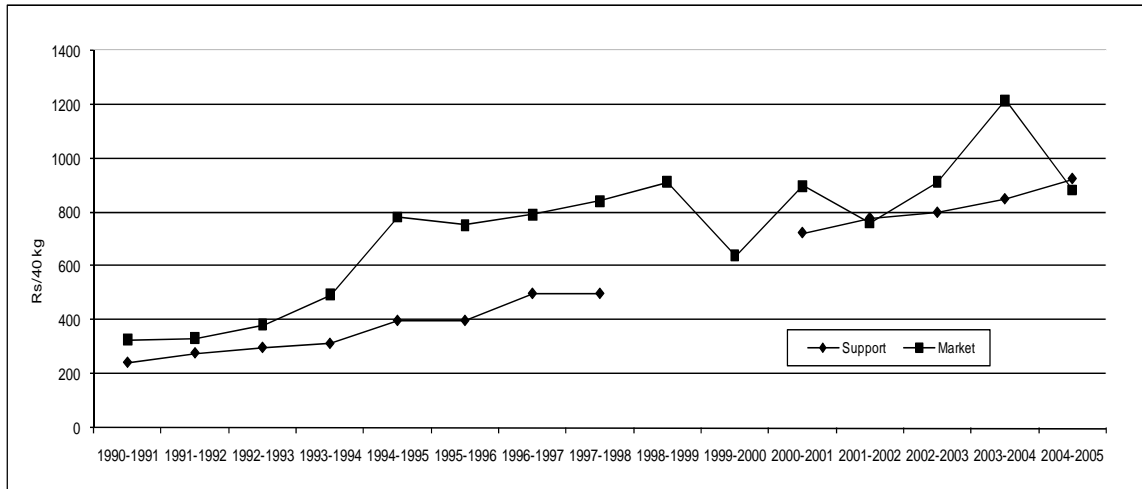
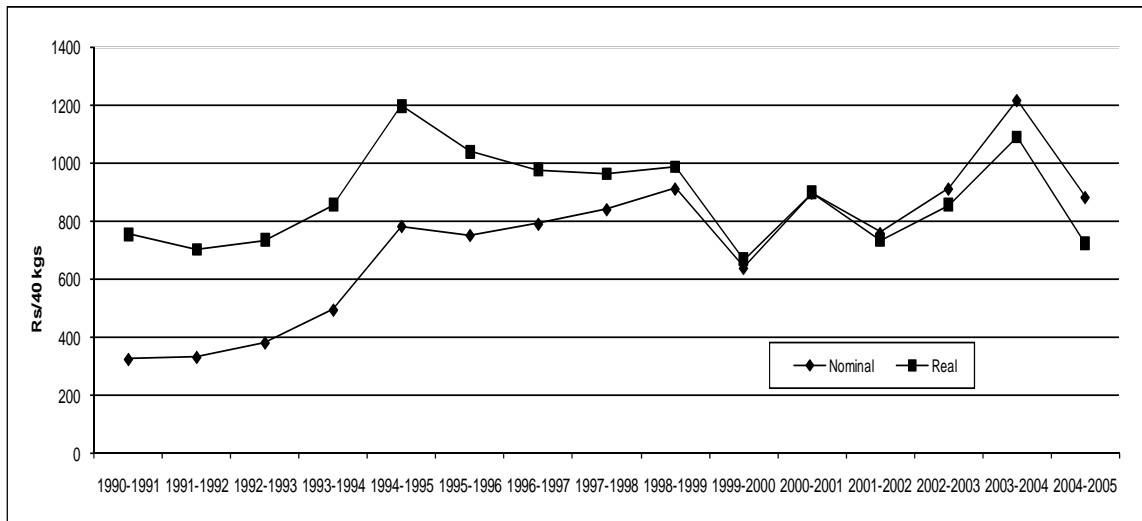


Figure 3.5 compares the nominal and real market prices of seed cotton. No clear trend is observable for real market price. The highest real market price level was in 1994–1995, and the lowest was in 1999–2000. From the lowest level, real market price recovered until 2003–2004. However, the peak reached in 2003–2004 was 8.8 percent below the peak attained in 1994–1995.

Figure 3.5. Nominal and real prices of seed cotton



The comparison of the market and support prices of seed cotton suggests that except for two years (2001–2002 and 2004–2005) market prices have been much higher than the support prices. In the above-mentioned years, when the market prices fell below the support prices, the government tried to sustain the prices of seed cotton by having the Trading Corporation of Pakistan (TCP) procure cotton lint. The TCP procured 34,500 tons (0.2 million bales) in 2001–2002 and 272,000 tons (1.6 million bales) in 2004–2005. These interventions, notwithstanding their positive effect on the market sentiment, failed to guarantee the support price to the growers. The situation in 1999–2000 was especially precarious as market prices were only 88 percent of the support prices. This happened largely because of the change in the government in the midst of the cotton harvest season as the new political administration took time to line up the requisite policy framework and institutional arrangements to shore up the market sentiment. In

the meantime, international prices continued to fall, putting downward pressure on the domestic prices. The textile industry, taking advantage of low international prices, had lined up large quantities of cotton from abroad in 1998–1999, which also depressed the domestic market. Without government intervention, market prices may have deteriorated further, to the disadvantage of cotton farmers.

Since the mid-1990s, the international price of cotton has been an important reference for the domestic transactions of cotton lint and the prices of seed cotton. In view of various technical considerations and characteristics important in determining its quality (such as staple length, micronaire, quality of ginning, and price received in the international market), Pakistani cotton has been grouped within Index B cottons. The average annual world market prices of this group are presented in Table 3.10 and illustrated in Figure 3.6. The world price of cotton exhibits substantial variability around a slight declining trend in nominal terms and in relation to the CPI of the United States between 1990–1991 and 2004–2005. The price of Index B cottons decreased from its peak in 1994–1995 to a trough in 2001–2002 by 57.8 percent in nominal terms. In relation to the U.S. CPI, Index B cotton’s price (in 2000 dollars) declined from \$107.1 per 100 pound to \$37.9, a decrease of 64.7 percent.

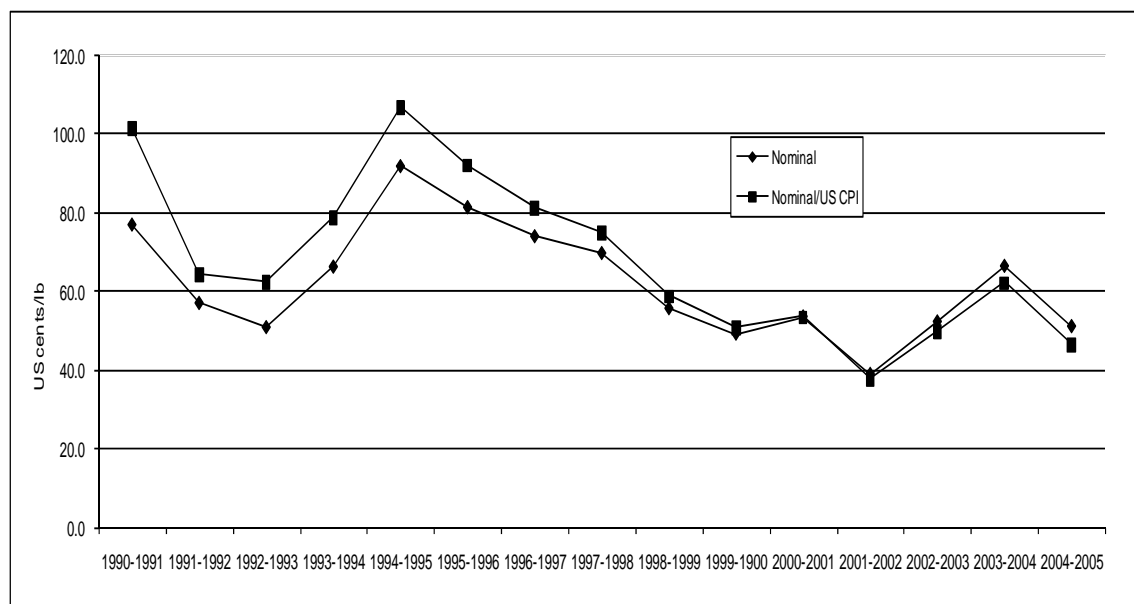
Table 3.10. International price of cotton, U.S. cents/pound (Index B)

Year	Nominal Price	Nominal Price/U.S. CPI
1990–1991	77.2	101.7
1991–1992	57.2	64.7
1992–1993	51.0	62.5
1993–1994	66.4	79.2
1994–1995	92.2	107.1
1995–1996	81.7	92.3
1996–1997	74.2	81.5
1997–1998	69.9	75.0
1998–1999	55.8	58.9
1999–2000	49.3	50.9
2000–2001	53.7	53.7
2001–2002	39.0	37.9
2002–2003	52.4	50.2
2003–2004	66.7	62.4
2004–2005	51.2	46.7
Mean	63	68
SD	14	21
C.V. %	23.2	30.2
Trend Growth %	–2.5	–4.8
t-statistics	–1.9	–3.6

Source: International Cotton Advisory Committee, Cotton World Statistics.

Note: SD = standard deviation; C.V. = coefficient of variation.

Figure 3.6. International price of cotton (Index B)



To see how closely domestic and international prices have moved together, the domestic market prices of seed cotton can be compared to the export and import parity prices worked back from border prices of cotton lint.⁶ These comparisons are shown in Table 3.11 and Figures 3.7 and 3.8. The average nominal export parity price between 1990–1991 and 2004–2005 is estimated at Rs 733/40 kilogram, with a coefficient of variation of 31.1 percent, whereas the average import parity price worked out to Rs 975/40 kilogram, with a coefficient of variation of 28.5 percent. The trend growth of the nominal export parity price is 5.5 percent. However, the trend growth of nominal price of Index B cottons in dollars is –2.5 percent (Table 3.10). These opposite trends illustrate the effect of substantial inflation on nominal seed cotton price levels in Pakistan.

Table 3.11. Domestic and international nominal and real prices of seed cotton

Year	Nominal Price (Rs/40 kilogram)			CPI	Real Price (Rs/40 kilogram)		
	Market	Export Parity	Import Parity		Market	Export Parity	Import Parity
1990–1991	327	473	592	43.2	758	1,096	1,370
1991–1992	334	408	503	47.4	704	861	1,061
1992–1993	384	385	495	52.1	737	739	951
1993–1994	497	527	772	57.9	858	910	1,332
1994–1995	785	711	1,045	65.5	1,198	1,086	1,596
1995–1996	754	875	995	72.6	1,039	1,206	1,371
1996–1997	793	877	1,085	81.1	978	1,082	1,338
1997–1998	843	838	1,069	87.5	964	959	1,222
1998–1999	914	782	1,030	92.5	989	846	1,114
1999–2000	641	599	989	95.8	669	625	1,033

⁶ See Orden et al. (2006) for details of the cotton lint domestic/border price comparisons. Since Pakistan has been a producer and exporter of yarn, one could also compute the market prices of seed cotton by working back from international yarn prices, but this involves an additional step of processing and we have not done so in either study.

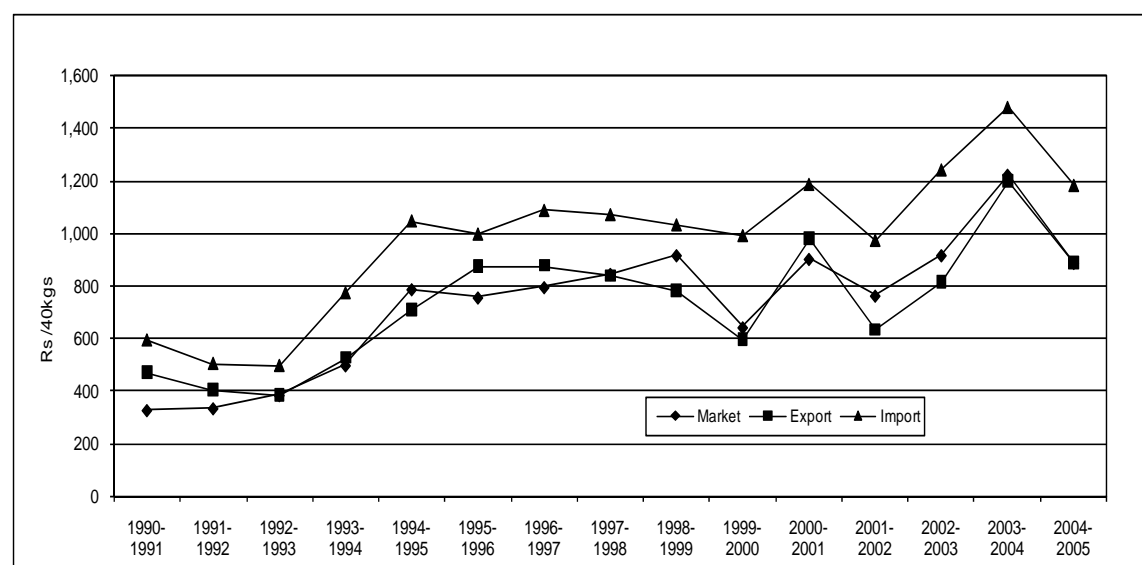
Table 3.11. Continued

Year	Nominal Price (Rs/40 kilogram)			CPI	Real Price (Rs/40 kilogram)		
	Market	Export Parity	Import Parity		Market	Export Parity	Import Parity
2000–2001	900	981	1,184	100.0	900	981	1,184
2001–2002	761	633	971	103.5	735	611	938
2002–2003	914	816	1,239	106.8	857	764	1,161
2003–2004	1,219	1,198	1,477	111.6	1,092	1,073	1,323
2004–2005	885	886	1,180	122.0	725	726	967
Mean	730	733	975	83	880	904	1,197
SD	251	228	277	25	160	185	191
C.V. %	34.4	31.1	28.5	30.2	18.1	20.4	15.9
Trend							
Growth %	7.5	5.5	6.1	7.2	0.3	-1.7	-1.1
t-statistics	5.5	4.0	5.4	16.5	0.2	-1.4	-1.2

Note: CPI = consumer price index; SD = standard deviation; C.V. = coefficient of variation.

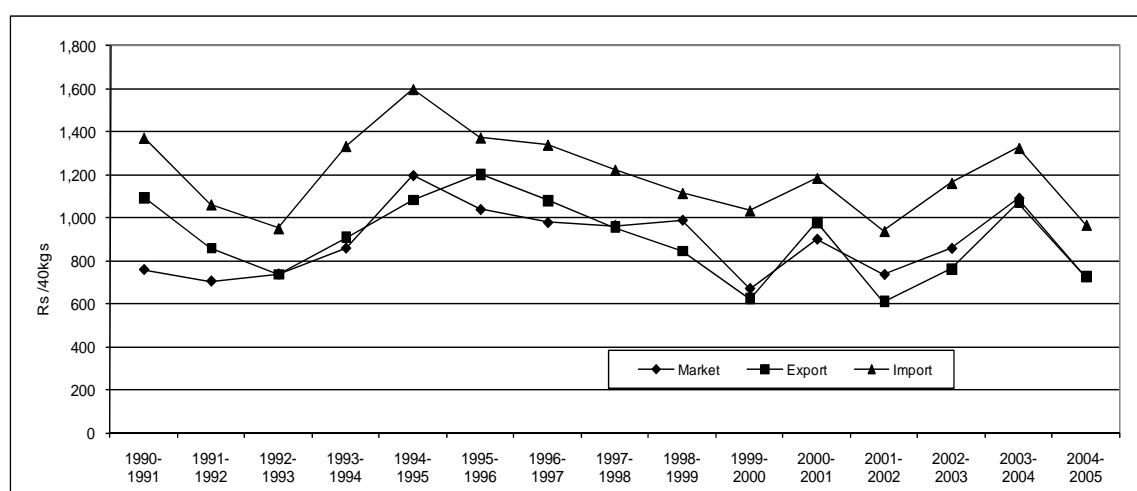
Comparison of export parity prices with the corresponding domestic market prices of seed cotton shows that the two price series generally track closely (Figure 3.7). There are 7 out of 15 years where export parity prices are higher than market prices and 8 where it is lower. Import parity prices are on average 25–35 percent higher than export parity prices. A comparison of domestic prices with import parity prices indicates that the price of imported cotton is substantially higher than the domestic price. Accordingly, the coefficient of nominal protection, estimated using the import parity price, is always significantly less than one. Generally, higher export and import parity prices characterize years in which substantial quantities of cotton were exported, whereas in years wherein imports were substantial, parity prices are lower. Moreover, as noted earlier, cotton exports have been declining and imports have increased in recent years as the domestic textile industry has expanded.

Figure 3.7. Nominal prices of seed cotton



Although nominal domestic cotton market prices track export parity prices relatively closely, the real price of cotton (adjusted for domestic inflation) depicts more realistically the price levels that affect the purchasing power and economic well-being of cotton farmers. Figure 3.8 shows that the real cotton price in Pakistan dropped in the late 1990s. A similar pattern is observed in the world price in U.S. dollars. However, the real depreciation of the rupee, which raised the value of world prices in domestic currency, moderated the decline in real prices in Pakistan. In real terms (adjusted for inflation in Pakistan and the United States), the rupee depreciated by 32.5 percent between 1994–1995 and 2001–2002. Because of the real depreciation, the real domestic market price of cotton declined by 38.7 percent between 1994–1995 and 2001–2002, which is lower than the world price decline of 64.7 percent in real dollars. The magnitude of the decline in the three-year averages of real world and domestic prices centered on the peak and trough years are lower: 49.1 percent decline in world dollar prices and 19.6 percent in domestic Rs prices.

Figure 3.8. Real prices of seed cotton



3.7. Implications of Cotton Income for Cultivation

Analysis of historical data in the previous sections indicates that high prices generally accompany years of low yield. This countercyclical pattern of yield and prices partly compensates for the loss of income for the growers. However, the rise in prices is not always sufficient to offset the farmers' potential income loss in years of poor crop. In the absence of any crop insurance programs as part of their risk management strategy, farmers may switch over to other crops, provided it is technically possible and economically feasible, and thus lessen the area under crops experiencing more frequent risks (Hazell and Valdes, 1986).

Farmers' allocation of land, water, and other resources to various enterprises is primarily governed by economic considerations. In this section, we make econometric estimates of the combined impact of changing yields and prices of seed cotton on crop area in the following year. The production of crops in general and of cotton in particular reflects the outcome of a host of factors, many of which are beyond the control of farmers. We confine our analysis of farmers' response to changes in prices and yield to an examination of the changes in the cotton area only. That is, the following two simple specifications are estimated:

$$(1) X_t = a + b Y_{t-1} + e \quad (\text{linear})$$

$$(2) \ln X_t = a + b \ln Y_{t-1} + e \quad (\text{log linear})$$

where X_t is the area under cotton in year t expressed in thousands of hectares, and Y_{t-1} is the lagged gross income per hectare of seed cotton expressed in rupees.

The data on cotton area in hectares are readily available. However, the data on yield of cotton in the official statistics are expressed in terms of lint, not in terms of seed cotton as produced and sold by the farmers. Generally, the ratio between cotton and seed cotton is 1:3. Thus, the yield of cotton as reported for various years was multiplied by three to convert into seed cotton. This is important because it is the price of seed cotton that is relevant to farmers. To estimate the income per hectare of cotton at the province level, the average price of seed cotton per season was multiplied by the derived provincial (Punjab and Sindh) yield of seed cotton using the above ratio. For the whole country, the average yield of cotton is used. The derived cotton income and the cotton area are used in estimating the linear and log linear specifications above. The results are presented in Table 3.12.

Table 3.12. Regression analysis of lagged income effect on cotton area

	Linear		Log Linear	
	Coefficient	t-statistics	Coefficient	t-statistics
Pakistan				
Intercept	2,599	32.2	6.9	26.9
Income lagged	0.011	4.4	0.101	4.0
R-square	0.62		0.59	
F-ratio	19.8		16.3	
Punjab				
Intercept	2,167	25.2	7.0	20.3
Income lagged	0.0064	2.5	0.0772	2.3
R-square	0.34		0.31	
F-ratio	6.22		5.39	
Sindh				
Intercept	458	12.5	4.9	9.3
Income lagged	0.00295	2.8	0.1385	2.7
R-square	0.40		0.38	
F-ratio	7.86		7.19	

Note: Number of observations in all these cases was 14.

The coefficients of estimated equations have right signs and size and are statistically significant. The linear function explains 62 percent of the variation in the area under cotton at the national level during the period under review. As the results of the regression analysis show, an increase of 10 Rs in the gross income per hectare of cotton, other things remaining the same, is expected to result in an expansion of 108 hectares in its area in the next season. As indicated by the results of the log linear equation, which explains about 59 percent of the variation in the log of cotton area during the period under reference, a 10 percent increase in the gross income of cotton, holding other factors constant, will lead to 1 percent expansion in the cotton area in the next season. Generally, the same insights can be drawn from the provincial results. However, acreage response coefficients are larger for Sindh than for Punjab. This is consistent with the greater availability of alternative cropping opportunities in Sindh than in Punjab, as earlier noted.

The results highlight that stability in income from cotton through either reducing the volatility in prices or minimizing the fluctuations in crop yield is critical for sustaining Pakistan's cotton production. Sustained growth in domestic cotton production is necessary to satisfy the growing cotton requirements of the textile industry. Otherwise, the textile industry will have to rely on relatively expensive cotton imports. This will negatively affect its competitiveness in the world market.

3.8. Emerging Challenges in Cotton Farming in Pakistan

One of the key challenges facing the cotton sector is how to maintain economic viability of cotton farming in the face of globalization, rising competition from synthetics, and increasing input prices and competition for land, water, and other resources from other crops and nonfarm uses. For example, the growth in input prices is higher than the growth in output prices. Thus, an important challenge is how to increase productivity to offset the impact of rising input prices on the economics of cotton farming. Another important challenge is how to minimize the losses caused by pests and weed infestations. How to assess and evaluate the potential of Bt cotton under Pakistan's conditions and developments of such cultivars in the country is a further challenge facing the sector. Reducing contamination in cotton and raising the quality of cotton lint is another critical challenge that confronts the sector.

3.8.1. Cost of Production

The principal input costs in cultivating cotton include seed, chemical fertilizers, pesticides, weedicides, diesel, water, and labor in addition to land. Annual data on selected nominal farm input prices along with the cost of production of seed cotton are shown in Table 3.13 from 1990–1991 to 2004–2005. There are substantial increases in the prices of all the inputs. Custom hire rate of plowing one acre has increased from Rs 35 in 1990–1991 to Rs 150 in 2004–2005, whereas the wage rate has increased from Rs 31 per person-day to Rs 100. The price of seed has escalated from Rs 6/kilogram in 1990–1991 to Rs 50/kilogram in 2004–2005. The prices of diammonium phosphate (DAP) and urea, the most commonly used fertilizers in Pakistan, have gone up from Rs 203 and Rs 150 per 50-kilogram bag to Rs 953 and Rs 424, respectively. The canal water rate has increased from Rs 34 per acre to Rs 93 in 2004–2005. The cost of cultivation reflects changes in input prices.⁷

Table 3.13. Prices of important inputs and cost of production of seed cotton

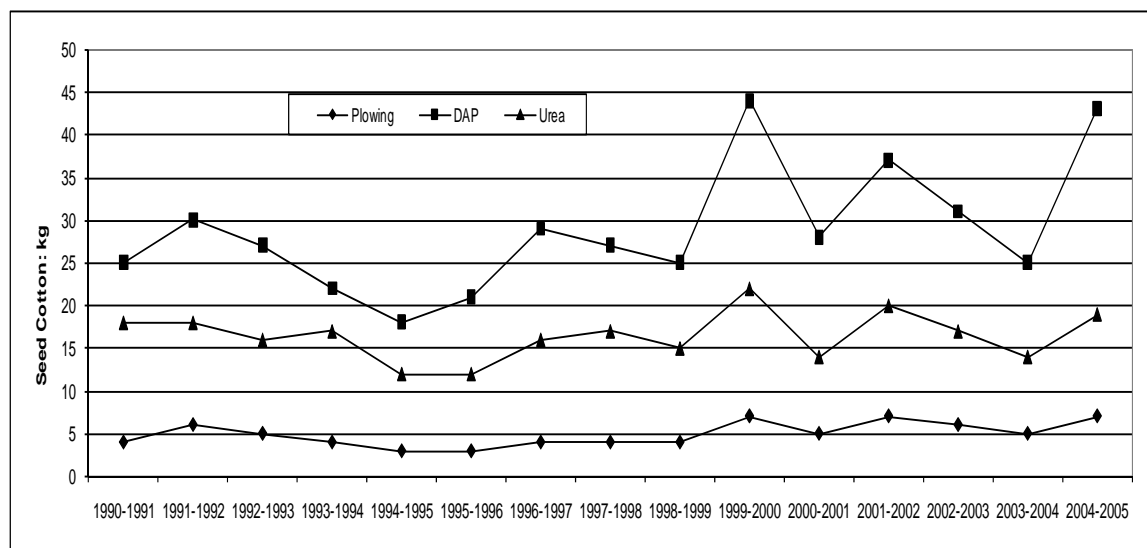
Year	CPI	Cost of Cultivation		Cost of Production Rs/40 Kilograms of Seed Cotton		Fertilizer Prices Rs/50 Kilograms Bag		Wage Rate Rs/Day	Canal Water Rate Rs/Acre	Price of Cottonseed Rs/Kilogram	Custom Rate for Plowing Rs/Acre
		Rs/Acre of Cotton		Rs/40 Kilograms of Seed Cotton		DAP Urea					
		Punjab	Sindh	Punjab	Sindh	DAP	Urea				
1990–1991	43.2	3,346	2,334	214	211	203	150	31	34	6	35
1991–1992	47.4	4,415	2,726	253	252	250	150	35	34	8	50
1992–1993	52.1	4,958	3,013	283	278	260	150	40	34	8	50
1993–1994	57.9	5,242	3,187	299	293	272	210	44	34	10	50
1994–1995	65.5	5,848	3,647	335	335	350	234	50	37	12	60
1995–1996	72.6	6,494	4,124	369	378	400	235	60	41	15	60
1996–1997	81.1	7,346	4,696	419	432	570	310	60	45	18	70
1997–1998	87.5	9,125	7,811	554	529	570	365	70	70	25	90
1998–1999	92.5	9,746	8,387	591	567	570	350	80	77	30	100
1999–2000	95.8	10,157	8,768	616	592	710	350	85	85	32	110
2000–2001	100.0	11,073	9,188	670	620	640	325	90	85	32	120
2001–2002	103.5	12,305	10,025	748	680	710	390	90	93	35	130
2002–2003	106.8	12,697	10,323	771	699	716	385	95	93	35	140
2003–2004	111.6	13,666	10,809	830	733	750	415	95	93	35	150
2004–2005	122.0	14,606	11,939	857	806	953	424	100	93	50	150
Growth %*	7.2	10.1	12.6	10.4	9.6	10.5	8.0	8.5	9.5	14.7	10.5
t-statistic	16.1	22.2	14.9	22.5	20.2	12.8	9.7	15.1	10.6	17.9	20.1

Note: CPI = consumer price index; *Growth rates calculated from the coefficient of a time variable in the semilog equation $\ln Y = a + bt$.

⁷ These data are drawn from various issues of The Pakistan Journal of Agricultural Economics and cotton policy reports of the Agricultural Prices Commission.

The average annual growth rates in the prices of inputs, the cost of cotton cultivation, and the cost of production are higher than that of the consumer price index (CPI). The average growth in CPI is 7.2 percent. The average growth in the cost of cultivation of cotton is 10.1 percent in Punjab and 12.6 percent in Sindh. The average growth in the cost of production is 10.4 percent in Punjab and 9.6 percent in Sindh. However, the data in Table 3.11 indicate that the average annual increase in the market price of seed cotton has been only 7.5 percent. Thus, cotton farmers are squeezed between increasing input prices and the slower rise in output prices. As a result, the quantity of seed cotton required to buy a given level of various inputs used in farm production has increased, as shown in Figure 3.9.

Figure 3.9. Seed cotton required to buy selected input



The real cost of cultivation of cotton has increased by 2.9 percent per year in the Punjab province (average increase in cost of cultivation less change in CPI) and by 5.4 percent in the Sindh province. Nevertheless, the real market price of seed cotton in Table 3.11 has not shown a statistically significant average annual growth (0.3 percent). At the same time, cotton yield over this period has widely fluctuated. In Table 3.3, the coefficient of variation for crop yield is 13.7 percent for all Pakistan, 17.5 percent for Punjab, and 24 percent for Sindh. These developments have adversely affected the income and welfare of cotton farmers.

3.8.2. Cotton Insects and Diseases and Their Control

Cotton—the source of silver fiber—is vulnerable to the attack of a host of insects and diseases during various stages of its life cycle. Important insects of the cotton crop in Pakistan are aphids, jassids, thrips, mites, white flies (sucking pests), field crickets, grass hoppers, locusts, cutworms, termites, and bollworms—army worm, and American, spotted, and pink bollworms—(Ahmad, Halemi, and Naqvi, 1988).

Economic losses due to pest infestation are substantial. They average 10–15 percent in normal years and 30–40 percent or even higher during abnormal times. Pakistan has experienced many such losses in recent years. In view of the importance of cotton crops and the implications of production losses to rural incomes and the performance of the economy, it is imperative to develop an effective strategy and adopt all possible measures to arrest and reduce these losses. Effective pest control, inter alia, depends on pest scouting for identification of insects, stage of life cycle, and intensity of attack/infestation (higher or lower than economic injury level), and judicious use of pest control methods. Proliferation of substandard

insecticides in the market, aggressive marketing by pesticide companies, and the farming population's limited knowledge about pest control methods and practices have led to the inefficient use of chemicals and higher costs of cultivation. Farmers' over reliance on chemicals and indiscriminate use of pesticides have resulted not only in higher costs of cultivation but also in environmental pollution and the development of resistance in insects against many of the insecticides.

The average cost of plant protection primarily against insects is around Rs 2,800 per acre in Punjab and Rs 1,850 per acre in Sindh, respectively—18 percent and 15 percent of gross costs of cultivation. This constitutes the single most important item of out of pocket (tradable) expenditure in cotton farming, as shown in Table 3.14. Farmers spray cotton fields five to six times on average per season and in certain situations the number of sprays may increase to more than 10 depending on weather and the intensity of pest infestation and quality (efficiency) of chemicals being used. Excessive use of chemicals besides polluting the environment has also exposed farm workers in general and cotton pickers in particular to health hazards. In addition, as manufacturing and the livestock feed industry use cottonseed edible oil, residues of pesticides on cottonseed may pose serious health problems.

Table 3.14. Average farmers' cost of production of cotton in Punjab and Sindh, 2004–2005 crop year

Summary of operations		Punjab		Sindh	
		Cost/Acre, Rs	Share, %	Cost/Acre, Rs	Share, %
1	Land preparation	1,018	7	1,220	10
2	Seed and sowing operations	628	4	862	7
3	Interculture and weeding	856	6	802	7
4	Irrigation	1,137	8	636	5
5	Labor for irrigation and water course cleaning	346	2	373	3
6	Plant protection (cost of pesticides, weedicides and application charges)	2,769	19	1,848	15
7	Manures and fertilizers including application	2,062	14	1,872	15
8	Mark up on farm investment (estimated at 14% per year on all costs incurred up to harvesting for eight months)	640	4	558	5
9	Management (for eight months)	330	2	330	3
10	Land rent (for eight months)	3,333	23	2,000	16
11	Land tax + drainage cess	80	1	149	1
12	Land revenue	5	0	5	0
13	Payments for picking	1,392	9	1,291	11
14	Harvesting of cotton sticks	185	1	285	2
15	Gross cost of cultivation	14,783	100	12,232	100
16	Value of cotton sticks	185		285	
17	Net cost of cultivation	14,598		11,947	
18	Seed cotton yield (kilograms/acre)	696		608	
19	Cost of the produce at farm gate:				
	1				
9.1	with land rent	839		786	
	1				
9.2	without land rent	647		655	
20	Transport and marketing costs	18		20	
21	Cost of the produce at market/gin:				
	2				
1.1	with land rent	857		806	
	2				
1.2	without land rent	665		675	

Source: Data adapted from APCOM's Price Policy Report for Cotton 2004–2005 crop (APCOM, 2004); figures rounded off.

Cotton is also susceptible to several plant diseases that collectively inflict substantial production losses every year, both in terms of lost production and lower quality of cotton. Although precise estimates of these losses are not available, knowledgeable farmers and others well versed in the crop conditions in the country put such losses at around 10–15 percent of the annual harvest on average. In serious situations, as experienced in the wake of the leaf curl virus attack in the 1990s, the losses may be 30–40 percent.

In spite of heavy losses in cotton production, farmers are not very familiar with the early symptoms of the diseases or are unaware of the possible measures to control them. This is perhaps because the pathogens that cause the diseases are not always evident on the plants but may be hidden or underground. The plants may not show early signs of any ill effects of disease but may suffer from an apparent sudden collapse.

Cotton experts in Pakistan have identified the following among important diseases: bacterial blight, leaf curl virus, boll rot, stem rot, wet rot, root rot, wilt, anthracnose, stunting, seed and seedling diseases, *Myrothecium* leaf spot, *Cercospora* leaf spot, *Alternaria* leaf spot, and nematode diseases (Kamal and Hussain, 1988). Of all these diseases, bacterial blight, boll rot, and root rot were generally singled out as the most damaging in Pakistan until the CLCV, which appeared in the 1990s. The CLCV seems to have overshadowed all other cotton diseases in the country, and serious efforts have been made to develop cotton cultivars that are tolerant of or resistant to leaf curl, which caused severe cotton losses.

Integrated pest management. In view of the high susceptibility and vulnerability of cotton to a host of insects, the complexity and diversity of the factors causing crop diseases, and the annual production losses caused by pest infestations, it is necessary to find ways to minimize such losses. However, there is no simple solution available to control the diverse pests and diseases. It may be helpful to adopt an integrated approach that would involve the following: (a) cultivating approved varieties for various zones; (b) following the recommended planting schedules; (c) uprooting the plants after the final harvest; (d) rotating crops; and (e) using chemicals judiciously. These precautions may offer the best hope for overcoming the losses inflicted by various pests and diseases in cotton farming.

Many countries utilize an IPM strategy in crop production in general and cotton farming in particular. The IPM strategy comprises:

- i. The development and cultivation of cotton varieties resistant to different insects, pests, and plant diseases
- ii. Cultural practices that arrest or prevent pest build up (interculture crop rotation, adhering to sowing and harvesting schedules prescribed and recommended by crop experts, uprooting plant stubbles, and burning the crop/plant residue)
- iii. Trapping pests
- iv. Sex pheromones
- v. Biological control by rearing and releasing the predators and parasites of various pests and insect pathogens in cotton fields
- vi. Microbial control
- vii. Physical methods to control insect pests

IPM does not exclude the use of chemicals for pest control but aims for their judicious use along with other methods to minimize the introduction of chemicals into the ecosystem. Banuri (1998) in his study *Pakistan: Environmental Impact of Cotton Production and Trade* noted that IPM offers promising alternatives to chemical use in pest control but had not been very successful on a broadscale.

3.8.3. Weed Control

Another important dimension of plant protection relates to the control of weeds in cotton cultivation. Salam and Soomro (1988) identify the common weeds found in cotton fields in various cotton-growing regions of Pakistan as “itsit” (*Triantberma monogyma*), “dela” (*Cyperus rotundus*), “khabbal” grass (*Cynodon dactylon*), “leli” (*Convolvulus arvensis*), “bhakra” (*Taribulus terrestris*), “dhodhak” (*Euphorbia prostrate*), and “tandala/cholai” (*Amarantus viridis*).

The continuous cultivation in the cotton fields crop after crop without fallowing and following the same rotation year after year have resulted in high weed infestation requiring hoeing, interculture, and the use of chemicals and herbicides for arresting weed populations to obtain good crop harvests. Weeds not only compete with crops for moisture, sunshine, and plant nutrients but also provide shelter to insects. Accordingly, effective weed control is an important constituent of the good crop husbandry and crop production strategies. The use of chemicals and weedicides and herbicides are increasingly supplanting or supplementing traditional methods of weed control, including fallowing, “dab,” crop rotation, and interculture. However, as most of the farmers do not have adequate knowledge, background, and training in the judicious use of herbicides, their indiscriminate use has not yielded the desired results. The availability of inferior quality and the marketing of substandard herbicides by unscrupulous traders compound the situation. Notwithstanding the increased use of chemicals, weeds remain an important constraint in increasing production and productivity of cotton. The high infestation of weeds and insect pests takes its toll: resulting in increased expenditure on cost of cultivation and loss of output; both in quantitative and qualitative terms leading to inefficient resource use and higher cost of production.

Quality of pesticides/weedicides. Farmers and crop experts in many fora and in the press have expressed complaints and concerns about substandard quality and adulteration of pesticides. It has also been pointed out that the quality of pesticides has deteriorated in the wake of local formulation and introduction of generic pesticides. The government has often expressed its resolve to root out the adulteration in the pesticides business. The provincial departments of agriculture have launched periodic, but sporadic campaigns to check the quality of pesticides in the market against substandard products. Nevertheless, because of the absence of an effective institutional framework for the enforcement of quality control, the lack of sustained efforts in this context, and the resourcefulness of the pesticide companies, the menace continues, greatly disadvantaging farmers, wasting resources, and diminishing production. To minimize the quantitative and qualitative losses in cotton production, to reduce its cost of cultivation, and to prevent environmental degradation, the establishment of a network of well-equipped, state-of-the-art laboratories and institutions of quality control standards is a sine qua non.

3.8.4. Bt Cotton

Technological innovations and technical developments, as in other fields, hold the key to improving productivity for increasing farm production as land and water resources face tough competition and encroachments from nonfarm uses. The efficient control of pests has come to occupy a special position in cotton farming as the crop has become increasingly vulnerable to a host of insects and diseases. Biotechnology, acclaimed by its proponents as the technology of the new millennium, has opened new vistas for expanding farm production and the development of new crop varieties through genetic engineering. Using this technology, many cotton-producing countries have developed new cotton varieties tolerant of insects. Bt cotton contains a gene, derived from soil bacteria (*Bacillus thuringiensis*) that protects cotton crop against bollworm by producing a special protein. The bollworms feeding on Bt cotton leaves become sleepy and lethargic, reducing damage to the crop plants.

Work on the development of Bt cotton varieties in Pakistan has been in progress for some time. The National Institute of Biotechnology and Genetic Engineering in Faisalabad has developed an insect resistant Bt cotton variety that is being submitted for approval to the National Biosafety Committee under the Biosafety Rules and Biosafety Guidelines enacted in 2005. Under these guidelines, all GM plant varieties intended for release will be required to obtain an environmental clearance prior to entering

normal testing and release procedures under the Seed Act of 1976. The Ministry of Food Agriculture and Livestock was reported in April 2006 to have finalized a strategy to regulate the release of GM plant varieties including Bt cotton. Subsequently, in January 2007 the ministry planned to release the National Institute of Biotechnology and Genetic Engineering Bt cotton variety IRFH-901 for use in the next season's crop.

Pakistan has lagged behind in the development and adoption of Bt cotton. Other major cotton-producing countries—the United States, China, and India—have made considerable progress in the development and cultivation of Bt cotton varieties. In India, the Genetic Engineering Approval Committee approved the commercial release of three hybrid Bt cottons in 2002. Because of their higher yield and better fiber quality, which translate into higher cash incomes, farmers are reported to have quickly adopted the cultivation of the Bt varieties. The national average cotton yield in India has increased from 294 pounds per acre in 2002–2003 to 391 pounds in 2004–2005, and total production surged from 10.6 million to 19 million bales (Robinson, 2005). It may be premature to ascertain the impact of Bt cotton on India's cotton production and even worldwide, as the technology is still evolving and in the early stages of development and adoption. However, Robinson (2005) reported that the ICAC had estimated that 27 percent of the world cotton area in 2005–2006 was planted with approved Bt cotton varieties, accounting for about 36 percent of total production.

In the absence of approved varieties, there is anecdotal evidence to suggest unauthorized cultivation of Bt cotton varieties in Pakistan, which was allegedly smuggled into the country so their origins and the extent and scale of their use are uncertain. However, one thing is very sure: Farmers are not going to wait indefinitely for approval of its cultivation.

Discussions with some progressive farmers and crop experts suggest widespread cultivation of the new cotton varieties in the cotton-growing areas of the Punjab. Visiting Sahiwal around the last week of August 2006, it was astonishing to see tractor trolleys transporting cotton from farms to market/ginneries, as it was quite early for cotton picking to have started in this district. Normally in the Sahiwal district, cotton has been planted from mid-May to mid-June and picking would start sometime in October. On my enquiry, farmers informed me about their early planting of cotton, in March or so. When asked about the pest attack on early-sown cotton, they indicated that the early-sown crop had escaped serious pest attack, as it was a different variety and farmers had already taken two or three pickings. Further discussions with the growers revealed that this was a new breed of cotton variety that had some “germs” in the plants or leaves that could kill the pests feeding on them. Obviously, farmers did not know precisely about the development of this new technology nor its chemistry but had some vague ideas about its salient features. They were highly appreciative of the savings in plant protection expenditures on this new cotton, which had escaped the onslaught of major pests; and only nominal expenses (Rs 300–400 per acre) to control sucking pests had been involved.

By the third week of August, farmers had taken two or three pickings and had picked 20–25 maunds (40 kilogram) of seed cotton per acre and were expecting about the same during the remainder of the season. Thus, yield expectations were around 40–50 maunds per acre. Cotton was being sold at Rs 1100–1200 per 40 kilograms in the village, and farmers were quite happy with the income potential.

I visited some cotton fields to have firsthand experience of the situation on the ground. Cotton sown in March appeared to have escaped major pests and bollworms. The plants looked quite healthy, bearing flowers and bolls of various sizes. The boll size also appeared bolder, and plants did not have any pest infestations. Farmers reported that cotton sown in the normal season of May–June suffered pest attacks due to the onset of rainy season during the growing stages of the plants, whereas early-sown crop, having experienced hot weather in May–June, escaped pest attack. However, there were some plants with somewhat swollen leaves, as if suffering from some kind of leaf curl virus disease.

In Sahiwal, the cultivation of hybrid maize, after the harvesting of potatoes in January/February has been very successful, yielding 80–90 maunds of grains from one acre of maize. Accordingly, potato–maize rotation has become very popular with farmers. Nevertheless, the maize prices had fallen to less than Rs 300 per 40 kilogram in 2006, much less than wheat prices (only 72 percent of the wheat support prices), whereas in previous years maize prices were quite competitive with wheat. As a result, farmers

have been disappointed as their input prices have been on the rise. In view of the good revenues from cotton this year and the declining income from maize, some of the maize areas may be switched over to cotton in the next crop season.

Given the importance of cotton to the economy, it is imperative to monitor the new developments and ascertain the extent of the cultivation, yield potential, sources of seed, and characteristics and quality of Bt cotton production. It is also important to take note of the environmental changes, if any, resulting from this new development. Formalizing the system with the release of approved varieties would facilitate its orderly development.

3.8.5. Producing Contamination-Free Cotton

Small farms undertake a substantial part of Pakistan's cotton cultivation on a small scale. The produce from the cotton plants is handpicked by women and children. In any given location, cotton farmers do not confine their cotton cultivation to one cultivar but grow many varieties. Cultivation of more than one variety is the norm even on small farms. During picking and storage, the different varieties are seldom kept separate. Cotton traders, "beoparis," and village merchants purchase cotton in small lots from various farmers. They seldom transport the produce of different farmers of varying grades/standards separately but instead mix various lots in the marketing process.

In many cotton-producing districts, until recently cotton was transported in jute, polypropylene, and plastic bags, resulting in the contamination of cotton with such materials. Other contaminants in cotton have been human/animal hair, bird feathers, cotton twigs, unopened bolls, and leaves. Cotton transportation in open trolley/truck bullock carts has often resulted in catching tree leaves, dirt, and dust. The open storage of cotton in ginneries on unpaved floors has also invited contamination from different sources. Consequently, a high degree of contamination has characterized seed cotton in Pakistan.

As the ginneries rely on old machinery and outdated methods of ginning and traders and the industry have not offered much premium for quality, ginneries have been indifferent to quality improvements. Lint produced from contaminated seed cotton has also suffered in terms of quality. The extent of contamination in certain cases was as high as 19 grams per bale. Therefore, until recently Pakistani cotton was rated as among the most contaminated cotton, which adversely affected its price in the international market. To improve the situation and to produce contamination-free cotton, a project was launched in 2001–2002 in three districts: R.Y. Khan in Punjab, Ghotki in Sindh, and Nasirabad in Balochistan. In the ginneries covered under the project that followed the procedures prescribed by the Pakistan Cotton Standards Institute (PCSI), contamination was reduced substantially, to only 0.74 to 1.97 grams per bale. Because of the importance of improved quality, the program was extended to one more district each in Punjab (Bahawalpur) and Sindh (Sanghar) and to the whole of Balochistan in 2002–2003. The PCSI-trained classers to provide the requisite labor for the program.

However, the Cotton Standardization Ordinance, which was launched with much fanfare in 2002, has not been effectively implemented. The textile industry has not been willing to pay a premium for higher quality produce and this has largely held back progress. To improve the quality of Pakistani cotton and to get better prices in the international and domestic markets, it is imperative to switch to a quality-based system of marketing that provides quality premiums and discounts.

Pakistani cotton is all handpicked and has good fiber characteristics. Nevertheless, after ginning, the trash content is still estimated to be around 7–8 percent on average and sometimes as high as 12 percent. In comparison, the trash content is up to 30 percent in the machine-picked cotton as in the United States, but when ginned and packed it is only 2–4 percent. Until recently, the trash content in Pakistan cotton averaged 25–40 grams per bale, which is very high. To help control this situation, the use of jute bags in the cotton trade has been banned, which has generated good results.

3.8.6. Improving Ginning

Most of the ginning units in the country have old machinery and the saws used in ginning units are frequently overused and not replaced on time, resulting in low-quality cotton lint. Improvements in

ginning machinery and practices can help improve the quality of the product and earn higher prices both in the domestic and international markets. Having pre- and postginning cleaners at the ginneries can also help in producing contamination-free cotton. There is also a need for drying and automatic moisturizing systems at the ginneries to produce uniform and better quality produce.

Farmers have often alleged that contamination/mixing of inferior cotton occurs during the postharvest handling of cotton in the marketing chain, for example, from stacking in the open at market and ginneries. To produce contamination-free lint, the ginning sector must make new investments in the ginneries. Replacing old saw gins with the new roller gins will also improve the fiber quality.

In some quarters, apprehensions about the motives and reluctance of the All Pakistan Textile Mills Association (APTMA) members to support a contamination-free cotton program in the past are cited to justify opposition to the program. It is alleged that vested interests in APTMA hinder investment in modern ginning. Roller gin output per hour is less than saw gins. Investment costs and lack of awareness about quality among the spinners has forced the ginneries not to update machinery and methods. There is a need to establish better incentives to produce contamination-free lint and clean seed cotton.

3.9. Conclusions and Recommendations

A high degree of variability and fluctuation characterizes the yield, production, and prices of cotton. Such variability is the hallmark of agricultural production because agriculture is an open roof industry and exposed to vagaries of uncertain weather and climate conditions. Nevertheless, the variability exhibited by cotton production in Pakistan seems rather high. The year-to-year changes in cotton production ranged from -29 percent to 45 percent during the period 1991–2005, translating, respectively, into a loss of 641,000 tons and a gain of 774,000 tons. These are staggering quantities with serious repercussions for farm revenues, capacity utilization of the ginning sector, supply of raw material to the industry, and institutional infrastructure and logistic arrangements for handling and marketing the produce. The fluctuations in cotton production also adversely affect the management of the nation's balance of trade and payments because it is an important cash crop in Pakistan.

A large proportion of the fluctuations in cotton production in Pakistan stem from the variability of cotton yields. The coefficient of variation of cotton yield in Pakistan is 17.5 percent, with year-to-year changes in yields ranging from -29 percent to 35 percent. Area variations have added to the uncertainty and variability in cotton production. Although the coefficient of variation of cotton area is smaller (5.6 percent), the annual fluctuations range between -10 percent and 13 percent. These translate to a contraction of 322,000 hectares and to an expansion of 344,000 hectares, respectively. Since wide fluctuations in the area and production of cotton have serious implications in terms of resource use planning and efficiency, efforts are needed to minimize these fluctuations.

The annual fluctuations in cotton yield are largely due to varying incidences of insects and crop diseases. Given the importance of cotton in the economy, with its forward and backward linkages and implications for alleviating poverty, measures that can minimize production losses due to pests and diseases are needed. In this context, it is imperative to strengthen the research base to continuously develop varieties that are resistant to plant diseases and methods and practices of controlling insects. It is also crucial to strengthen the pest-scouting services and training of farmers in monitoring pest infestation and efficient control of pests.

Ensuring pesticide quality at the grass root level is necessary to achieve effective pest control. The use of substandard chemicals is playing havoc, not only causing economic losses but also resulting in environmental pollution and health hazards. Economic losses in production because of ineffective pest control, if continued unchecked, ultimately translate into higher costs of production and may lead Pakistan's cotton sector to lose their competitiveness. It is a serious matter and needs the attention of all the concerned federal and provincial departments and agencies. It is high time to make agricultural production knowledge based to save recurring losses in farm production and incomes. This will, inter alia, require investments in training farmers in improved methods of crop husbandry and technical support and the timely provision of necessary farm inputs with effective quality control.

There are reports of widespread cultivation of Bt cotton without much information about its sources and origins, and the concerned authorities have now approved one such variety for cultivation. The mystery and uncertainty surrounding the development, approval, and “official” introduction of Bt cotton in the country has resulted in a lot of confusion among the farmers. There has been rapid development of Bt cotton production in other countries, including India, leading to higher yields and lower costs. Pakistani farmers, if left behind and without the benefits of this new technology, would suffer production loss and loss of competitiveness with the cheaper cotton produced elsewhere in the world. There is an urgent need to have a clear-cut policy for developing the necessary institutional capacity and expertise to address and evaluate the emerging technological issues and to ascertain the risks involved in tackling these problems and not ignoring the emerging challenges.

The domestic prices of seed cotton have witnessed substantial inter- and in-year fluctuations. These fluctuations have caused substantial income losses to the farmers and are a matter of concern for efforts directed at alleviating rural poverty (see Chapter 5). Some of these fluctuations have their origins in the international commodity markets, which are beyond the control of individual governments. Cotton season in Pakistan, which used to span from September to December and the bulk of domestic trade in cotton concentrated in November to January seems to be stretching from July to January/February with a lot of uncertainty surrounding the size of harvest and speculation about the prices of the product. There is an urgent need to strengthen the institutional base and the framework for estimating the size of harvest to have a realistic and sound basis of crop size. It is also important to have the support/reference price of cotton lint determined transparently in consultation with the stakeholders after the announcement of prices of seed cotton rather than to leave it to judgment of the TCP. There is also a need for fine-tuning the implementation of a price stabilization program to save the farming community from the avoidable losses and machinations of unscrupulous trade. Fortunately, since the mid-1990s, export taxes have been eliminated and domestic seed cotton prices are closely integrated with world prices of cotton lint.

In the wake of increasing globalization and the abolition of the MFA, it has become a necessity for the governments to keep abreast of the policies of other countries in general and competing countries in particular as well as of the developments in the world commodity markets. This will require strengthening the institutional framework and developing indigenous expertise to cater to the fast changing requirements and emerging situations.

In the chain linking various stakeholders in the cotton sector, ginning plays a key role in shaping the quality of lint resulting from seed cotton. The practices, methods, and machinery used in the ginning sector need substantial improvement so that the benefits of handpicked cotton can be realized and Pakistan can maintain its competitive edge in the world markets.

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4. CHALLENGES IN THE PAKISTAN COTTON, YARN, TEXTILE, AND APPAREL SECTORS

Zafar Altaf

4.1. Introduction

The combined cotton–yarn–textile–apparel sector is critical to Pakistan in a number of ways. It contributed 11 percent to the economy’s gross domestic product (GDP) in 2004–2005. It captures 46 percent of the entire manufacturing sector, 38 percent of industrial employment, and 31 percent of investment. It also provides critical rural incomes.

The entire value chain, which represents the production of cotton, ginning, spinning, weaving, dyeing, printing, and finally garment manufacturing, is a major source of foreign exchange. Over the period 1990–2005, the average share of its export receipts to the overall exports of Pakistan is 60 percent (Table 4.1). Output in each step of the value chain is exportable. However, there have been significant changes in the structure of textile exports over time. The share of total cotton, which includes raw cotton and cotton waste, to the total export receipts of the industry declined from 12.5 percent in 1990–1991 to 3.6 percent in 2004–2005. The share even dropped to its lowest level at 0.7 percent in 1998–1999. Within manufactured cotton, there have been major shifts in the structure of exports as well. The share of cotton yarn export to the export total of the industry declined from 31.6 percent in 1990–1991 to 12.6 percent in 2004–2005. The share of cotton cloth/fabric exports is about 20 percent, although there are some fluctuations within the period. Nevertheless, the share of bed wear exports increased from 6.6 percent in 1990–1991 to 17.3 percent in 2004–2005. In addition, over the same period, the export share of hosiery increased from 8.9 percent to 19.5 percent. There are also noticeable improvements in the export share of towels and other made-ups. These shifts in the structure of exports imply that value addition is taking place within the textile industry. This presents an encouraging trend. However, although this is positive, the entire industry faces a whole set of major challenges for it to move forward.

To move forward in these sectors, Pakistan needs a strategy for the coming decade that is internationally linked and globally competitive. In this environment, ultimately what matters is the way Pakistan is going to position itself within the global industry. Despite the changes noted above, the industry feels besieged by rising production costs and increased competition in domestic and international markets. It is necessary to realize that the way out of the current situation is based on making the sectors work to the advantage of the country and themselves. That will be possible only if there is a realization that seeking rents is not the way out.

One approach to evaluating the future is to consider where Pakistan’s strengths and weaknesses lie. A basic and obvious strength is the availability of raw material. One of the major weaknesses is the contaminated cotton, for which the industry bears some of the responsibility, starting with decisions made in the 1980s. In 1999, the first year of contamination-free cotton, the industry was supposed to pay a premium to the ginners; but, true to form, once they had obtained the ginned cotton they reneged on the payment. Over the full period from 1980 to 2007, contamination-free cotton has been available only in limited quantities. Recently, the government has been asked to pick up the cost of a quality premium, and they have agreed to do so. A concern is that once such a policy comes into force the government will pay for this intervention in perpetuity although the industry itself should, instead, address the quality issue.

Competitiveness of the raw material supply may also erode unless Pakistan takes on a paradigm shift and starts producing GM cotton. Recently, a GM cotton was approved for production. However, the government has yet to approve its implementation. However, farmers have already gone ahead, even without approved varieties, and the results are that not only have the yields increased but also the cost of production has been reduced.

Table 4.1. Pakistan export of textile products

Million US\$	1990– 1991	1991– 1992	1992– 1993	1993– 1994	1994– 1995	1995– 1996	1996– 1997	1997– 1998	1998– 1999	1999– 2000	2000– 2001	2001– 2002	2002– 2003	2003– 2004	2004– 2005
Cotton Manufacturers	3,274	3,648	3,746	3,792	4,646	5,008	5,022	4,889	4,559	5,111	5,225	5,404	6,668	7,572	8,099
Cotton yarn	1,183	1,173	1,122	1,259	1,528	1,540	1,412	1,160	945	1,072	1,077	942	928	1,127	1,057
Cotton cloth	676	819	863	821	1,081	1,276	1,262	1,250	1,115	1,096	1,035	1,133	1,346	1,711	1,863
Tents and canvas	80	51	40	29	38	40	36	58	41	53	50	47	73	75	67
Cotton bags	21	32	24	17	19	25	28	23	21	19	19	18	18	0	0
Towels	129	137	139	129	145	174	194	200	178	196	243	270	375	404	520
Bed wear	246	284	352	286	340	422	456	509	611	710	735	919	1,329	1,383	1,450
Other made-ups	109	114	126	129	164	179	209	246	255	308	328	351	360	420	420
Garments	497	614	618	612	642	649	736	747	651	772	828	882	1,093	993	1,088
Hosiery	334	425	464	509	689	703	689	697	742	887	910	842	1,147	1,459	1,635
Cotton	467	578	320	142	125	564	73	168	30	109	177	66	94	234	302
Raw cotton	412	518	271	80	62	507	31	126	2	73	138	25	49	48	110
Cotton waste	56	60	49	62	63	57	42	42	28	36	39	42	45	187	193
All cotton	3,741	4,226	4,066	3,933	4,771	5,572	5,095	5,057	4,590	5,220	5,402	5,470	6,761	7,806	8,402
Total export (Pakistan)	6,133	6,904	6,814	6,803	8,137	8,707	8,320	8,628	7,779	8,569	9,225	9,124	11,160	12,313	14,391
Ratios, %															
All cotton/total export Pakistan	61.0	61.2	59.7	57.8	58.6	64.0	61.2	58.6	59.0	60.9	58.6	60.0	60.6	63.4	58.4
Cotton/all cotton	12.5	13.7	7.9	3.6	2.6	10.1	1.4	3.3	0.7	2.1	3.3	1.2	1.4	3.0	3.6
Cotton manufacturers/all cotton	87.5	86.3	92.1	96.4	97.4	89.9	98.6	96.7	99.3	97.9	96.7	98.8	98.6	97.0	96.4
Cotton yarn	31.6	27.7	27.6	32.0	32.0	27.6	27.7	22.9	20.6	20.5	19.9	17.2	13.7	14.4	12.6
Cotton cloth	18.1	19.4	21.2	20.9	22.7	22.9	24.8	24.7	24.3	21.0	19.2	20.7	19.9	21.9	22.2
Tents and canvas	2.1	1.2	1.0	0.7	0.8	0.7	0.7	1.1	0.9	1.0	0.9	0.9	1.1	1.0	0.8
Cotton bags	0.5	0.8	0.6	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.3	0.3		
Towels	3.5	3.2	3.4	3.3	3.0	3.1	3.8	4.0	3.9	3.7	4.5	4.9	5.5	5.2	6.2
Bed wear	6.6	6.7	8.6	7.3	7.1	7.6	9.0	10.1	13.3	13.6	13.6	16.8	19.7	17.7	17.3
Other made-ups	2.9	2.7	3.1	3.3	3.4	3.2	4.1	4.9	5.6	5.9	6.1	6.4	5.3	5.4	5.0
Garments	13.3	14.5	15.2	15.6	13.5	11.6	14.5	14.8	14.2	14.8	15.3	16.1	16.2	12.7	12.9
Hosiery	8.9	10.1	11.4	12.9	14.4	12.6	13.5	13.8	16.2	17.0	16.9	15.4	17.0	18.7	19.5

Source: Textile Commission's Organization, various issues.

Although there was always some confusion and regressive actions regarding the export of cotton lint, this is now on the free list and the ginners and the private sector can export it. The PCSI, which was not allowed to work for over a decade, has finally been allowed to take the lint standards to the world market. The PCSI was initially envisaged to be with the agriculture ministry but was shifted to the commerce ministry and then to the textile ministry because the industry is wary of decisions outside the sector. A ginning research institute was established to address weaknesses in the industry. The Balancing, Modernization, and Rehabilitation (BMR) facilities have provided funding to the spinning industry. Similar action has been allowed for the weaving industry, which is being encouraged to go for quality production through shuttleless to air jet looms. A sum of \$5.5 billion has been provided. How these resources have been utilized is another interesting issue to analyze.

Pakistan has cheap labor, but this advantage is riddled with inefficiencies. The quality of skilled workers is under question and the myopic view of the entrepreneur has taken its toll. Recently, the minimum wage was raised from Rs 3000 to Rs 4000 per month (from \$50 to \$66). This intervention, according to the spinning industry increased its costs by 75 billion Rs. Yet a monthly wage of Rs 4000 is not a living wage. The motivation to work under such circumstances suffers.

Probably the most difficult task throughout the industry is to develop enough human resources. This is not one of show but something that has to be done on a recurring basis. The skills have to be regularly updated. Thus, it is encouraging that a training institute for the processing industry has been set up and special credit facilities are available to entrepreneurs to avail themselves of this opportunity. For the garments industry, the textile ministry is trying to set up a reward system and establish dedicated training institutes for garments—a new fashion school. Consultants for technology and brand development, social compliance, and other requirements of the international market are to be paid from a technology up-gradation fund, which has Rs 3.47 billion. Other copycat interventions have been made based on the hope that success stories elsewhere can be replicated in Pakistan. These public sector interventions are essential, especially ones that are of a collective nature.

The fabric, apparel, and other textile-processing sectors are dependent on the yarn industry, which is essential to quality production. The plea that the machinery is obsolete cannot be an excuse anymore. Success depends on the nature of new investments made. Support for investment has been provided, but the news from the industry is that 90 percent of the looms established are secondhand. Although the spinning industry has made investments in new machinery, even there some obsolete machinery has been obtained.

Since fabric flexibility is the order of the day, the industry has to gear itself to man-made fibers. Both man-made staple and filament are in demand. Demand projection is not so difficult now as it was in the earlier years because of the internet facilities available, making market information more readily available. Polyester is gaining at the expense of acrylic, cellulose, and nylon. The policy of preferential treatment of cotton via the BMR needs to be discontinued to allow the entrepreneurs to take appropriate investment decisions.

Given the long value chain and the different possible kinds of yarns, the kinds of fabrics that are developed are different.⁸ The entire value chain requires modifications in Pakistan, but these will have to be undertaken after due diligence and discussion with eminent industrialists to transcend their self-interests. The need for a collective approach is necessary. As one goes from one collective decision to another, the interventions required to rationalize and harmonize the industry will come into focus. The interventions should be market based, not bureaucratic or lobby based. More advanced market-based institutions, such as forward and hedge markets, can be put in place when the time requires.

Developed economies have stringent standards and regulations, and it will be difficult to meet these standards. Realistically, Pakistan will continue, for some time, to export at the low end of the market. Moreover, there are fears about the industry's competitiveness. In a recent period, exports have declined as competition increased in international markets. For example, Pakistan's export for the quarter July to September 2006 decreased by 10.3 percent, mostly due to the decrease in value-added items and

⁸There are 500 different yarns spun in Italy.

fabrics. Some gains in the export of yarn offset other losses by 3 percent. Moreover, imports of machinery that was supposed to have gone into improving quality and hence competitiveness fell to \$771 million from an earlier quarterly high of \$921 million. This has again set off calls by the industry for support. They now quote many reasons for their calls for aid, such as high-energy costs and increased competition. Therefore, the battle lines are drawn yet again. Every debacle is someone else's fault. The industry is heading for another show down with the government.

Historically, the APTMA has put pressure on the government of Pakistan, and when it comes to getting some benefits from the government the industry has always formed an alliance. They understand that if one subsector benefits through subsidy, then it is only a matter of time before others will benefit. If there is enough noise, the government must yield to the demands of what must surely be the most powerful association in the country.

Given this culture, the industry's competitive ability is deeply flawed. The majority of shares are well below the par value. How they have been surviving and why these units have not been liquidated is something of a mystery. One view is that although these are public limited companies, they are all within the extended family and the units are not operating. There are no transactions of the shares and therefore these units will always have spindles and looms that do not operating. This is wasteful and the investment is not adding to the growth or industrial output of the country. A policy intervention is needed to make these units productive.

Historically, the policies followed in the late 1950s and early 1960s made the textile industry very wealthy as the state of Pakistan became established. Meanwhile, the rural areas now have residents that are elderly or women, all the young men having migrated to the cities. Unless we can put our people back to the villages through policies that are designed to make it feasible for them to work the primary resources and in the process earn decent livings, the farming community will not have the motivation to undertake energetic actions and productive interventions.

The best hope in the cotton-processing industrial sectors is the emergence of a new set of entrepreneurs who can play the market and whom the government has not propped up, as the industry has been for well over 50 years. Either that or their scions have to be taken through a management attitudinal change that is focused and works on the ethics and values that are necessary for taking on competition from the giants in world trade. It can be done. Some effective production units already have created a niche for themselves without any government support.

The government is also guilty of all too frequent changes in policy. The industry considers very few individuals in the government trustworthy. The government instead of proactive policies reacts to the requirements of the most powerful. The APTMA lobby that is in liaison with the government is in turn manipulated by the spinners. The results of such interventions are that a few benefit. Although one can continue to conclude that the government meets the industry's needs, that kind of neopatrimonial activity is not called for and should be resisted. That might mean that the industry will suffer but only in the short term. The consequences can be handled when the industry learns to position itself in the market place.

The ethical aspect of the industry has to be commented upon. There are scandals on the duty drawback schemes. Almost 3,000 cases of phantom duty drawbacks have been detected. Similarly, the textile industry has been the beneficiary of overinvoiced machinery. Second-hand machinery if effective with some government help; there is no need for expensive new machinery. Indeed, the entire BMR intervention can be distorted into a means to overinvoice and to make money through rents, something that industrialists have always done. The result has been obvious. Despite an investment of \$5.5 billion, exports in the last quarter have plummeted.

The industry can do better. It would do well to take actions on all such issues that are quality oriented, whether it is in the weaving or any ancillary industry related to textiles. That means that the more investment in shuttleless and air jet looms there is, the better. Since the banks are in the private sector and since they can take action as they want to with respect to their clients, the financing of the entire sector can now be handled on a private, bilateral level.

On the organizational side, the units manufacturing the various products are without any formal marketing structure. Individual owners generally play out the marketing efforts, and these are very

skeletal. Pakistan has to go to more systemic action wherein a new breed of management structure can be developed. Pakistani entrepreneurs cannot coexist in the 21st century with an organization structure that is in the 19th century. Ultimately, the critical factor is how the entire package can be assembled. We discuss the obstacles and challenges in the sections that follow.

4.2. Historical Perspective on Raw Cotton Policy Issues

Section 3 of this Discussion Paper gives a comprehensive discussion of the structure of the cotton sector in Pakistan. It also provides a description of the institutions and policy interventions in the raw cotton sector since 1990. In this section, we discuss additional historical and policy perspective of the sector.

4.2.1. Marketing and Trade Policy

At the base of the entire industry is the raw cotton sector. Cotton classification, and hence its marketing and price, is dependent on character, staple, and grade. Character is dependent on diameter, strength, maturity that represents the ratio of mature fibers to immature ones, body, and smoothness of the fibers. Staple refers to fiber length and grade refers to color, brightness, and the amount of foreign matter. With an ever-conscious market, the quality of cotton plays a large part in the income of the producers and processors throughout the value chain.

What happens to the economy in Pakistan is very much dependent on the cotton–yarn–textiles–apparel complex. It has been the subject of policy deviations according to the perceptions of the powerful players. The powerful players in the marketing of this commodity substantially affect the entire chain, leading to either the worsening of poverty or its alleviation. The incomes of all concerned in this market suffer from wide fluctuations, and there is no reason to assume that income generation from this industry is on a steady increase. Efforts at removing or reducing the fluctuations have not met with much success, and the industry faces stiff global competition.

Cotton trade was in the private sector until 1974 when the socialist government of the Pakistan People’s Party nationalized the sector and the Cotton Export Corporation (CEC) was created. The economic rationale was that producers were not getting their due amount for their hard work; that private industry was responsible for the poor performance of the sector in the international market; that a considerable amount of unwanted practices had emanated from the industry’s irresponsible behavior; and that the debacle in East Pakistan had economic ramifications and the economy had to be more radically controlled, or so the government of the day reckoned.

The consequence was that the free market operations were terminated and some of the large players were financially, or even judicially, incarcerated. Following a commanding heights argument, the textile industry was subjected to nationalization. When the CEC was formed, it worked at two levels: as the main agency for the purchase of cotton from the farmers and as the exporter to international traders at government-regulated prices.⁹

In the mid-1970s, an export tax was imposed ranging from 30 to 35 percent. The consequence of this was that the domestic spinning industry was provided with low-cost inputs. One result was that the quality of ginned cotton suffered. Over time, the farmers did not receive the prices that they should have. The net result was that inefficiencies of the sector increased manifold, mainly due to the policies followed by CEC. This was not an overnight phenomenon; inefficiencies crept into the industry over time. The interventions of the government were weak, for example, those against market-led checks. In developing countries, the choice is between the best of the worst. Over time, the major players of the export market assumed greater predominance over the primary producers.

Policies after nationalization led to the private sector being partly reinducted into the cotton sector. The exports of the private sector were subjected to MEP. One argument for the MEP was that underinvoicing could be checked. The Pakistan economy was, and to an extent remains, riddled with the

⁹ Decisions were based on the Economic Committee of the Cabinet.

underinvoicing of raw materials and overinvoicing of machinery. Efforts to stop these malpractices have never been successful. The main reason for this is the power of the trade and industrial sector.

The MEP was predicated on the international prices of lint, the domestic prices of yarn and lint, the domestic requirements of the industry, and the global and local supply situation. The benchmark price was determined based on the ex-gin price of lint plus export incidentals. To further forestall the number of players and to exclude liberal export policy, the exporters of the Karachi Cotton Exchange were allowed to buy directly from the ginners. The result of this complicated procedure was that a bureaucratic process was put in place and a number of malpractices emerged. These malpractices included shipment of higher grades than the one declared, default in shipments, undercutting of MEP, and delay in payments to the ginners (which in effect meant that the farmers were not paid). All this meant that there was confusion before the actual harvesting of cotton and this in turn militated against higher productivity of the crop. Farmers reduced their investment. The industry benefited at the cost of the cotton farmer and this was almost of the order of 30–40 percent of the international price of cotton. Eventually this led to the isolation of the local markets with the international markets. The idea was fostered that higher yields will lead to lower prices and hence reduced incomes.

This policy tilt toward benefit to the local industry led to complacency and inefficiencies. The consequences for the future were even more critical as it led to wasteful use of the commodity. Imbalances of the supply and demand situation in the country were often a result. When the supply was in excess, the cotton traders were required to carry these stocks to the next year, taking on inventory costs. It is also well known that quality suffers with long storage. Thus, the traders had to bear a two-way knock. Ultimately, there was a reduction in production due to the effects of curl leaf cotton virus. In 1993–1994 and 1994–1995, Pakistan had to import cotton.

The discrimination against cotton exports resulted in the local yarn spinning industry becoming the favored investment area. The spinning industry, which was already operating at lower counts, had no desire to improve the quality of their products. The yarn quality was of 12–20 counts as against the potential of 20–40 counts. Yarn of low quality was exported. The period saw Pakistan with 80 percent of the world market for low-quality yarn. Pakistan's copycat industrial investment led to an expansion of the spinning industry. Despite the policies depressing domestic cotton prices, the production of cotton increased during this period. This provided the incentive for additional spinning capacity.

This period also saw the demise of the nationalized sector and the reemergence of the formal private sector. Industrial investments in certain areas were politically oriented. Policies were to be modified and, in return, the political system sought loyalty and support from the corporate sector. A good part of the unregulated subsidy went to the Japanese and Korean investors who financed the local industry. Other malpractices also emerged. Among these, it was common knowledge that the overinvoicing of machinery and other allied requirements by the textile industry was siphoning resources off for personal benefits.

The members of the APTMA became powerful players and ignored investment in upstream quality production. Cotton marketing was primordial, and cotton of various qualities was mixed. That by itself discouraged the sector from spinning higher count production. Jute and polyester fiber packing materials found their way into the raw cotton. Poor quality cotton was also subjected to rough treatment in the various market chain transactions. The ginning industry did not keep pace with the international standards. Despite a potential for economic gain, the major players did not achieve what was clearly their opportunity and potential. APTMA's short-term profit motives reinforced the inefficiencies of the CEC. All that was required was to play the decision makers so that subsidies and other handouts remained intact.

Further policy changes came about due to the weakness in policy and the introduction of a new government. The producer stakeholders, who were mostly farmers, managed to have the export duty removed, and the market fluctuated with the international prices in 1994–1997. The flows of imports and exports were freed. One would have thought that the domestic processing industry would welcome such a move toward markets, but that was not the case as the earlier policies of providing low-cost raw material inputs had depressed the local producers' prices. This lack of open market operations meant that the

industry was not geared to competition and the opening of the raw cotton trade resulted in the closing of many inefficient spinning units. Inefficiency does not mean the liquidation of assets in the Pakistan scene. It means only that the mills closed their operations and began seeking assistance from the government through various government subsidies.

Competition and more expensive raw materials meant that the industry had to work on leaner profit margins. The subsidy and the cheap raw material available had fostered certain inefficiencies in the sector. Earlier, profit had been taken for granted. When shortages occurred, the industry started importing cotton, not only through the private sector but also through the CEC, which had been conceived as an export organization. This reversal indicated the power of APTMA, as this decision was taken at the level of the cabinet.

Policies are never clean, and there is always some degree of confusion. Players that make for this confusion are generally the winners. In one instance, having asked the CEC to import cotton from the central Asian republics, there were no purchasers for this cotton. The inventory cost and the natural deterioration that occurred forced the raw cotton to be sold at auction. The players formed a cartel, and the auction procedures allowed them to buy this cotton cheaply. Powerful players do play such games with the public sector and their influence on the public sector cannot be discounted. Government policies are heavily geared toward them—an unintended consequence of the power structure that assumes authority through a nondemocratic procedure. They then seek allies in the powerful industrial sectors. The industrial mafia understands this. It plays the game to its own benefit.

Since 2000, there has been an effort to improve the quality of cotton. Farmers and ginners were promised premium prices for cotton provided the trash was either completely eliminated or minimized. A number of ginneries were earmarked for this purpose. The PCSI, which was to have been set up in the late 1980s, was finally set up in the late 1990s. It has developed useful standards, but other efforts to increase competition have fallen short. For example, the only effort in 1999 to create additional bidding for raw cotton through e-commerce ended in a fiasco because the Karachi Cotton Exchange exerted every effort to have it stopped.¹⁰ Since then, the textile industry has sought to keep the PCSI under its administrative control. The income of the farmers has suffered as a result. Such contradictions and conflicts of interest have still not been removed. The trader's way of thinking has been simple—keep farmer's prices as low as possible. That kind of thinking is not conducive to efficiency and the competitive functioning of markets.

The quality of cotton has different meaning for different players. For the ginners the requirement is high ginning output. For the spinners, high grade, longer staple, strength, and uniformity are important. Despite the presence of the PCSI, quality considerations were often not implemented in letter or spirit. During the time that the PCSI was developed, a training institute for ginners was to be set up. The adverse reaction from APTMA was so strong that it had to be given up and financing potentially available from the Asian Development Bank was never utilized.

Despite the difficulties, PCSI has achieved some constructive measures. Among these measures are (1) the setting up of standards and the subsequent approval by the government and acceptance by Liverpool; (2) the successful implementation of standards in a number of ginneries; (3) the keeping up to date of international and local organizations with the standards; (4) the development of a color chart coding raw cotton quality for the Pakistan cotton that is used by international players; (5) the training of cotton classers; and (6) the establishment of cotton testing facilities in cotton areas. As a result, Pakistan cotton is now in COTLOOK Index A rather than in Index B.

4.2.2. Cotton Support Prices

In parallel with its export market interventions, the government directed the TCP to become a buyer in the cotton field. The domestic price support system was intended to partly counter the power of the cotton

¹⁰ The potential of e-commerce to improve competition to the benefit of farmers was illustrated by the first German buyer that came up based on the PCSI standards. This buyer offered to purchase a substantial amount of cotton for \$0.64/pound whereas the farmers were being offered \$0.39/pound by the Karachi Cotton Exchange.

ginners. The support price system is still in operation and the policymakers would like to believe that it raises productivity, induces an exportable surplus, safeguards the interest of the farmers against falling prices, and helps stabilize inter- and intrayear prices. That it achieves these objectives is not borne out by the facts. Except for a few years, the market price for seed cotton and lint cotton has been higher than the support price (Section 3). The benefit of the support price seems to be more psychological than monetary. Pakistan's small cotton farmers must offload their cotton as soon as it is harvested. Some of them, when strapped for cash, sell in advance, receiving the price that the profiteer provides not the price the market would determine. In the absence of any forward markets, the loser eventually is the farmer. The support prices have done little to change these dynamics, except in a few years. However, the new emerging trend is to leave price determination to market forces. The industry supports this move to some extent. After much vacillation, the government is inclined toward a free trade policy.

Pakistan continues to import cotton because of rising mill consumption and the growing need for clean and contamination-free cotton. Pakistan is now emerging as the largest importer of Pima cotton¹¹. The lobbyists for the farmers and the ginners have been advocating that medium staple cotton should not be allowed to be imported into Pakistan, as that will depress prices of local cottonseed and lint. That illustrates a common industry feature in Pakistan—to not develop a system that would be beneficial to the entire chain.

The domestic market will continue to be modified, as the government has been considering hedge markets and custom ginning. Much will depend not only on how fairly and justly the market players perform but also on the perception of the small farmers as to the credibility of the ginning and textile industry.

Volatility can hit any of the industry players (farmers, ginners, or textile manufacturers) whenever market prices do not truly reflect cottonseed values. Short-term gain is little conducive to long-term stability. If this provides a lesson for Pakistan's policymakers, it is that any policy influence should be on fair trading practices, not on price levels directly. The powerful players have never been able to have a hands-off policy. However, the price mechanism must be seen to be just and fair, whether it is to be left to the market forces or to government involvement. Certainly, there is a case for balancing the power of the players involved. The paradox has never been resolved and the tilt moves with the government perception of what is happening in the sector or who can influence the government.

The textile and apparel sector's intentions may lead to the permanent entanglement of the TCP.¹² Nevertheless, the global order will force changes in the system, and it is inconceivable that the public sector will continue to provide short-term relief to whoever is adversely affected. The TCP is not an independent body that makes its own decisions but rather a government organization. The government needs to continuously shift its interventions if it is to rationalize its handling of the cotton industry, but it has seldom made these shifts. This trend will continue. The pace cannot be predicted because there are powerful players who will try to beat the system. The inefficient producers of yarn and textiles are likely to go into liquidation if the market is allowed to play its hand, and that may be a better way of rationalization and harmonization of the sector.

There is a need for a shift away from past thinking and action within the industry. The first requirement is for the farmers to gain a more mature marketing outlook. Their dependence on government subsidies and support does not help the market. The same is true for the powerful end players, members of the APTMA. Ginners, who are the intermediaries between the textile industry and the farmers, must improve their technology; profits have rarely been reinvested to do so. Producers spend most of the time working on production, and lack information on what is happening in other cotton-producing countries. The producer has to shift from a supply to a demand perception. That is going to be slow in coming. To survive the competitive onslaught under the WTO it will be necessary for the entrepreneurs to shift their

¹¹ Pima cotton (*Gossypium barbadense*), also known as Extra Long Staple.

¹² The plan is to produce 100,000 bales of clean cotton (70,000 in Punjab and 30,000 in Sindh) with payments by the TCP at the rate of Rs 50 per 40 kilogram. The government has approved this program to continue in 2008–2009 (300,000 bales in 2007–2008 and 600,000 bales in 2008–2009). The government will pay, but the private sector will benefit. The hope is that this intervention will motivate the cotton pickers to provide contamination-free cotton.

entire management concept and to develop institutional strengths that give more consideration to the quality that is required and the prices in the international market. Hedge marketing and forward contracting could go some distance toward improving the marketing system.

4.3. The Ginning Sector

In cotton processing, one of the first stages is ginning. Most of the early ginners were traders, so their operations were never recognized as a processing industry. The ginners have to cope with market risks from changes in the prices of cotton lint and cottonseed. The ginning sector was originally organized using traditional technology and primitive saw gins. The technology currently used is 1940 vintage and local mechanics maintain it. Nonapplication of standards and poor management handicap the ginning subsector. Only recently with the advent of the WTO and greater competition in the world markets is the industry undergoing a change, but it will be some time before the real impact is felt. The international standard for productivity has gone to 60 bales per hour, whereas Pakistan and other developing countries are still operating at 10–12 bales per hour. Thus, the shift to better machinery and some ginning factories have been earmarked to provide better ginned cotton lint. The promise of better and fairer prices may become an incentive to update machinery, as the ginners have complained that when they deliberately improved the quality of cotton, the formal sector has not paid them the premium that they were supposed to.

The cotton control acts of Punjab and Sindh initially regulated the ginning sector in Pakistan. The industry was originally concentrated in a few hands but opened up in 1986–1987. So thirsty was this industry for deregulation that from a few hundred units it mushroomed to over 1,000 within the space of a few months. The number of ginning units installed (about 1,220; Table 4.2) remains practically constant since 1999. There was a slight decline in the number of ginning units in Punjab, which the increase in Sindh offset. However, of these not more than 800 units are actually working. In the rural, indigenous market, small ginning units are operated for the use of the local community. A ginning factory that processes more than 10,000 bales is a large unit, and the average is 5,000 bales in a season. The ginning operation is spread over a period of 100–120 days, with Sindh starting as early as July. In terms of basic capacity and conversions, the maximum number of bales produced in one season was 14 million bales in 2005, although the capacity with full utilization of three shifts per day is over 36 million bales. Producing 100 bales of cotton lint requires 52,000 kilogram of seed cotton, with a ginning output on average of 17,200 kilograms of lint (33 percent). The byproduct is cottonseed, averaging 32,240 kilograms (62 percent of input weight), with trash accounting for 2,560 kilograms.

Table 4.2. Number of ginning factories and machines

Location	Number of Factories		
	1999–2000	2005–2006	
Punjab	1,075	1,045	
Sindh	146	178	
Total	1,221	1,223	
Machine Type	Number of Installed Machines	Capacity per Machine (bales per eight-hour shift)	Total Capacity (bales per day per shift)
80 saws	229	12.5	2,863
90 saws	3,500	18.5	59,235
100 saws	132	31.0	4,092
Total	5,488		

Source: Pakistan Cotton Ginners' Association.

Seed cotton is transported and stored at a minimal cost, and there are no established procedures or standards for the storage infrastructure. The cottonseed is kept in the open, where it gathers dust and trash while waiting to be processed. Moisture content in excess of 10 percent is a serious issue; and as most of the cotton is picked early in the morning, the moisture content is excessive. The cotton is generally laid out in the open for drying, but the facts that the vagaries of weather play on it and that the nature of cotton is hygroscopic make matters difficult. Excess moisture adds to the cost of electricity, a major cost factor. It also leads to the shattering of seed, and this is almost impossible to eliminate from the ginning process. The cost to the industry of contaminated cotton is shown in Table 4.3.

Table 4.3. Industry losses due to cotton contamination, 2004–2005

Product/Category	Value, US\$
Cotton yarn	55,370
Cotton fabrics	104,604
Ready-made garments	61,425
Knit wear	99,786
Bed wear	321,185
Towels	586,999
Other textile products	1,069,394
Total	2,298,763

Source: Textile Commission's Organization, various issues.

To improve efficiency in the operation and quality in cotton lint, the ginning sector has to address a number of pressing issues. It is a sector that has developed indigenously over time. *Mistri*, or local artisans (locally developed technicians, as the guild system does not exist), run the ginning factories. Efficiency and quality considerations are secondary, and the sole objective seems to be to keep the factories running, having learned the trade through the *ustad–shagird* (teacher–apprentice) system. A ginning institute that was to have been set up in the 1980s was not allowed to go past the planning stage. The main culprit was the APTMA, as it feared that modernization would raise the cost of the raw material. In any case, ginners were in the low segment of the market and thus had little incentive for any activity that would improve quality.

The technology of all the machines needs improvement, as this will affect the quality of output. Fiber length, length uniformity, fiber strength, micronaire, neps, and color all are affected if the machines are of low technology. The textile industry has long sought fiber consistency and has begun also seeking lower levels of neps and short fibers. The textile-spinning sector now more closely monitors the quality of ginning.

Technology-specific aspects of the machinery must be considered in the light of the high cost of investment. Since capital cost has increased, and is likely to increase further, the machinery has to operate at a higher level of efficiency to amortize its cost. Management and machinery efficiency are linked. Any obsolescence in any part of the chain will affect the end product and its marketability and hence incomes and profitability, which travels down the line ultimately to the farmer.

Other important issues are the weaknesses in the cleaning process and the elimination of external matter while in storage. Only 10 percent of the ginning factories have lint cleaners. Some of these lint cleaners, imported by the CEC, are now rusting as the ginners discarded them. The price that the ginner received from the formal textile sector did not reflect the cost of cleaning.

Overall, standardization is lacking in the ginning sector. In particular, classification of cotton according to quality is necessary. In the absence of this, regular and uniform lint cotton will not be available. Better classification is one of the major improvements that will enable quality cotton and goods to be exported in competitive global markets under the WTO regime. Furthermore, packing of bales has to be improved, keeping quality in mind.

There are institutional issues that have to be addressed as well, including capital constraints. A basic issue for the ginners is that they are starved for working capital, and therefore it was necessary to cut all kinds of unnecessary costs. In any season and dependent on the capacity, the financing requirement is between 30 and 40 million Rs. When the State Bank of Pakistan is in liquidity crises, credit is not available. The cost factor further escalates if the ginners are to carry stocks for the textile mills over longer periods.

Traditional ways of trade are now obsolete; more mature methods must arise and meet international requirements. Since cotton lint is not exported, the ginners are at the mercy of the textile sectors. The marketing chain does not work in an equitable manner.

4.4. The Textile Industry

4.4.1. The Spinning Sector: Installed and Working Capacity

From the ginners, cotton lint goes to the spinners of yarn. The spinning industry in Pakistan has grown over the years. The number of units increased from 70 in the late 1950s to the peak of 503 in 1995–1996 (Table 4.4). There was a slight decline since then. In 2004–2005, the number of units stands at 458. The growth of the spinning industry has been steady as well. The number of spindles increased from 1.5 million in the 1950s to 10.5 million in 2004–2005. The economy of scale that was initially envisaged was 12,500 spindles per unit. However, by 1998 the average number of spindles had increased to 18,000 per unit. There has been a similar trend in the rotor sector. The number of open-ended rotors has increased steadily as well over the period, from 16,000 rotors in 1979–1980 to 155,000 in 2004–2005.

Table 4.4. Installed and working capacity in the spinning sector, all Pakistan

Year	Units	Installed Capacity (000)		Working Capacity (000)		Capacity Utilization, %	
		Spindles	Rotors	Spindles	Rotors	Spindles	Rotors
1958–1959	70	1,581	0	1,488	0		
1979–1980	187	3,781	16	2,701	14	0.90*	0.59
1989–1990	266	5,271	72	4,489	64	0.74 [†]	0.83
1990–1991	277	5,568	75	4,827	67	0.87	0.89
1995–1996	503	8,717	143	6,548	80	0.73	0.56
1996–1997	440	8,230	143	6,538	87	0.75	0.56
1997–1998	442	8,368	150	6,631	80	0.79	0.61
1998–1999	442	8,392	166	6,671	66	0.79	0.53
1999–2000	443	8,477	150	6,825	66	0.79	0.40
2000–2001	444	8,601	146	6,913	70	0.81	0.44
2001–2002	450	9,060	141	7,440	66	0.80	0.48
2002–2003	453	9,260	148	7,676	70	0.82	0.47
2003–2004	456	9,592	146	8,009	66	0.83	0.47
2004–2005	458	10,485	155	8,492	79	0.83	0.45

Source: Textile Commission's Organization, various issues.

Note: *Average capacity utilization for 1958–1979 (spindles and rotors).

[†]Average capacity utilization for 1980–1990 (spindles and rotors).

However, there are gaps between installed and working capacities in the various sectors. Figure 4.1 indicates that in the first half of the 1990s, the capacity utilization in the spindle and rotor sectors was about 80 percent. In the mid-1990s, there was a drop in capacity utilization in all sectors. This was because there was a steady increase in the number of spindles and rotors despite the cotton crop failure in 1993 and 1994. In another instance, as the installed capacity increased in 1997–1999, despite uncertainty caused by the upheavals in the political system, the working capacity of these rotors decreased.

Table 4.5 shows the structure of installed capacity at the provincial level. The share of Punjab in the number of units increased steadily over the years from 38 percent in the 1970s to 67 percent in 2004–2005. During this period, Sindh’s share dropped. A similar structure is observed in the distribution of the number of spindles and, to some extent, in the number of rotors. However, ever since law and order became a serious problem, some of the units in Sindh have relocated to Punjab and to within the metropolis of Karachi where the rural local population is not involved in the industrial benefits.

Figure 4.1. Capacity utilization in the spinning sector, 1958-2005

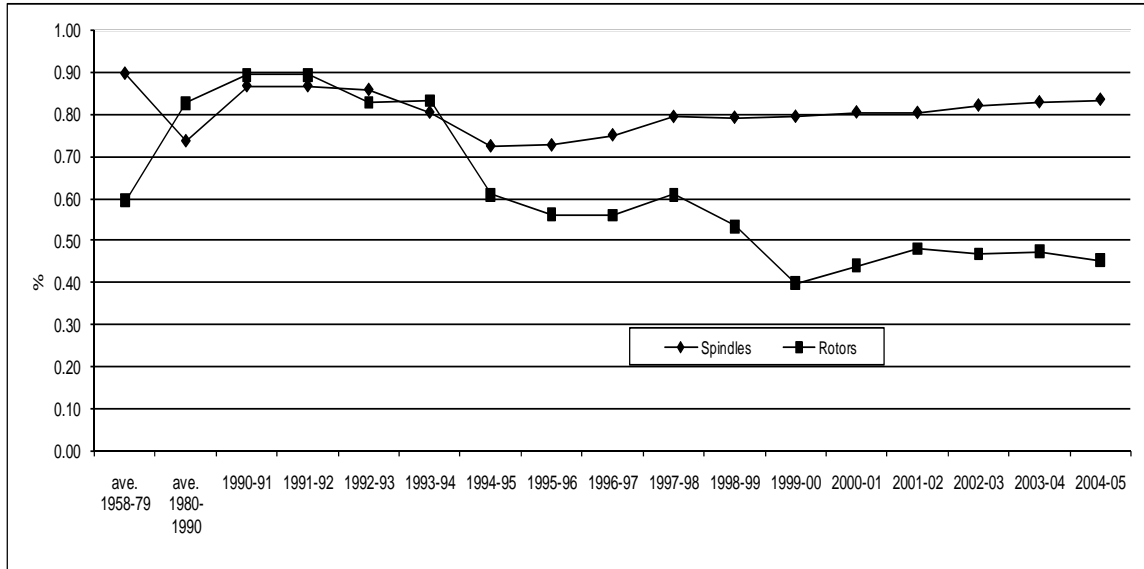


Table 4.5. Installed capacity in the spinning sector, by province (% distribution)

	Units				Spindles				Rotors			
	Punjab	Sindh	Others*	Total	Punjab	Sindh	Others*	Total	Punjab	Sindh	Others*	Total
average 1971–1980	38.3	53.8	8.0	100.0	41.0	51.9	7.0	100.0	41.3	58.7	0.0	100.0
average 1980–1990	44.4	46.1	9.5	100.0	47.9	43.0	9.1	100.0	35.5	55.2	9.2	100.0
1990–1991	51.3	39.7	9.0	100.0	57.7	34.3	8.0	100.0	34.7	52.1	13.2	100.0
1991–1992	55.7	36.2	8.1	100.0	53.8	37.3	8.9	100.0	36.8	50.6	12.6	100.0
1992–1993	58.4	33.5	8.1	100.0	61.9	29.9	8.2	100.0	39.1	46.9	13.9	100.0
1993–1994	63.2	28.9	7.9	100.0	66.6	25.2	8.2	100.0	47.4	40.8	11.8	100.0
1994–1995	64.1	28.0	7.8	100.0	67.0	24.8	8.3	100.0	45.6	42.9	11.5	100.0
1995–1996	64.4	27.8	7.8	100.0	66.8	24.8	8.4	100.0	47.0	42.0	11.1	100.0
1996–1997	66.6	25.9	7.5	100.0	68.7	23.7	7.6	100.0	49.9	39.9	10.2	100.0
1997–1998	66.7	25.8	7.5	100.0	68.7	23.4	7.9	100.0	51.1	39.2	9.8	100.0
1998–1999	66.7	25.8	7.5	100.0	68.1	23.6	8.3	100.0	56.4	35.4	8.2	100.0
1999–2000	66.8	25.7	7.4	100.0	68.1	23.6	8.3	100.0	51.5	38.9	9.6	100.0
2000–2001	66.9	25.7	7.4	100.0	68.1	23.2	8.7	100.0	51.1	38.9	10.0	100.0
2001–2002	67.1	25.6	7.3	100.0	68.4	22.3	9.2	100.0	51.4	38.2	10.3	100.0
2002–2003	67.1	25.6	7.3	100.0	69.4	21.6	9.1	100.0	52.1	38.1	9.9	100.0
2003–2004	67.3	25.4	7.2	100.0	69.8	20.8	9.3	100.0	51.6	38.5	10.0	100.0
2004–2005	67.0	25.8	7.2	100.0	66.7	24.0	9.3	100.0	50.6	40.0	9.4	100.0

Source: Textile Commission's Organization, various issues.

*Balochistan, Northwest Frontier Province, and A. Kashmir.

4.4.2. Fiber Consumption

Before the 1980s, the textile industry in Pakistan consumed purely cotton fibers (Table 4.6). However, in the 1980s, it started to use man-made fibers, and since then the use of man-made fibers has steadily increased. From an average share of 8.7 percent to total fiber consumption in the 1980s, it peaked at 22 percent in 1998–1999. It started to ease a little bit, but was still significant at 19 percent in 2004–2005. The important categories of man-made fibers are polyester/cotton and polyester/viscose.

Table 4.6. Consumption of cotton and other fibers (% distribution)

	Cotton	Other Fibers	Total
Average 1948–1980	100.0	0.0	100.0
Average 1980–1990	91.3	8.7	100.0
Average 1990–1995	90.4	9.6	100.0
1996–1997	85.9	14.1	100.0
1997–1998	82.2	17.8	100.0
1998–1999	78.0	22.0	100.0
1999–2000	79.5	20.5	100.0
2000–2001	80.5	19.5	100.0
2001–2002	81.1	18.9	100.0
2002–2003	81.2	18.8	100.0
2003–2004	80.5	19.5	100.0
2004–2005	81.1	18.9	100.0

Source: Textile Commission's Organization, various issues.

The increased use of man-made fibers has occurred because of access to locally manufactured products. There are now five domestic man-made fiber manufactures. However, they are still uncompetitive relative to the world market. Domestic spinners are in serious difficulties and allege that the cost of local yarn for local mills is extremely high.¹³ When things are not going well in the market, the commercial banks decline to extend credit to the manufactures. The behavior of weavers further aggravates the situation. They take advantage of the excessive supply to go slow on purchases in view of the increased inventories with the blended yarn manufacturers. In addition to this, the blended yarn manufacturers pay a duty of 6.5 percent if the raw material is to be imported.¹⁴ All this is not favorable to the development of the textile industry in Pakistan. Unless appropriate policies address these constraints, they will continue to hinder the growth of the industry. Distortions have to be eliminated. Modernization of the industry requires the increased use of man-made fibers in yarn production.

4.4.3. Production of Yarn

The local production of man-made fibers has resulted in the higher production of yarn that is blended with man-made fibers. In the 1970s, 95 percent of yarn produced was made of pure cotton (Table 4.7). At that time, polyester/cotton blend accounted for only 4 percent of total production of yarn. In the 1990s, the average share of polyester/cotton yarn increased slightly to 6 percent, and the share of polyester/viscose blend increased to 4 percent. The rising shares of these two blended yarns brought down the average share of pure cotton yarn to 88 percent. Since then, the share of polyester/cotton yarn increased. At present, the production of man-made fibers constitutes almost one-quarter of yarn output.

¹³ The price of locally produced synthetic fiber is higher by about 50 percent. This has come down but the protection is a real problem for the weaving industry using this yarn. The U.S. market is estimated at \$20 billion and Pakistan has missed out on this market.

¹⁴ Through the president of the Blended Yarn Producers, blended yarn manufacturers are seeking the elimination of this tariff.

Table 4.7. Production of yarn, % distribution

	Cotton	Cotton Waste	Blend		Total
			Polyester/ Viscose Blend	Polyester/ Cotton Blend	
Average 1972–1980	95.2	0.6	0.0	4.2	100.00
Average 1980–1990	88.2	2.1	3.7	6.1	100.00
Average 1990–1995	82.6	1.5	6.9	9.0	100.00
1996–1997	78.8	1.8	6.8	12.6	100.00
1997–1998	76.4	1.3	6.5	15.7	100.00
1998–1999	73.1	1.5	7.6	17.9	100.00
1999–2000	74.1	1.9	7.7	16.3	100.00
2000–2001	75.3	2.0	6.5	16.3	100.00
2001–2002	74.0	2.1	5.6	18.2	100.00
2002–2003	74.9	1.4	4.4	19.3	100.00
2003–2004	74.6	1.4	4.6	19.5	100.00
2004–2005	76.2	1.3	4.4	18.1	100.00

Source: Textile Commission's Organization, various issues.

About half of total yarn production in the 1970s came from the Punjab province. Its shares have increased since then. At present, more than 70 percent of yarn production occurs in Punjab (Table 4.8). Conversely, the share of total yarn production in Sindh declined from 43 percent in the 1970s to about 20 percent at present. Sindh's share of yarn production has declined because of the relocation of installed capacity to the Punjab province, as described earlier.

Table 4.8. Production of yarn, by major province (% distribution)

	Punjab	Sindh	Others*	Total
Average 1971–1980	49.7	43.2	7.1	100.00
Average 1980–1990	53.3	40.9	5.8	100.00
Average 1990–1995	67.5	27.5	5.0	100.00
1996–1997	71.6	21.7	6.7	100.00
1997–1998	71.4	21.8	6.9	100.00
1998–1999	71.5	21.6	6.9	100.00
1999–2000	71.2	21.9	7.0	100.00
2000–2001	71.7	21.1	7.2	100.00
2001–2002	70.6	21.5	7.9	100.00
2002–2003	70.7	21.8	7.5	100.00
2003–2004	71.1	21.6	7.3	100.00
2004–2005	71.0	21.5	7.5	100.00

Source: Textile Commission's Organization, various issues.

*Others include Northwest Frontier Province, Balochistan, and A. Kashmir.

Less than 10 percent of yarn production comes from other provinces, mostly from the Northwest Frontier Province and the Balochistan province. However, the Balochistan industry has been closed since

1983 after working for only a couple of years as a joint venture with Iran. The Balochistan industry that was in the public sector has been liquidated since then and is now on the privatization list. Because cotton is a determinant of the incomes for the poor, the closure meant an increase of poverty. The provincial disparities in cotton growing and processing have important poverty implications. Since the bulk of cotton production and processing is in Punjab and Sindh, farmers and the rural areas in these provinces have the edge in terms of income generation over the rest of the provinces.

Over the period 1990–2005, the production of yarn in Pakistan (cotton and man made) increased at an average annual rate of 4.7 percent (Table 4.9). This is astonishing growth, as it was achieved under conditions of political instability. The share of exports of yarn increased from 29 percent in the 1970s to 47.5 percent in 1991–1992, but started to ease since this peak. In 2004–2005, the share of exports of yarn declined to 26.5 percent. Some of the major international markets for Pakistan cotton yarn in recent years include Hong Kong, China, United States, and South Korea (Table 4.10).

Table 4.9. Production and market for Pakistan yarn

	Production (000 metric tons)	Market (000 metric tons)			Total
		Local Domestic Market	Consumed in Domestic Mill Sector	Exports	
1972–1973	376	102	90	184	376
1980–1981	375	236	43	95	375
1990–1991	1,055	514	40	501	1,055
1991–1992	1,188	646	36	506	1,188
1992–1993	1,235	644	35	555	1,235
1993–1994	1,327	782	33	512	1,327
1994–1995	1,381	842	28	510	1,381
1995–1996	1,475	920	30	525	1,475
1996–1997	1,531	976	47	508	1,531
1997–1998	1,541	1,025	53	462	1,541
1998–1999	1,548	1,070	56	421	1,548
1999–2000	1,679	1,100	65	513	1,679
2000–2001	1,729	1,116	68	545	1,729
2001–2002	1,818	1,202	77	540	1,818
2002–2003	1,925	1,320	79	525	1,925
2003–2004	1,939	1,331	93	514	1,939
2004–2005	2,087	1,517	96	475	2,087
		Market (% distribution)			
Average 1972–1980		48.8	22.2	29.0	100.0
Average 1980–1990		60.3	9.3	30.4	100.0
1990–1991		54.4	5.1	40.5	100.0
1991–1992		48.7	3.8	47.5	100.0
1992–1993		54.4	3.0	42.6	100.0
1993–1994		52.2	2.8	45.0	100.0
1994–1995		58.9	2.5	38.6	100.0
1995–1996		61.0	2.1	36.9	100.0
1996–1997		62.4	2.0	35.6	100.0
1997–1998		63.7	3.1	33.2	100.0
1998–1999		66.6	3.5	30.0	100.0

Table 4.9. Continued

Production (000 metric tons)	Market (000 metric tons)			Total
	Local Domestic Market	Consumed in Domestic Mill Sector	Exports	
	Market (% distribution)			
1999–2000	69.2	3.6	27.2	100.0
2000–2001	65.5	3.9	30.6	100.0
2001–2002	64.5	3.9	31.5	100.0
2002–2003	66.1	4.3	29.7	100.0
2003–2004	68.6	4.1	27.3	100.0
2004–2005	68.7	4.8	26.5	100.0

Source: Textile Commission's Organization, various issues.

Table 4.10. Major country destination of exports of cotton yarn from Pakistan

Countries	2003–2004	2004–2005
Hong Kong	31.4	31.0
China	13.2	14.2
United States	9.9	10.1
South Korea	11.0	8.0
Portugal	3.7	3.5
Bangladesh	4.9	5.6
Japan	4.8	5.5
Italy	1.8	2.1
Indonesia	1.1	1.6
Philippines	0.5	1.0
Others	17.7	17.5
Total	100	100

Source: Export Promotion Bureau.

Pakistan is a major producer of cotton yarn. Table 4.11 shows that its share in the world production has increased from 7.2 percent in 1994 to 9.1 percent in 2004, which is slightly lower than the share of India (9.7 percent) and greater than the share of the United States (5.8 percent). However, it is considerably lower than the share of Mainland China (46.8 percent).

Table 4.11. World production of cotton yarn

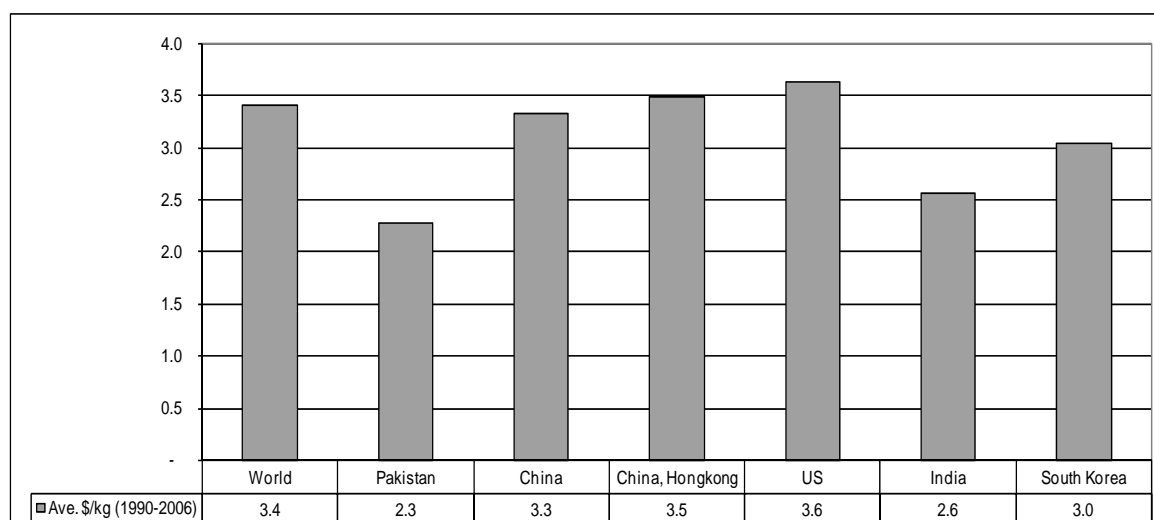
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Millions metric tons											
World	16.2	16.7	16.7	15.6	16.9	17.7	19.7	19.7	20.9	22.1	23.2
China	4.9	5.4	5.1	5.6	5.4	5.7	6.6	7.0	8.5	9.8	10.9
India	1.6	1.8	2.1	2.3	2.0	2.2	2.3	2.2	2.2	2.1	2.2
Pakistan	1.2	1.2	1.3	1.2	1.2	1.6	1.7	1.8	1.9	2.0	2.1
United States	2.0	2.0	2.0	0.0	2.0	1.9	1.9	1.6	1.4	1.2	1.3
% of World											
China	30.2	32.5	30.7	35.9	32.2	32.0	33.4	35.3	40.6	44.5	46.8
India	10.0	11.0	12.5	14.4	12.0	12.2	11.6	11.2	10.5	9.4	9.7
Pakistan	7.2	7.3	7.7	8.0	6.8	9.1	8.7	9.0	8.9	8.9	9.1
United States	12.2	12.1	11.8	0.1	11.8	10.8	9.7	8.0	6.6	5.6	5.8

Source: International Cotton Advisory Committee.

The spinning industry of Pakistan produces most of the counts of yarn, but it is heavily tilted toward low counts,¹⁵ which are of relatively low value. Table 4.12 presents the count structure of cotton yarn production. In the 1970s, 57 percent of cotton yarn produced was coarse count: 23.2 percent in the 20s, 16.4 percent in the 10s, and 9 percent in the 16s. There were some within the medium count, mostly in the 21s. Except for the decline in the share in the 1980s, the share of cotton count 20s slightly increased in the 1990s and at present. The share of cotton count 30s also improved slightly over the period. However, the share of cotton count 21s declined as well as the share of cotton count 10s.

Table 4.13 shows the historical data of the world export of yarn (cotton and man made). It includes data on value (billion \$), volume (million tons), and export unit price (\$/kilogram) of the world as a whole and a few selected major yarn-exporting countries including Pakistan. The annual export unit price of Pakistan yarn is below the world average. It is also below the annual export unit price of the rest of the yarn-exporting countries included in the list. Over the period 1990–2006, the average export unit price of Pakistan yarn was \$2.3/kilogram (Figure 4.2). The average world export price is \$3.4/kilogram.

Figure 4.2. Average export price of yarn



Source: United Nations Comtrade Database

¹⁵Cotton count refers to a number that indicates the mass per unit length or the length per unit mass of yarn.

Table 4.12. Production of cotton yarn, countwise (% distribution)

Year	Course								Medium					Fine			Super Fine		Total	
	1-9s	10s	12s	14s	16s	18s	20s	21s	24s	28s	30s	32s	34s	36s	40s	47s	48s	60s		80s
Average 1971-1980	2.6	16.4	3.4	2.3	9.1	0.4	23.2	21.7	0.0	4.2	6.9	4.7	0.3	1.3	2.2	0.2	0.2	0.6	0.2	100
Average 1981-1990	3.7	11.3	4.2	4.4	7.6	3.1	8.6	22.2	5.2	5.6	7.5	5.2	4.2	1.9	1.6	1.1	0.5	1.5	0.6	100
1990-1991	4.8	11.3	1.7	3.0	10.0	0.6	16.5	23.9	8.1	5.9	8.7	2.3	0.3	1.1	0.7	0.1	0.2	0.8	0.1	100
1991-1992	4.5	10.0	1.5	2.8	9.0	0.9	18.1	21.2	8.1	5.5	10.4	2.9	0.3	2.2	0.9	0.1	0.3	1.0	0.1	100
1992-1993	5.1	9.1	1.6	2.6	9.7	1.3	21.4	17.9	6.9	5.0	10.8	3.2	0.2	1.8	1.0	0.1	0.4	1.2	0.4	100
1993-1994	5.3	8.7	2.2	2.7	9.4	1.4	25.7	14.3	5.5	3.9	12.8	3.0	0.5	1.7	1.1	0.2	0.3	0.7	0.5	100
1994-1995	3.6	8.4	2.0	2.4	10.1	1.0	27.2	12.0	6.5	2.7	14.3	3.0	0.7	2.2	2.0	0.2	0.2	0.5	1.0	100
1995-1996	4.6	9.0	2.1	2.0	10.5	1.9	26.0	10.6	6.5	2.7	12.7	3.9	0.7	2.4	2.4	0.2	0.4	0.7	0.8	100
1996-1997	4.6	9.6	2.4	2.9	10.8	2.3	25.5	8.5	6.2	2.6	12.4	4.6	0.9	2.6	2.0	0.2	0.4	0.5	1.0	100
1997-1998	4.5	8.5	2.8	2.7	11.5	3.4	24.9	8.1	6.7	2.8	12.3	4.2	0.9	2.6	2.1	0.3	0.5	0.4	0.7	100
1998-1999	4.7	9.3	3.1	2.3	13.3	3.0	26.9	7.4	5.4	2.9	12.8	3.0	1.0	1.3	1.6	0.3	0.5	0.5	0.7	100
1999-2000	4.8	8.9	3.1	2.9	12.1	3.8	29.3	6.0	5.1	2.6	12.7	2.6	1.7	0.8	1.8	0.3	0.3	0.3	0.9	100
2000-2001	5.3	7.6	3.2	2.7	12.9	3.1	29.1	5.8	5.1	3.1	12.8	3.3	1.4	0.8	1.9	0.3	0.4	0.3	0.9	100
2001-2002	6.3	9.3	3.6	2.3	12.6	2.9	28.8	5.5	4.9	2.7	11.1	2.8	1.2	0.9	2.8	0.3	0.4	0.3	1.2	100
2002-2003	7.1	9.1	4.4	2.4	10.9	4.2	25.6	5.9	4.2	3.7	11.6	3.1	1.4	1.1	2.6	0.5	0.7	0.6	1.1	100
2003-2004	7.2	8.8	4.6	2.5	11.1	3.8	26.1	5.2	3.9	4.0	10.6	3.9	1.3	0.8	2.9	0.9	0.7	0.7	1.1	100
2004-2005	7.4	9.7	4.7	2.5	10.2	3.6	25.0	4.6	5.1	3.0	11.3	3.7	1.1	1.2	3.7	0.9	0.6	0.6	1.2	100

Source: Textile Commission's Organization, various issues.

Table 4.13. World export of yarn

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Value (billion US\$)																	
World	18.4	18.6	23.3	20.7	24.2	30.0	30.4	32.2	30.4	28.5	31.0	29.0	29.8	33.4	37.5	37.7	21.5
Pakistan	1.0	1.2	1.3	1.2		1.6	1.7	1.5	1.1	1.1	1.2	1.1	1.0	1.2	1.1	1.3	1.5
China			1.3	1.3	1.8	2.1	1.9	2.3	2.0	2.2	2.7	2.7	3.1	3.8	4.4	5.2	6.6
China, Hong Kong			1.9	1.9	2.3	2.8	3.1	3.2	2.9	2.6	3.0	3.1	3.2	3.6	3.9	3.5	3.6
United States	1.3	1.3	1.2	1.0	1.2	1.5	1.7	1.9	1.9	1.9	2.1	1.7	1.7	1.9	2.1	2.1	2.5
India	0.4	0.5	0.6	0.7	1.1	1.3	1.8	2.0	1.4	1.6	2.0	1.6	1.8	1.9	1.9	2.3	-
South Korea	0.9	1.0	1.0	0.9	1.1	1.3	1.5	1.8		1.4	1.6	1.3	1.4	1.6	1.6	1.5	1.4
Volume (million tons)																	
World	5.3	4.1	5.2	5.6	6.2	7.2	7.9	10.4	13.7	9.1	10.5	10.2	10.8	10.8	11.5	11.3	6.5
Pakistan	0.4	0.5	0.6	0.6		0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.6	0.7
China			0.4	0.5	0.5	0.6	0.5	0.7	0.6	0.6	0.7	0.8	1.1	1.3	1.4	1.7	2.2
China, Hong Kong			0.5	0.6	0.7	0.8	0.9	0.9	1.0	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0
United States	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.7	0.7
India	0.1	0.2	0.2	0.3	0.4	0.4	0.6	0.7	0.4	0.7	0.9	0.7	0.9	0.8	0.8	0.9	-
South Korea	1.5	0.2	0.2	0.2	0.3	0.3	0.5	0.7		0.6	0.6	0.5	0.6	0.7	0.6	0.5	0.5
Price (\$/kilograms)																	
World	3.5	4.5	4.4	3.7	3.9	4.2	3.9	3.1	2.2	3.1	2.9	2.8	2.7	3.1	3.3	3.3	3.3
Pakistan	2.2	2.4	2.2	2.0		3.1	2.8	2.7	2.4	2.2	2.1	1.9	1.7	2.2	2.3	2.1	2.1
China			3.2	2.9	3.4	3.8	3.8	3.6	3.5	3.5	3.8	3.4	2.9	3.0	3.1	3.1	3.0
China, Hong Kong			3.8	3.3	3.2	3.5	3.4	3.4	3.0	3.4	3.7	3.7	3.4	3.5	3.8	3.6	3.6
United States	4.2	3.8	4.1	3.9	3.5	3.8	3.8	3.8	3.8	3.7	3.7	3.4	3.3	3.2	3.2	3.2	3.3
India	2.6	2.7	2.6	2.5	2.9	3.2	2.9	2.7	3.2	2.4	2.2	2.2	2.0	2.3	2.3	2.4	
South Korea	0.6	4.5	4.9	4.1	4.0	4.3	3.2	2.7		2.3	2.6	2.4	2.4	2.3	2.6	2.8	2.9

Source: United Nation Comtrade Database.

High price is important, but the entrepreneur also has to take into account the return on investment and the relationship of the price to the quality of the product. Table 4.14 presents estimates of the rates of return to equity for producing yarn of different counts. Despite the increased profitability of higher counts, the entrepreneurs are not interested in raising counts; they appear unwilling to take any risks.

Table 4.14. Equity internal rate of return of different counts

Count	12s	20	30	40	80
Equity internal rate of return	15%	32%	39%	42%	48%
Project internal rate of return	13%	20%	30%	32%	35%

Source: Author's calculations developed for the years 2000–2003.

There are a number of historic reasons for this industry behavior, all tied to having operated historically in a protected market. First, as described above, the pricing of raw cotton favored the domestic processing industries until the early 1990s. Another reason for low-risk behavior, perhaps the most basic reason, may be the creation by government fiat of entrepreneurs who were not risk takers. Altaf (1988) provides ample evidence to that affect. For key industries, including textile, cement, sugar, edible oil, and flour mills, granting permission to operate was the responsibility of Pakistan's president/prime minister. Altaf (1988) presents evidence that textile permissions were used as political bribes. The market did not play any part in location, selection of entrepreneurs, or financing of production. Moreover, even today, the number of looms that are not operating and the spindles and the rotors that are idle is an indication of the handouts that the government continues to give the sector in various forms.

Yet a third reason for noncompetitiveness of Pakistan's spinning industry is that exports were entirely dependent on quotas in the MFA system, which has undergone change. Moreover, and importantly, former East Pakistan, now Bangladesh, provided the West Pakistan exporters with a captive market where all kinds of poor quality yarn were exported. The import of yarn was banned from 1956 to 1973 and was one of the economic abuses to which East Pakistan was subjected.

As a result, the share of Pakistan in the lower counts is excessive, and its export earnings have consequently been less than what was, and is, envisaged. One cause of concern is that yarn producers have been receiving more government support than the weaving industry. Soft management in government always tilts toward the power blocks, whose support they constantly seek.

4.4.4. Production of Cloth/Fabrics

This section and the next examine some of the issues facing the textile industry that processes yarn into value-added products of cloth/fabrics and textile "made-ups" such as towels, bed wear, and linens. In these industries, Pakistan faces sharp international competition.

The average annual growth in the production of cloth in Pakistan over the period 1990–2005 was 5.6 percent (Table 4.15). Mills and nonmills produce cloth.¹⁶ Only 10 percent of production comes from mills, whereas 90 percent comes from nonmills. About two-thirds of output goes to the local market, and the remaining one third goes to the rest of the world.

¹⁶ The weaving industry in Pakistan can be broadly classified into three main segments: (a) the composite weaving units (the mill sector); (b) the independent shuttleless weaving units; and (c) the power loom sector. The composite weaving units comprise the integrated textile mills (which are labeled as "Units" in Tables 5.5 and 5.16), which have their own spinning and dyeing facility. All independent units are equipped shuttleless weaving technologies, dominated by the Sulzer projectile looms, which constitutes almost 70 percent of the equipment installed. The power loom sector dominates the fabric production. (Source: Small and Medium Enterprise Development of Authority, SMEDA, Government of Pakistan).

Table 4.15. Production and market of Pakistan cloth

	Million Square Meters					
	Production			Market		
	Total	Mill	Nonmill	Total	Local Market	Export
1972–1973	1,191	589	603	1,191	673	518
1980–1981	1,834	308	1,526	1,834	1,333	501
1990–1991	2,854	293	2,561	2,854	1,797	1,057
1991–1992	3,239	308	2,931	3,239	2,043	1,196
1992–1993	3,360	325	3,035	3,360	2,232	1,128
1993–1994	3,378	315	3,063	3,378	2,331	1,047
1994–1995	3,101	322	2,779	3,101	1,940	1,161
1995–1996	3,706	327	3,379	3,706	2,383	1,323
1996–1997	3,781	334	3,448	3,781	2,524	1,257
1997–1998	3,914	340	3,573	3,914	2,642	1,271
1998–1999	4,387	385	4,002	4,387	3,032	1,355
1999–2000	4,987	437	4,550	4,987	3,412	1,575
2000–2001	5,591	490	5,101	5,591	3,855	1,736
2001–2002	5,826	568	5,257	5,826	3,868	1,957
2002–2003	5,651	582	5,068	5,651	3,645	2,005
2003–2004	6,833	683	6,150	6,833	4,420	2,413
2004–2005	6,481	925	5,556	6,481	3,729	2,752
	% Distribution					
Average 1972–1980	100.00	30.4	69.6	100	69.6	30.4
Average 1980–1990	100.00	13.5	86.5	100	66.8	33.2
1990–1991	100.00	10.3	89.7	100	63.0	37.0
1991–1992	100.00	9.5	90.5	100	63.1	36.9
1992–1993	100.00	9.7	90.3	100	66.4	33.6
1993–1994	100.00	9.3	90.7	100	69.0	31.0
1994–1995	100.00	10.4	89.6	100	62.6	37.4
1995–1996	100.00	8.8	91.2	100	64.3	35.7
1996–1997	100.00	8.8	91.2	100	66.7	33.3
1997–1998	100.00	8.7	91.3	100	67.5	32.5
1998–1999	100.00	8.8	91.2	100	69.1	30.9
1999–2000	100.00	8.8	91.2	100	68.4	31.6
2000–2001	100.00	8.8	91.2	100	69.0	31.0
2001–2002	100.00	9.8	90.2	100	66.4	33.6
2002–2003	100.00	10.3	89.7	100	64.5	35.5
2003–2004	100.00	10.0	90.0	100	64.7	35.3
2004–2005	100.00	14.3	85.7	100	57.5	42.5

Source: Textile Commission's Organization, various issues.

The small production share coming from mills may be due to the declining number of looms in the integrated textile mills. There were 25,000 looms available in 187 textile units in the country in 1979–1981 (Table 4.16). The number dropped significantly to 15,000 after 10 years and further down to 9,000 in 2004–2005. Out of the installed capacity, only about 50 percent is operative. In terms of provincial breakdown of capacity and production of cloth, about 50 percent of capacity is in Punjab, 45 percent in

Sindh, and the rest in other provinces (Table 4.17). However, about 60 percent of cloth produced comes from Punjab.

In terms of the types of cloth produced, more than 50 percent is in gray form (Table 4.18).¹⁷ Blended cloth accounts for more than 10 percent, but there is a growing share of dyed and printed cloth, which in 2004–2005 had a share of 31.7 percent.

Table 4.16. Installed and working capacity in the loom sector, all Pakistan

Year	Units	Installed Capacity (000)	Working Capacity (000)	Capacity Utilization (%)
1958–1959	70	27	24	
1979–1980	187	25	14	0.85*
1989–1990	266	15	8	0.53 [†]
1990–1991	277	15	8	0.53
1991–1992	307	14	8	0.53
1992–1993	334	14	6	0.57
1993–1994	471	14	6	0.43
1994–1995	494	13	5	0.43
1995–1996	503	10	5	0.38
1996–1997	440	10	5	0.50
1997–1998	442	10	4	0.50
1998–1999	442	10	5	0.40
1999–2000	443	10	4	0.50
2000–2001	444	10	4	0.40
2001–2002	450	10	5	0.40
2002–2003	453	10	5	0.50
2003–2004	456	10	4	0.50
2004–2005	458	9	4	0.40

Source: Textile Commission's Organization, various issues.

Note: *Average capacity utilization for 1958–1979; [†]Average capacity utilization for 1980–1990.

¹⁷ No similar set of information is available on the nonmill sector.

Table 4.17. Installed capacity in the loom sector and production of cloth (mill sector), by major province

	Installed Capacity (% distribution)				Production of Cloth (% distribution)			
	Punjab	Sindh	Others*	Total	Punjab	Sindh	Others*	Total
Average 1971–1980	47.5	48.0	4.5	100.0	58.0	36.5	5.5	100.0
Average 1980–1990	41.8	42.4	15.8	100.0	49.1	45.6	5.3	100.0
1990–1991	47.5	33.9	18.6	100.0	52.2	45.4	2.4	100.0
1991–1992	46.8	34.6	18.6	100.0	56.6	41.4	2.0	100.0
1992–1993	46.9	33.4	19.6	100.0	55.7	42.3	2.0	100.0
1993–1994	43.2	36.4	20.3	100.0	56.2	41.8	2.0	100.0
1994–1995	39.5	40.9	19.6	100.0	54.2	44.7	1.2	100.0
1995–1996	43.3	36.2	20.6	100.0	58.0	42.0	0.0	100.0
1996–1997	48.0	46.6	5.5	100.0	62.4	37.6	0.0	100.0
1997–1998	51.8	42.7	5.6	100.0	62.5	37.5	0.0	100.0
1998–1999	52.4	42.1	5.5	100.0	59.8	40.2	0.0	100.0
1999–2000	52.3	42.2	5.5	100.0	66.9	33.1	0.0	100.0
2000–2001	50.9	43.6	5.4	100.0	63.2	36.8	0.0	100.0
2001–2002	50.9	43.8	5.4	100.0	62.5	37.5	0.0	100.0
2002–2003	49.3	45.5	5.2	100.0	54.6	45.4	0.0	100.0
2003–2004	51.0	43.9	5.1	100.0	59.9	40.1	0.0	100.0
2004–2005	47.8	46.2	6.0	100.0	65.6	34.4	0.0	100.0

Source: Textile Commission's Organization.

Note: *Balochistan, Northwest Frontier Province, and A. Kashmir.

Table 4.18. Production of cloth mill sector (% distribution)

	Blended	Gray	Bleached	Dyed and Printed	Total
Average 1972–1980	1.5	66.3	15.8	16.5	100.00
Average 1980–1990	14.7	55.1	11.2	18.9	100.00
Average 1990–1995	19.3	54.2	5.1	21.4	100.00
1996–1997	17.2	58.3	3.6	21.0	100.00
1997–1998	16.6	60.6	3.8	19.0	100.00
1998–1999	16.9	50.9	6.7	25.6	100.00
1999–2000	13.9	60.3	2.5	23.3	100.00
2000–2001	13.8	56.7	4.1	25.5	100.00
2001–2002	13.6	55.8	3.2	27.4	100.00
2002–2003	15.9	50.8	5.5	27.7	100.00
2003–2004	14.9	48.6	6.4	30.1	100.00
2004–2005	5.6	53.9	8.9	31.7	100.00

Source: Textile Commission's Organization, various issues.

The change in quality of cloth produced in the mill sector over the period 1997–2002 roughly indicates the developments taking place in the cloth/fabric sector. This is shown in Table 4.19. The share of fine quality cloth declined from 42.3 percent in 1997–1998 to 24.6 percent in 2001–2002 but slightly recovered to 27.8 percent in 2003–2004. The bulk of the cloth is in gray form. The high share of fine cloth in 1997–1998 was the result of policy initiatives by the government and the elimination of export subsidies and the benchmark price system. However, as the price of raw cotton increased, entrepreneurs were forced into channels that would enable them to break even or even become profitable. Thus, they shifted to the production of medium quality cloth, which incurs lower production costs. The share of medium quality cloth increased from 26 percent to 54.4 percent over the same period. This is in gray, dyed, and printed form. The share of coarse quality cloth declined over time from 31.7 percent in 1997–1998 to 21 percent in 2001–2002. However, the share of coarse quality of cloth recovered to 31 percent in 2003–2004.

Table 4.19. Quality of cloth production, mill sector (% distribution)

Quality	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004
Fine	42.3	30.0	19.9	20.7	24.6	25.6	27.8
Gray	36.5	18.2	17.4	18.4	22.5	15.6	15.9
Bleached	1.8	4.8	0.6	0.3	0.2	1.7	2.1
Dyed and printed	4.0	7.0	2.0	2.1	1.9	8.2	9.8
Medium	26.0	41.0	56.4	57.2	54.4	43.4	41.1
Gray	10.8	21.0	33.1	31.8	27.1	26.2	23.5
Bleached	2.1	2.1	2.5	3.3	3.0	2.9	3.1
Dyed and printed	13.1	17.8	20.8	22.1	24.3	14.3	14.5
Coarse	31.7	29.1	23.7	22.0	21.0	31.0	31.2
Gray	27.3	22.8	18.3	14.1	14.6	18.3	17.8
Bleached	0.6	0.9	0.3	0.9	0.7	2.0	2.3
Dyed and printed	3.8	5.4	5.0	7.1	5.7	10.7	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Costistics and Textile Commission's Organization, various issues.

The extent of value addition can be assessed by analyzing the split of processed and unprocessed fabrics. It was hoped that investment in the mill sector would enable it to have economies of scale and focus on quality uppermost. Nevertheless, this did not take place. Over 50 percent of the total fabric production is of greige fabric. This is unprocessed gray cloth that has to be subjected to much more processing to make it usable in the product cycle. Finishing takes many forms, for it must be adapted to the kind of fiber and yarn used in the fabric and most importantly to its end use, and the products become more specialized.¹⁸

Given this, one can then understand why the weaving industry has taken the unprocessed cloth route; it enables them to reduce risk and have a larger market. Their focus on unprocessed products also reflects the gap in their marketing abilities to go into more specialized products. The marketing wing of the weaving mills is very rudimentary. Any change in the amount of greige cloth means that the marketing of the product must become a specialized aspect of the organization. This involves cost. Furthermore, despite the fact that there has been massive investment at subsidized rates, capital intensity has not been very successful at improving quality. However, there is an increase in shuttles looms, and the new mills that have come up have substantially reduced labor intake.

Table 4.20 presents Pakistan export markets for cloth/fabric. Almost one-fifth of its exports go to the U.S. market. Pakistan's exports of fabric reflect its production pattern. About 40 percent of the exports is unbleached fabric, which is 22 percent of the world trade. Bleached fabric accounts for about 15 percent of Pakistan's exports. Bleaching does not significantly increase the value added. In the global trade, Pakistan's share is 20 percent and the market is considerably limited.

Table 4.20. Major country destination of exports of cotton cloth from Pakistan

Countries	2003–2004	2004–2005
United States	19.5	15.7
Turkey	6.9	7.7
Hong Kong	6.4	5.9
United Arab Emirates	3.7	5.2
Italy	4.9	5.0
Bangladesh	4.0	3.8
Spain	3.6	3.5
United Kingdom	4.8	3.6
Sri Lanka	2.5	2.9
China	3.1	2.8
Others	40.8	43.8
Total	100	100

Source: Export Promotion Bureau.

More highly processed printed fabrics comprise 29 percent of Pakistan's exports, a 15 percent share of the total world market. The quality of the fabric printed on power looms suffers due to low-category technology; but printing masks defects, whereas dyeing accentuates defects. The dyed fabrics have a 14 percent share of Pakistan's exports. Pakistan's exports approximated \$195 million of the total world market of \$4.14 billion.

An argument that is well taken is that wherever quality fabric is required, developing countries are weak in that area. Denim and calendared fabric are only a small share of Pakistan's exports. This

¹⁸ Finishing may change the appearance of the fabric, its feel, its serviceability, and its durability. Even the factor of thread count, so important in the evaluation of fabric can be changed by the kind and amount of finishing. Cotton can be given the soft touch for such fabrics as batiste, nainsook, and lawn, the napped finish required for flannelette, the hard stiffened finish typical for cambric and linen, or the lustrous effect of chintz. The types of processing are so numerous that that would call for a separate study.

category faces competition from the United States, Italy, and Hong Kong, indicating that quality drives. The processing industry will have to improve if Pakistan is to make significant gains. This is true for the rest of the fabric segments as well, although Pakistan is showing better results in the bleached segment.

Overall, the industry broadly identifies defects in four categories: general, yarn, weaving, and mechanical. To go into these in detail would be a massive exercise, but it should be pointed out that the industry is rampant with these faults that negatively affect quality. The industry as a result of the massive interjection of credit is now considering interventions that would reduce this difficulty in production.

In addition to quality issues related to product defects, the fabric industry faces the challenge of producing a wider range of products. Even the latest weaving technology has not been able to widen the product mix. The power loom sector is in sheeting, and the shuttleless looms are producing shirting fabric and twills. Moreover, the Pakistan textile sector is too heavily dependent on cotton fiber. The market for cotton in the international market has been volatile, and there seems to be more demand for blended fibers. Pakistan is producing fewer blends than its competitors.

Increased export growth cannot be achieved if there are these kinds of weaknesses, and there are weaknesses in human resources. To use an expression from the game of cricket, the Pakistan wicket has to make major changes if the WTO and globalization are to be tackled. However, there is complacency in the sector. If man-made fibers were to be more fully integrated into the weaving sector, the neighboring countries such as Sri Lanka and Bangladesh would certainly benefit from more diverse Pakistani exports.

4.4.5. Production of Textile Made-Ups

In the past five years, the international market for textile made-ups has expanded by 11.7 percent (Table 4.21).¹⁹ In 2005, the total world export of textile made-ups amounted to \$30.2 billion. Textile made-ups can be divided into six major categories: towels and cleaning cloths; bed wear and linens; blankets; curtains and furnishings; canvas products; and table linens. Major exporters include China, Pakistan, India, Turkey, and Portugal. The export receipts of China from textile made-ups increased by 178 percent over this period. Thus, its share increased from 21.2 percent in 2001 to 33.9 percent in 2005. Pakistan has also fared very well. Its exports of these items grew by 107 percent. Its share improved from 8.6 percent in 2001 to 10.1 percent in 2005.

Table 4.21. Exports of textile made-ups

	Billion Dollars					% of World				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
World	17.4	19.1	23.5	26.4	30.2					
China	3.7	4.4	6.1	7.7	10.3	21.2	22.9	26.2	29.3	33.9
Pakistan	1.5	1.8	2.3	2.3	3.1	8.6	9.2	10.0	8.9	10.1
India	1.1	1.3	1.6	1.8	2.4	6.3	6.6	6.8	6.8	7.9
Turkey	1.0	1.2	1.6	1.8	2.0	6.0	6.5	6.9	7.0	6.5
Portugal	0.8	0.8	0.8	0.8	0.8	4.5	4.1	3.5	3.2	2.5

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Towels and cleaning cloths. The Pakistan towel industry is mostly in the organized sector, unlike other textiles. There are about 325 units, of which 250 are classified in the organized sector. The technology is based on locally manufactured looms (9,000) and imported auto looms (250). Correspondingly, about 90 percent of production is from local looms and only 10 percent is from the imported looms. Local looms produce 1,000 kilograms of towels per month, whereas the imported looms can produce 3,500 kilograms. With the increased output in quantity there is also improved quality.

¹⁹This is under product group # 658 in the International Trade Statistics: "Made-up articles, wholly or chiefly of textile materials, n.e.s."

Table 4.22 shows the recent trends in world exports for towels and cleaning cloths. Pakistan stands at second place among exporters. Its share in the world market increased from 7.1 percent in 2001 to 9.8 percent in 2006. India is conspicuous by its absence, which is explained by domestic production that is oriented to meeting the demand of its tourist industry.

Table 4.22. Major exporters of towels and cleaning cloths

Country	Million Dollars					% Distribution				
	2002	2003	2004	2005	2006	2002	2003	2004	2005	2006
China	797	865	1,900	989	913	23.0	23.1	37.8	23.6	23.8
Pakistan	247	321	305	346	375	7.1	8.6	6.1	8.2	9.8
Portugal	316	302	284	284	265	9.1	8.0	5.7	6.8	6.9
Turkey	148	172	251	271	251	4.3	4.6	5.0	6.5	6.5
Belgium	215	217	238	271	251	6.2	5.8	4.7	6.5	6.5
Germany	283	278	260	273	213	8.2	7.4	5.2	6.5	5.5
Brazil	161	168	181	156	156	4.6	4.5	3.6	3.7	4.1
Others	1,302	1,429	1,606	1,606	1,414	37.5	38.1	32.0	38.3	36.8
Total	3,469	3,752	5,025	4,196	3,838	100.0	100.0	100.0	100.0	100.0

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Pakistan's exports are concentrated in cotton towels and wash cloths (Table 4.23), and the United States is the predominant destination, accounting for almost 50 percent of Pakistan's export value (Table 4.24). U.S. decisions related to the general war on terror after 9/11 may have helped Pakistan in this regard. Over 50 percent of the exports in this segment are through other cotton linens, and this is in line with the growth in global exports.

Table 4.23. Pakistan's exports of towels and cleaning cloths (million dollars)

Commodity	1999–2000	2000–2001	2004–2005	2005–2006
Cotton gauze, etc.				
Cotton gauze bleached	11.3	5.4	5.4	11.2
Toweling cotton bleached	30.1	4.1	4.1	30.0
Other terry towels, cotton	0.5	1.3	1.3	0.5
Other linens of cotton				
Towels cotton mill made	193.1	241.8	241.8	193.0
Towels cotton hand loom	1.8	1.5	1.5	1.8
Toilet kitchen linens mill	12.0	12.1	12.1	12.0
Other linens and fibers				
Toilet kitchen linens flax	4.6	4.4	4.6	4.6
Cleaning cloth				
Dish cloth	10.2	11.0	11	10.0
Wash cloth	65.2	82.4	82.4	65.2
Dusters	10.3	9.0	9	10.3
Bar mops	40.2	39.1	39	40.2

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Note: Insignificant items have been left out.

Table 4.24. Major country destination of exports of towels from Pakistan

Countries	2003–2004	2004–2005
United States	47.9	49.1
Germany	3.8	5.6
United Kingdom	6.4	5.4
United Arab Emirates	6.6	5.0
Italy	2.7	3.5
Spain	2.1	3.1
Canada	4.5	3.0
Netherlands	3.2	2.6
France	2.5	2.3
Belgium	1.5	1.9
Others	18.9	18.4
Total	100	100

Source: Export Promotion Bureau.

The unit prices received in the U.S. market by Pakistan and several other exporters during the 1990s indicate that the country has to go some distance in realizing the best outcomes. Price is dependent on quality, so this is not surprising with over 90 percent of the industry based on local looms. China realizes the highest value for its products. Interestingly, in times when the Pakistan industry was faced with high cotton prices due to low yields in the primary sector, it met its obligations by producing higher value goods (in 1994–1995, the unit price jumped from \$1.99 to \$4.71 per kilogram). A rising world cotton price was one reason for the unit price increase, but this unusual year also indicates that the industry is capable of moving into quality production.

To do so, Pakistan has to move to diversify its exports in this segment and the strategy could be to do this in markets where Pakistan has a better reputation. The move to the higher end of the market would be dependent on the production of towels from dyed yarn rather than on piece-dyed towels. Currently the facilities for yarn dyeing are limited. There should be more investment.

One of the leading towel exporters was asked about domestic and international competition. There are 22 towel units, but the main competitor within the country is just one. This unit exports to the European Union and there it meets stiff competition from Turkey and Portugal. These latter countries have certain advantages: geographic proximity, a trained and educated labor force, better research and development (R&D) facilities (which are nonexistent in Pakistan), reliable financial institutions, and better investment opportunities. Despite this, the Pakistani unit has been a priority supplier to the European Union. This is because the unit does not compromise on quality. The requirements and designs are catalogued and they are regularly updated so that the international customer is able to determine the range and quality of products. The unit has invested quite heavily in machinery from Switzerland, China, Japan, and Pakistan. The critical machinery is always necessary for quality production. Again, this example illustrates that Pakistan's textile producers can meet the international competition.

Bed wear and linens. Over the past 11 years, the world export market for bed wear and linens increased by 8.6 percent (Table 4.25). Pakistan has performed remarkably well in these items. In 1995, Pakistan was second to China in these export receipts. It surpassed China starting in 2001. In 2005, Pakistan captured a 28.2 percent share in the world market for bed wear and linens, whereas China had a 27.1 percent share.

Table 4.25. Major exporters of bed wear

Countries	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Million Dollars											
China	658	597	708	603	696	786	819	825	988	1,135	1,847
Pakistan	376	469	487	567	681	745	831	1,044	1,380	1,288	1,926
Portugal	321	325	355	384	380	370	359	346	362	384	339
Turkey	117	131	174	210	214	233	251	289	409	499	549
United States	103	106	122	144	111	100	57	82	84	92	106
France	108	103	108	122	127	123	104	106	139	151	151
Mexico	85	115	121	133	77	69	52	62	54	63	72
Others	986	975	953	990	974	1,175	1,278	1,309	1,556	1,790	1,830
Total	2,754	2,821	3,028	3,153	3,260	3,600	3,752	4,062	4,971	5,401	6,821
% Distribution											
China	23.9	21.2	23.4	19.1	21.3	21.8	21.8	20.3	19.9	21.0	27.1
Pakistan	13.7	16.6	16.1	18.0	20.9	20.7	22.2	25.7	27.8	23.8	28.2
Portugal	11.7	11.5	11.7	12.2	11.7	10.3	9.6	8.5	7.3	7.1	5.0
Turkey	4.2	4.6	5.7	6.7	6.6	6.5	6.7	7.1	8.2	9.2	8.1
United States	3.7	3.8	4.0	4.6	3.4	2.8	1.5	2.0	1.7	1.7	1.5
France	3.9	3.7	3.6	3.9	3.9	3.4	2.8	2.6	2.8	2.8	2.2
Mexico	3.1	4.1	4.0	4.2	2.4	1.9	1.4	1.5	1.1	1.2	1.1
Others	35.8	34.6	31.5	31.4	29.9	32.6	34.1	32.2	31.3	33.1	26.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Table 4.26 presents the composition of Pakistan's export of bed wear and linens. In 2000, 69 percent of its exports come from bed linens made of cotton. This share came down in the past five years, but the share for knitted and crocheted bed linens increased.

The United States is a major trading partner of Pakistan in this segment, followed by the United Kingdom (Table 4.27). An assessment of the market indicates that Pakistan has done reasonably well in the world market except in Japan, where Pakistan figured in the first 20 countries that export bed wear.

The question also arises from the bed linens export data of whether the recent outcomes are due to preferential policies followed by the United States and United Kingdom after 9/11. Has Pakistan's industry really developed to the extent that it is competitive for these market shares or are exports due partly in response to the ongoing conflict?

Table 4.26. Composition of Pakistan's exports of bed wear

Type	2000	2001	2002	2003	2004	2005
Million Dollars						
Bed linens, knit, crocheted	4	7	28	109	179	203
Bed linens, cotton	515	581	808	1,044	874	1,116
Bed linens, other textiles	225	243	208	226	235	607
Total	745	831	1,044	1,380	1,288	1,926
% Distribution						
Bed linens, knit, crocheted	0.6	0.8	2.7	7.9	13.9	10.5
Bed linens, cotton	69.1	69.9	77.4	75.7	67.9	58.0
Bed linens, other textiles	30.3	29.3	19.9	16.4	18.2	31.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Table 4.27. Major country destination of exports of bed wear from Pakistan

Countries	2003–2004	2004–2005
United States	31.0	41.1
United Kingdom	15.3	10.6
Germany	6.8	6.9
United Arab Emirates	6.9	6.2
France	6.3	5.6
Netherlands	5.1	4.8
Belgium	2.7	3.4
Spain	2.6	3.0
Italy	2.1	2.1
Canada	1.5	2.0
Others	19.6	14.4
Total	100.0	100.0

Source: Export Promotion Bureau.

To ascertain this, one has to evaluate the past and project the future to determine whether this growth is sustainable. The data for the 1990s cannot strictly be compared with the data of 2000–2004. Yet the difference is obvious. Even the most liberal assumption about the ability of the bed linens exporters indicates that international response was geared to the 9/11 event. The growth to that extent may be artificially induced. If Pakistan is to take advantage of this, the present situation needs to be strengthened so that when the props are gone, the growth in trade is sustainable.

In terms of unit prices in the U.S. market, Pakistan had the lowest unit price realization among exporters in the 1990s. Prices fluctuate, with the price realization from 2001 to 2004 in the range of \$5.49 to \$5.66 per kilogram, a further reduction from the average unit price of the 1990s. That Pakistan was hitting the lower end of the market is obvious. The highest average price in this segment was received by Mexico (\$17.43 per kilogram) followed by Germany (\$14.20 per kilogram). The comparisons are not quite accurate because of the advantages of the latter countries. Their exports can be classified as coming from developed regions. Mexico has a preferential trade arrangement with the United States under the North American Free Trade Agreement, which probably helped the unit prices, whereas from Germany one can expect quality products.

The issue is that Pakistani entrepreneurs have never worked at quality. The reason is simple. The better the quality, the more marketing work that has to be done. Like the spinners, most of the firms do not have a marketing cell; and for those that do, they are very rudimentary.

As trade reforms take place, the global market becomes more competitive. The rate of growth of the developing world is increasing faster than that of the developed world. The developing world exports are improving in quality but still have a long way to go to meet the changing demands. The developed world will bring in nontariff restrictions related to concerns such as child labor, the environmental, and other social issues to try to restrict the onslaught from the developing world. Intraregional trade is likely to increase and strategic mergers cannot be ruled out.

To be successful in this competitive world market, the suppliers will have to reliably meet demand from the buyers, provide quality at a competitive price or have a unique product that has a premium price, reduce costs, and make the industry more productive.

Table 4.28 presents the trends in the world market for clothing. In 1996–2004, the market increased at an annual growth rate of 4.1 percent. In 2004, the total value of world exports of clothing was \$234 billion. China, with a share of 26.5 percent, captured a significant part of this huge market. Its share has grown significantly over the past 11 years. In contrast, the shares of the other major exporters including Pakistan have not improved over the years. Pakistan's share has stagnated at slightly over 1 percent of the world market. India's share is about 3 percent.

Although Pakistan has performed well in bed wear linens, it faces major challenges for it to move forward. The major changes include (a) how to improve technology because it is obsolete and low cost, which is the main reason for hitting the low end of the market; (b) how to improve human resources because at present they are lagging far behind and almost primordial; (c) how to improve on design and development because at present they are not regular functions; and (d) how to improve on standards because at present the lack of standards not only brings the price down but also creates problems of reputation for the ones involved in best practices. Furthermore, Pakistan will have to improve its image as a low-price producer of poor quality products. In many cases, perception rather than reality is what matters.

4.5. Apparel

The apparel/clothing segment has the highest value in the entire chain. Classification is based on the structure of the fabric used and its purpose or use (e.g., knit and woven wear and within this whether the product is men's wear, women's wear, sportswear, hosiery items, etc.) The trend in the market is one of continuous growth; and after the liberalization by the WTO, this growth continues unabated. The decade of the 1990s saw the trade nearly double from the preceding decade. This trend is continuing with the WTO reforms and the abolishing of quotas in January 2005. The shift in world trading patterns has been in favor of Asian countries. Many analysts expect that Asia will continue to gain from the WTO liberalization of trade. It is too early to state whether that has really taken place.

Table 4.28. World export of clothing

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Billion Dollars									
World	162.6	181.3	180.8	180.3	193.9	196.7	190.8	217.4	233.8
China	25.0	31.8	30.0	30.1	36.1	36.7	41.3	52.1	61.9
India	4.2	4.3	4.8	5.2	6.2	5.5	6.0	6.6	6.6
Bangladesh	2.2	2.7	3.8	n.a.	4.2	4.3	3.9	4.5	4.4
Pakistan	1.9	1.8	1.8	1.8	2.1	2.1	2.2	2.8	3.0
% of World									
China	15.4	17.5	16.6	16.7	18.6	18.6	21.6	24.0	26.5
India	2.6	2.4	2.6	2.9	3.2	2.8	3.2	3.0	2.8
Bangladesh	1.4	1.5	2.1	n.a.	2.1	2.2	2.1	2.1	1.9
Pakistan	1.2	1.0	1.0	1.0	1.1	1.1	1.2	1.3	1.3

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Note: n.a. = not available.

However, Pakistan recently experienced a relative shift from textiles to clothing production and exports that has been more pronounced than the shift at the world level. Global export growth has also reflected movements in the fashion market as well as enhanced usage of diverse fabrics and materials, particularly in the apparel segment. Pakistan, although making some headway, still has a long way to go because of the inability to convert yarns into fabrics and high-value garments. Pakistan's exports continue to be concentrated in the low-value segment.

Broadly, the world clothing/apparel trade can be divided into three categories: woven garments, knit garments, and articles of apparel/clothing accessories. Over the period 2001–2004, the average share of woven garments was 40 percent, knit garments 13.4 percent, and articles of apparel/clothing accessories 47.5 percent (Table 4.29).

Table 4.29. Exports of clothing

	2001	2002	2003	2004
World (million dollars)	196.7	190.8	217.4	233.8
Men/boys wear woven	39.1	35.4	39.4	39.8
Women/girls clothing woven	42.6	39.5	44.2	47.1
Men/boys wear knit/crocheted	10.0	9.5	10.9	11.6
Women/girls wear knit/crocheted	16.6	15.4	18.8	19.7
Articles of apparel, NEC	61.7	63.9	72.8	80.8
Clothing accessories	12.4	12.7	14.3	16.1
Articles of apparel and clothing accessories*	14.2	14.4	17.0	18.7
Pakistan (million dollars)	2.14	2.23	2.84	3.03
Men/boys wear woven	0.51	0.52	0.60	0.52
Women/girls clothing woven	0.14	0.17	0.21	0.19
Men/boys wear knit/crocheted	0.54	0.51	0.70	0.75
Women/girls wear knit/crocheted	0.09	0.14	0.22	0.17
Articles of apparel, NES	0.27	0.30	0.45	0.69
Clothing accessories	0.18	0.27	0.27	0.28
Articles of apparel and clothing accessories*	0.40	0.31	0.39	0.43
Pakistan as % of world				
Men/boys wear woven	1.32	1.48	1.52	1.30
Women/girls clothing woven	0.33	0.44	0.47	0.41
Men/boys wear knit/crocheted	5.43	5.36	6.43	6.45
Women/girls wear knit/crocheted	0.54	0.93	1.14	0.86
Articles of apparel, NES	0.44	0.47	0.61	0.85
Clothing accessories	1.48	2.12	1.91	1.75
Articles of apparel and clothing accessories*	2.79	2.14	2.33	2.28
Clothing exports of Pakistan (% distribution)				
Men/boys wear woven	24.1	23.5	21.1	17.1
Women/girls clothing woven	6.6	7.8	7.3	6.4
Men/boys wear knit/crocheted	25.3	22.9	24.7	24.7
Women/girls wear knit/crocheted	4.2	6.4	7.6	5.6
Articles of apparel, NES	12.6	13.6	15.7	22.7
Clothing accessories	8.6	12.1	9.6	9.3
Articles of apparel and clothing accessories*	18.6	13.8	13.9	14.1
Total	100.0	100.0	100.0	100.0

Source: International Trade Statistics (<http://www.intracen.org/tradstat/sitc3-3d/indexpe.htm>).

Notes. NES = Not elsewhere specified.

*Other than textile fabrics; headgear of all materials.

Table 4.30 lists Pakistan's destination country of garments exports and Table 4.31 of knit wear (hosiery) in recent years. The United States remains the major market for Pakistan's exports of these items.

Table 4.30. Major country destination of exports of garments from Pakistan

Countries	2003–2004	2004–2005
United States	33.8	34.6
Germany	11.1	10.3
United Kingdom	11.6	10.0
United Arab Emirates	6.7	9.5
Saudi Arabia	5.2	5.5
France	5.1	4.7
Italy	4.4	4.5
Spain	3.3	4.0
Netherlands	5.2	3.8
Belgium	3.3	3.3
Others	10.3	9.9
Total	100	100

Source: Export Promotion Bureau.

Table 4.31. Major country destination of exports of knit wear (hosiery) from Pakistan

Countries	2003–2004	2004–2005
United States	57.6	56.8
United Kingdom	10.7	9.4
Germany	6.1	5.4
Netherlands	5.1	4.5
Italy	3.1	4.1
France	2.7	2.9
Belgium	2.7	2.8
Spain	1.7	2.2
United Arab Emirates	1.4	2.1
Canada	2.4	2.0
Others	6.4	7.9
Total	100	100

Source: Export Promotion Bureau.

4.5.1. Pakistan's Apparel Sector

The total number of units in the apparel segment in 2000–2001 was 4,500. Out of these 80 percent are cottage industries. The total number of installed sewing machines was 650,000, of which 200,000 are industrial machines and the rest are home workers/domestic machines used in cottage-based small units. Production in 1972–1973 was 9.5 million pieces, which increased to 685 million pieces in 2000–2001. The majority of the units are located in Karachi and Lahore. Other important areas include the towns of Faisalabad, Gujranwala, Quetta, Sialkot, and Rawalpindi. The dispersal of this industry is possible as it has low entry costs. However, this dispersion also allows low-quality production. The industry needs to be reorganized and brought into the semiformal sector where the government provides the wherewithal for the improvement of quality. The value chain in the apparel industry includes knitting, dyeing, printing, finishing, stitching, trims, and accessories, not to mention packaging processes. All these require separate specialization.

The apparel industry is labor intensive, and although definite statistics are not available, it provides jobs to an estimated 700,000 workers. In the knit units, the tendency is to have integrated units, which not only produce fabrics but also stitch garments. In the woven subsector, the investment is heavy and the units are stand alone. Processing and weaving are separate.

Pakistan has a strong base in men’s woven and knitted garment exports but Pakistan’s entrance into the nonquota markets has not been established. Fabrics available to the Pakistani producers are limited, which will limit their competitiveness in these markets. Two categories of products (men’s trousers and men’s shirts) have a 65 percent share for Pakistan’s exports, whereas some of the other exporters have a more balanced mix.

Pakistan’s exports must move toward those categories that have been neglected so far but that provide better unit values. The situation in the nontraditional knitted men’s wear is different as Pakistan has a better unit value (weighted) than its competitors China, India, and Bangladesh.

Pakistan’s exports of women knit wear increased over 2001–2003 but slowed down in 2004 (Table 4.29). A similar pattern is observed for women’s woven clothing. The probable reason is the inability of handling fashion movements worldwide. Pakistan exporters seem to have little flexibility in the production process. The emergence of institutes to handle this lack of knowledge may be of some help in the future.

4.5.2. Challenges in the Apparel Sector

The main areas of concern for the apparel sector are marketing and technology. The apparel market is a fast changing market, and when there is reticence on the part of the entrepreneur to change with the times, the market is lost. Pakistan markets its products to a few buyers in the United States and the European Union, resulting in difficulties when the market is in recession. In any case, the vulnerability increases if the buyers are few.

The technology is ever changing. Fabric producers have to keep pace with the changes. The ever-increasing new styles and collections mean that lead time will shrink with technological advancement. One of the ways to assess the technology is to examine the losses of the industry. Table 4.32 presents some recent estimates of industry losses due to outdated technology. One of the major reasons for these losses is unskilled workers. In cases where some are skilled, technological advances are such that they are unable to match their skills with the new machinery that is available. The units employing these individuals are not working on improving their skills because of the unstable nature of the market. Industry challenges are that it may have to go into high-cost automated functions and it faces growing industrial country concern about quality. Technological advancement in quality monitoring may lead to increased rejection of apparel.

Table 4.32. Recent estimates of losses due to outdated technology

Cut to shipment losses	2%–3%
Knitting losses	2%
Dyeing and finishing losses	4%–7%
Cutting and stitching losses	15%–18%
Total	23%–28%

Source: Textile Commission’s Organization, various issues.

A leading garment exporter was asked what he thought of the various policies on competition. He summarized by saying that “Pakistan’s garment industry is floundering” (Birnbaum’s Garment Imports, Annual Report 2003). Tables 4.33–4.35 provide a candid assessment of the garment industry and how the country is positioned on the various variables listed therein. It is apparent that Pakistan is at the lower end of the range and that its main competitors are ahead. China is a giant that has to be contended with. Its labor force is disciplined and there is no cutting corners in that country. India has moved on dramatically and is now reckoned as one of the economic forces along with China. Bangladesh has a buoyant garment industry and is doing as well as India—despite the fact that it has no raw materials of its own. For Pakistan, unless a qualitative change is brought about, the chances of enhanced trade will remain diminished. To stay competitive, the industry has to address the following concerns:

- Respond quickly and reliably to customer demands, meeting contractual obligations and diversifying markets.
- Provide quality at a competitive price; this can only happen if productivity increases. At the moment, there is not a single unit that has carried out a study that involves productivity; neither is the apparel association involved in this. A degree of market intelligence is required about the costs that the competitors are undergoing.
- Improve Pakistan's image as a garment manufacturer. One poor performer can mar the image of the entire country and its trade. The question really is how to work with this intangible situation. The institutional framework required for this is limited, and although the Export Promotion Bureau is doing its bit, that is insufficient.
- Establish research and development facilities in the private and public sectors. Even the associations that are involved in collective actions are more in fire-fighting actions. Their contention is that the public sector must do its bit and that they should not be burdened by the extra costs, as their margins are already thin.
- Maintain continuous skill development. This could be done with an apprentice system, but Pakistan has never asserted that its labor force should be skilled. A labor force that is trained has its own compulsions and does not want a master and servant attitude.
- Change from vertically integrated units to contractual control. Lahore-based knitwear is vertically integrated. Subcontracted manufacture has created quality concerns and at the same time been a barrier to specialization. However, the disadvantages of a vertical set up are that it requires volume before it can go into production, flexibility is reduced because of concentration on a few products, and operational costs of vertical units are greater than the specialized units.

Table 4.33. Cross-country evaluation of apparel marketing channels

	Pakistan	India	China	Bangladesh	Sri Lanka
Respect for contracts	1–2	4	4–5	3	4
Business culture	2	3	4	3	4
Institutional support	1–2	2–3	4	2	3
Strategic alliances					
Joint ventures	–	+	+	+	+
Technical support	+	+	+	+	+
Expatriate management	–	+	+	+	+
Value for money					
Best practice mills	5	5	4	4	4–5
Average mills	1–2	2–3	3	2–3	3
Labor productivity					
Best practice mills	4	4	4	3–4	4–5
Average mills	1–2	2	2–3	1	3
Labor cost/hour \$	0.55	0.60	0.65	0.45	0.52

Source: Interview with a leading garment manufacture; International Textile Manufacturers Federation (ITMF)

Legend: 1 = Very poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very good, --generally negative, +=generally positive.

Table 4.34. Cross-country evaluation of apparel human resources

	Pakistan	India	China	Bangladesh	Sri Lanka
Industry weakness					
Operator skills	1-2	1-2	3	1	4
Market management and shop floor	1-2	2-3	3-4	2	4
Management organization	1-2	3	4	2-3	4
Education training					
Primary	1-2	3	1-2	1	2
Secondary	1-2	3	1-2	1-2	3
Operator/vocational training	1-2	2-3	2	1	2-3
Market management and shop floor	1-2	2-3	2-3	1	3
University/college	-	+	+	+	+

Source: Interview with a leading garment manufacture; International Textile Manufacturers Federation (ITMF)

Legend: 1 = Very poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very good, -=generally negative, +=generally positive.

Furthermore, there are key issues in human resource development that have to be addressed to stay competitive. These include (1) the number of training programs must increase and the quality must improve to be in line with world quality requirements; (2) trainers must undergo training to bring them up to a competitive level; (3) a skilled labor force may be temporarily imported that is product specific, but this requires the identification of skill shortages; and (4) a regular supply of labor is required for the simple reason that besides a second generation, a new labor force has to be developed to meet the market exigencies.

Table 4.35. Cross-country evaluation of apparel bureaucracy and infrastructure

	Pakistan	India	China	Bangladesh	Sri Lanka
Bureaucracy: perceived performance					
CBR	1-2	1	3	1-2	3
EPB	1-2	1	3	1-2	3
Customs	1-2	1-2	3	1	3
Banks	1-2	2	3	1	3
Infrastructure					
Road paved as % of all	54%	46%	n.a.	10%	95%
Railway	2-3	2-3	3	2	n.a.
Ports	2	2	3-4	1-2	3
Telecommunications	3	3	3-4	2	4

Source: Interview with a leading garment manufacture; International Textile Manufacturers Federation (ITMF)

Note: CBR = Central Board of Revenue; EPB =Export Promotion Bureau .

Legend: 1 = Very poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very good; n.a. = not available.

4.6. Future of the Industry

A strategy for progress of the Pakistan industry must encompass both private and public dimensions. At the private level, increasing productivity is a function of more than obtaining the latest machinery, as Pakistani entrepreneurs are finding out. The latest from the industry is that they have computerized machinery (computer-aided manufacturing and computer-aided design) but there is no planning for production or inventory. Without those management components, the marketing of Pakistan's products will languish.

Transaction costs have also increased in areas that fall into the public domain, including poor road infrastructure. Pakistan is incapable of bulk handling of exports at the ports. For high-price garments,

the need is to determine the demand from the international source or have a buying house system that determines demand in the short run. Because of the diverse nature of the industry and the supply chain functionaries, it is essential to manage in ways that are not only industry specific but also policy and institutional specific. If the various associations act as lobbyists and make demands of the government but do not work in tandem and support each other, progress will be retarded. Table 4.36 shows the advantage of an integrated supply chain leading to increased value added in the nation's production.

Table 4.36. Value added in cotton to apparel marketing chain

Product	Export Price (US\$/kilogram)	% Value Addition over Cotton	Previous Stage
Cotton	0.87	0	0
Yarn	2.09	140	140
Cloth, gray	4.62	4.31	1.21
Cloth	5.31	5.1	15
Garments	13.62	14.66	156

Source: Wajid Javed, Aziz Memon, et al., 2002.

To move forward, three alternative scenarios that the industry has articulated are (i) low road scenario—only the historic growth rates are maintained (6 percent annual growth); (ii) doable scenario—increase in unit price of realization of yarn, fabrics, textile made-ups, and garments with the attempt to keep their share of the world market (12 percent growth); and (iii) high road scenario—apparel sector as the engine of growth. This requires the diversification of exports into neglected areas (woven garments, sportswear, specialized industrial garments, etc.); a higher share of unexplored, nontraditional markets; and export growth of 16 percent per annum, with the assumption of 20 percent growth in the garments and made-ups segments.

4.6.1. Challenging Environment since 2005 and Industry Demands

In the near-term aftermath of the terrorist attacks of 9/11, the textile and related industries of Pakistan were somewhat hopeful of gaining advantageous access to export markets and experiencing a boom period that would stimulate the Pakistani economy. In a sponsored article, the APTMA made noises that 9/11 had allowed tariff-free access to the European Union, an upward revision by 15 percent, and a modest tariff relief of \$142 million by the United States.

This hopeful view has undergone a change because of the liberal WTO and challenges Pakistan faces from China, India and others. China's share in the U.S. market is 30 percent, India's is 5 percent, and Pakistan's is a mere 3 percent. Policymakers and the industry had felt there would be buoyancy in exports and Pakistan should be able to increase its share. Recent evidence is to the contrary.

Since the lifting of global trade restrictions in 2005, Pakistan has been placed in double jeopardy. Its exports are facing a price war in once established markets (United States and European Union). Pakistan has lost its preferential status with the European Union because its exports were more than 2 percent in 2005–2006. Meanwhile, Chinese and Thai products flood its home market. In this liberal trade regime, Pakistan's textile industry has made gains in quantity terms in export markets. This means that the country exported large quantities of goods at lower prices. The profit margins have been squeezed.

The consequence of this, continuing in 2007, is that the industry is seeking all kinds of concessions. To sweeten the entire package, the industry has promised that with the help it is seeking exports would grow to \$20 billion and six million new jobs would be created. How that would be done is not stated.

When a major player enquired about the justifications for these concessions the industry was seeking, it was stated that the concerns of the industry were

The ever-increasing cost of doing business, including rising energy costs. Two government interventions have raised the cost of doing business: increases in the minimum wage and the power tariff. These have raised the cost in the spinning industry alone by Rs 75 million per annum (Rs 3.75 per pound since the country spins about 20 million pounds of yarn). The market is not ready to absorb this increase, and it cannot be passed on. The sustainability of the sector is under growing concern.

Monopolized buying by selected international brands where margins have drastically been reduced. During the quota regime, resources were moving to the developing countries from the developed countries. Now it is the other way around. A reverse auction price has been established where the brand buyers fix a low price and ask the developing countries to state their selling price. Other social conditions add to the cost. The solution suggested was that the subcontinent and China join hands and take on the world collectively. China and Pakistan may well be working collectively and the third country has to get involved.

Overleveraging and carrying out of obsolete inventories resulting in window dressing of balance sheets. Some window-dressed balance sheets have led to antidumping actions by the European Union.

Lack of effective and informed industry-specific research. The government and its various institutes must do this. Instead of going into cosmetics, it may be necessary to go into action-oriented research where the global demand is to be met. The fashion and the fabric industry is changing, and this must be taken note of and product-specific interventions must be made.

In the context of such concerns, and such promises, the industry asked in 2006 that the government solve six specific problems:

- The import duty on textile machinery and spare parts should be removed.
- The eligibility criteria of the State Bank of Pakistan's (SBP)'s long-term financing and export should be modified to accommodate all investments in the textile sector instead of those existing.
- As the spinning industry has availed itself of finance from leasing and other conventional modes of financing, the Security Exchange Commission of Pakistan and SBP should allow the exchange of loans from high cost capital to a lower cost capital and other forms of concessions.
- Short-term loans at reduced interest rates should be provided. The textile industry procures cotton for nine months and thus incurs heavy losses in terms of financial charges. The spinning industry operates by buying cotton for the entire year in the span of three months and thus has the extra burden of carrying costs for a whole year. This increases the cost and thus undermines international competitiveness. APTMA has suggested that short-term loans at reduced interest rates be provided effective October 2006 so that it could compete in the international market. The industry asserts that others do not bear this inventory cost.
- Polyester staple fiber should be allowed under the temporary importation scheme. This was a banned item.

The outstanding loans of the entire spinning and weaving industry should be eligible for SBP's low-cost funds irrespective of the period. This would make the entire industry viable. Companies that due to various reasons had not opted to avail themselves of the incentives in terms of past investment schemes to lessen the cost of servicing their loans are carrying long-term liabilities. The government should extend relief to such companies for their sustainability.

Beyond these specific proposals, the industry has received various forms of support. We described premium payments for quality cotton and the BMR investment support above. There have also been paid between Rs 25–40 billion after the government announced that it would continue 6 percent R&D rebates to garments and knitwear during the fiscal year 2006–2007. Fabrics and home textiles have also been given 3 percent and 5 percent rebates for R&D, respectively. Bank loans given to textiles are being swapped with long-term finance facility for export-oriented industries. In addition, textile exporters

are being given financing at 7 percent. For refinance, they are also being provided loans at 7 percent. These various benefits will be doled out to the most powerful of the tycoons and those who are most vociferous. Not all are vociferous. The root cause of all this was the creating of robber barons in the 1960s. They have become a powerful mafia.

4.6.2. International Comparisons

Each country follows its own rules for supporting the major players, as has been clear in negotiations at WTO meetings. In a very competitive market, the jockeying for subsidies takes on many different forms. The major players of Pakistan seek the solution to problems, and the institution that they have collectively formed has a very powerful voice in the economy.

As often happens, the industry has looked at the Indian scene and recently come up with a technology up-gradation fund where the industry is allowed a rebate of 5 percent on the interest rate to encourage capital formation. A total of nearly Rs 12 billion have been provided, of which 34 percent went to the spinning industry.

To see if Pakistan industry is on a level playing field, the industry and the textile commissioner examined financial cost and rebate comparisons. The results are given in Tables 4.37 and 4.38. To an extent, they show larger subsidies in India; but the record is not unambiguous, and the differences vary over time (for example, export financing support has been increased in Pakistan). The financial gap may have been corrected since this investigation, as the Pakistan export finance cost has been reduced.

Table 4.37. Financial and rebate cost comparison, Pakistan and India

	Pakistan	India
Finance		
Export	9.00%	6.50%
Term	12.00%	5.75%
Rebates		
Cotton	0.90%	6.00%
Blend	0.81%	6.80%
Polyester	0.43%	7.50%
Average	0.71%	6.76%
R&D	6.00%	0.00%
Total	6.71	6.76

Source: Textile presentation at the Pakistan Administrative Staff College (Hussain, 2006).

Table 4.38. Cross-country evaluation of ease of doing business

	Pakistan	Thailand	Malaysia	India
Ease of business	60	20	21	116
Starting	38	29	57	81
License	80	8	101	5
Hiring and firing	91	23	34	20
Registering property	43	22	53	36
Getting credit	72	59	6	18
Protect investors	20	33	5	14
Paying taxes	127	34	19	50
Trade across borders	103	89	36	12
Enforcing contracts	134	49	61	3
Closing a business	36	37	43	1

Source: Japan International Cooperation Agency (2006).

There are other important bases for comparison. Production costs differ because of input costs, labor costs, the effectiveness of marketing and management, and the use of advanced technology. Another issue has to do with social compliance. That means improving the working conditions of the factory and removing all vestiges of child labor. To increase the number of units that can manage quality production and have themselves certified, as International Standards Organization 9000/2000 would not be possible without government support. The units that are certified comprise 20 percent of the textile mills.

Yet another issue concerns regional trade agreements and preferences. Pakistan has a challenge in that the least developed countries have preferential treatment. These comparisons suggest there are other issues at stake beyond comparative subsidies. But will the industry wake up to these deeper concerns? In spite of low labor cost, Pakistan has lost its advantage in this sector. The reasons are due to high production costs and inadequate infrastructure.

In relation to trade agreements, Pakistan is now going into bilateral agreements (with Sri Lanka and China) to try to boost its exports. Whether it is able to take the Chinese challenge has yet to be seen, as this agreement was signed in November 2006. The consideration is that with China and India there are 48 complementary products from Pakistan. All three countries could gain from expanded regional trade.

Pakistan also hopes to improve its productivity so that the exports would reach \$30 billion. That seems to be at some distance at the moment. Some of the international comparisons suggest how Pakistan must improve to remain competitive or become increasingly so. In any competitive polices, the institutions of the state have to play a large part.

A comparative analysis was done by the Japan International Cooperation Agency based on the World Bank (WB) study ranking 155 countries' trade-related polices and the Japan External Trade Organization for investment promotion. Pakistan is not an easy business country (Table 4.39), and what is true for the foreigners is equally true for Pakistanis. The country is suspicious of the investor.

Table 4.39. Pakistan's economic planning process for textiles

Planning	Fiscal	Financing	Investment	Import	Export	Labor	Miscellaneous
Five-year plans	Import duty	Credit	Incentives	Import facilities price	Bilateral agreement	Education	R&D
Annual plans	Production	WB	Tax concessions	Price stabilization	WTO	Training	Quality control
Strategy	Income tax	ADB	Ind. Zones	Antidumping	ATC	Skill development	Productivity
Targets	Misc. tax	Special credits	Infrastructure		Export promotion	Welfare	Standardization
Local demand	Exemptions	Foreign private loans	Location				Conflict resolution
Export demand	Sector specific	Suppliers credits repatriatable investment nonrepatriatable investment	Facilitation/promotion development of support industry, machinery, synthetic raw material, services, packaging, trips, and trims		Cotton policy market development		Price control and price support

Source: Textile Commission's Organization, various issues.

Note: ADB = Asian Development Bank; ATC= Agreement on Textiles and Clothing; WTO= World Trade Organization

Pakistan has a complex policy-planning process, and when attempting too much, too little is normally done. To assume that the Textile Commission's Organization (TCO) is organized on all these

fronts and bears the consequences of the interventions is to assume that the organization is fit to deal with all consequences that follow policy. Policymaking is very complicated in Pakistan and it takes a considerable amount of time. The fashion school that was to be set up in August 2002 finally was given the land in December 2004. This was a decision at the highest level. So what is the fate of other decisions? Very time consuming and very frustrating—and this is in a lead sector. Efforts at “one window” operations do not function in a society that does not allow or that is inimical to asset development irrespective of who benefits. Pakistan has many challenges to meet to remain competitive in the cotton–yarn–fabric–textile and apparel sectors.

4.7. Conclusion

The strength of Pakistan lies in having cheap raw material, but poor and cheap picking and collecting methods vitiate this. The untrained pickers are responsible for the contamination of raw cotton and the mixing practices that go on due to either neglect or the inability to understand the compulsions of a growing competitive market where value is dependent on quality products. The solution out of this is to provide incentives for contamination-free cotton. This was done, but the premium was not given. This has to be undertaken so that those who pay more get the advantage of better market prices.

To maintain competitiveness, Pakistan has to move to GM cotton. The efforts have not been institutionalized so far, resulting in Pakistan being way behind China and India. Farmers are far ahead of government approval policies and have already wrested the initiative from the policymakers.

An institutional arrangement was made via the PCSI for ensuring quality raw cotton for the world markets, but this was not operative for over a decade. The institution would have resolved all quality issues during this decade (1990s,) but APTMA’s lobbying prevented it.

Cotton products require that the labor market be updated and the labor force provided with facilities to acquire relevant skills. A technology up-gradation fund has been provided but this is only the beginning, for this has to be on a continuous basis so that the growing demand and requirements are met. The human capacity that is required is across the board, and the industry would do well to intervene from its own resources rather than await handouts from the government.

Much of the value added in this industry is dependent on the quality and the different kinds of yarns produced. Price would obviously matter, for the biggest competitors China and India have taken steps to do so. Pakistan need not copy them but go its own way in achieving this.

Man-made fibers are very much a part of the value chain, and a level playing field has to be provided to the manufacturers of these fibers. Cotton yarn producers are not the only players. Competitiveness needs to be examined for all kinds of yarn products, and a harmonization in policy would help.

The earlier method of developing entrepreneurs is not possible. The Boston School of thought was that robber barons would be able to industrialize the country but this has led to entrepreneurs who are entirely dependent on government handouts—year in year out. Independent entrepreneurs can only emerge when Pakistan is able to shift from a government-based production system to one that is dependent on the market. The market can and will sift the entrepreneurs. The market also enables the entrepreneur to be self-reliant and to pay the price of inefficiency.

In the new regime, ethical practices have to be at par with the international standards. It is no longer possible to cut corners and to hope that things will somehow continue. Drift is no longer possible. The industry is known to have purchased obsolete technology out of the preferential credit that was allowed to them. Policies providing incentives will now have to be per WTO regulations.

The organizational and management structures within the industry are based on the extended family systems. The organizations lack marketing personal, and this was usually taken care of by the owner/CEO underscoring the need for having a competitive structure in place in terms of deliverables in a highly competitive world market—whether at the organizational level or the raw quality cotton or in the entire value chain. This is an ever-improving sector, and to keep at the very edge of competitiveness it

may be necessary to stay at that level through continuous innovations. It may indeed be desirable to have, within APTMA, a section considering the manner and direction of the textile and apparel sector.

The policies that the government can affect do not have to do with price subsidies but with providing, through involvement and influence, fair trading practices. Short as Pakistan is in earning enough foreign exchange, there is a considerable amount of anxiety at that level if the textile sector is not doing well. Pakistan has not diversified its international trade. The effort may be not to effect policy changes in the short term but to initiate long-term trends. That requires long-term policy consistency, which may require political stability to reinforce economic stability.

Who is to do what in the public and private sectors have been the subject of much debate in Pakistan. Generally, the private sector feels that government should pick up all the costs whereas the benefits should accrue to the private sector. The result has been that the private sector has not evolved out of market forces, making the weak players pay for their lack of intense effort in the market. The government rather than the sector industry has made the new institutional efforts at collective support to the textile sector. Hedge and forward marketing practices that were followed until the mid-1980s will have to be reconsidered and a body of knowledge developed in this kind of marketing. Evidence, understandably indirect, indicates that the units doing well are aggressive and play the world market well.

There is considerable spare capacity, which may not be the result of market forces but of connective cronyism where paper transactions have allowed the politically powerful to become entrepreneurs and to sell the allocation (for some time now, the textile industry and four others were directly controlled and were subject to permission of the prime minister or the president). A secondary market based on paper permissions developed. This led to serious erosion of the entrepreneurial spirit and to playing the market for risks that are inherently there to be tackled. Even now, the government can exercise industrial permission through the financial system. The ability to allow the market to exercise its reason or the lack of it is not allowed to any great extent. Economic financial strength could lead to political strength and that could upset the power structure of the elites. On the other hand, playing the government's lone hand may be beneficial.

Technological shifts, whether in the ginning, spinning, weaving, or apparel industry, would be necessary, and a technological reserve fund either at the industry level and managed by them or at the unit level will have to be established eventually. Public funds cannot be used in perpetuity, and those who cannot survive the market's onslaught need to meet their fate through liquidation.

Human resources as briefly indicated earlier have to be developed at all levels. It is inconceivable that the sector can stand if there are some weaker sectors (as in ginning, which the ustad-shagird system manages). The interface between technology and the raw materials that eventually provide the basis for quality have to be task forced regularly, as the methodology is evolving over time. Innovation will continue, and the only way to be better off is to understand this and take effective steps.

The apparel industry has also been effectively playing the man-made fiber manufacturers and feels that these units should be exposed to world markets. A level playing field has never been effectively implemented, and the importers of blended yarn have to pay a duty on the import. There are no reasons for giving this kind of protection in the market, so why provide this to the powerful lobby? One of the basic arguments for this is the rising cost of utilities. These are for everyone; the macrolevel factors do not hit individually but collectively. The infant industry argument also is not tenable, as all these industries have been in position for a long time.

Before long, Pakistan will have to improve its image as far as the cloth and apparel industry is concerned. Value addition is complex but played very well by a handful of industrial players. The easy route may be disastrous in the long run; new players will enter the unprocessed route to intervene in world markets, and they will be competitive. Every technological shift requires the development of the human resources to manage that technology. That is time consuming and although the necessary textile-training units are in place (like the textile-training institutes at the textile city Faisalabad) they have succumbed to bureaucratic stagnation. The shift to ever-higher added value is absolutely necessary if Pakistan is to continue earning foreign exchange.

The effort, in short, must be toward meeting the obligations reliably, provide quality at a competitive price or develop unique products that can be price fixers, reduce costs, and continue on the efficiency and productivity track. One exporting unit that does not meet its obligations can cause a reputation loss to the entire industry.

The R&D section has to be smart and able to understand the market trends and likewise influence those market trends that it creates in the process. In fact, this is not happening because APTMA focuses entirely on the government and tries to gain whatever rents it can. This shifts the focus from industry requirements to short-term gains.

The competitive aspect is not only in the industry but also nationwide. If energy is expensive, it adds to the cost, and if machinery uses that energy inefficiently, there is double jeopardy. If the transport systems are poor and if the packing systems are not attractive for the products, the market will not accept them. The industry must implement a package of improvements. Governments can provide only an environment that helps the industry. It cannot pick and choose.

If Pakistan reverberates to easy options, it will only minimize its activities in world trade. The entrepreneurs have now been at their sector for over six decades, and there has to be some degree of independent action to enable them to be players on the world scene. Certainly, those who cannot play by the international rules lose in the process. Markets must be able to play its affirmative role. In the ultimate analysis, it is the attitudes that must change and the scene that must take on an affirmative aspect. In economic matters, the cabinet committee plays a crucial role. Scarce resources are a limiting factor in policymaking. In an effort to get more out of limitations (of whatever kind), governments tend to oversee; that oversight is by the bureaucracy, and that will always be regressive.

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GLOSSARY

Bale	The unit of weighing cotton. In Pakistan, the standard weight of a bale is equal to 170 kilograms of lint.
Bleaching	Bleaching is the process of improving the whiteness of textile material, with or without the removal of natural coloring matter and/or extraneous substances, by a bleaching agent.
Blended Cloth	Fabric made of more than one type of yarn. The usual practice in Pakistan is to mix cotton yarn with man-made yarn such as polyester or viscose.
Blending	Blending is the process primarily concerned with the efficient mixing of various lots of fibers. Blending is normally carried out to mix fibers, which may be of different physical properties, market values, or colors.
Calendaring	The process of passing fabric through a calendar in which a highly polished, usually heated, steel bowl rotates at a higher surface speed than the softer bowl against which it works, thus producing a glaze on the face of the fabric that is in contact with the stress bowl. The friction ratio is the ratio of the peripheral speed of the faster steel bowl to that of the slower bowl and is normally in the range of 15–3.0.
Cotton Fiber	Outer growth of epidermal cells on the cottonseed.
Count	Count is the measure of fineness of yarn. The higher the count, the finer the yarn. Count is a ratio of length per unit weight. One count represents a length of 840 yards from one pound of any fiber.
Denim	Denim gets its name from the city of Nimes. It is a very strong cotton material made from a twill weave. Usually the warp is dyed indigo blue, and the weft in accrue or bleached. With the same weft, the warp can also be black.
Fabric	Fabric is a manufactured assembly of fibers and/or yarns that has substantial surface area in relation to its thickness and sufficient mechanical strength to give the assembly inherent cohesion. Fabrics are most commonly knitted or woven, but the term includes assemblies produced by lace making, tufting, net making, and the nonwoven processes.
Fabric Length	Fabric length is the usable length of a piece between any marks, piece-ends, or numbering when the fabric is measured laid flat on a table in the absence of tension.
Ginning	The process of removal/separation of cotton lint from the seed.
Greige	Greige or gray fabrics are woven or knitted fabrics as they leave the loom or the knitting machine, i.e., before any bleaching, dyeing, or finishing treatment.
Hosiery	Hosiery is the group of apparel that includes coverings for the feet and legs.
Knit	Knit is a process to form a fabric by intermeshing the loops of yarn.
Knitwear	Knitwear is a term applied in the generic sense to all knitted outer garments except stockings and socks.
Lint	The long seed coat fibers, which are spinnable.
Micronaire	Unit used to determine fiber fineness.
Neps	Small entangled mass of fibers in lint, measured in terms of neps per gram of lint.

Nylon	A synthetic textile from the polyamide family. Nylon is characterized by its resistance to wear and abrasion, its elasticity, and easy care.
Polyester	Synthetic fiber obtained by the polymerization of petrochemical substances.
Roller Gin	Machine with two rollers, used for ginning of long staple cotton.
Rotor Spinning	A method of open end spinning that uses a rotor to collect an individual fiber into a yarn. The fibers on entering a rapidly rotating rotor are distributed around its circumference and temporarily held there by centrifugal force. The yarn is withdrawn from the rotor wall and, because of the rotation, generates the twist.
Saw Gin	Machine with gin saws (blades with tiny saws) used for ginning.
Seed Cotton	Raw cotton, fibers along with cottonseed also called Phutti.
Spinning	Spinning is the process or the processes used in the production of yarns or filaments.
Spun Yarn	Yarn that consists of staple fibers held together by twist.
Staple Fiber	Staple is fiber of short lengths and can be both natural and man made.
Synthetic Fiber	A man-made fiber produced from a polymer produced by humans from chemical elements or compounds in contrast to fibers made by humans from naturally occurring fiber-forming polymers.
Textile	Fibers, filaments, or yarns, both natural and man made, and the products obtained from them.
Weave	Weave is the pattern of interlacing of warp and weft in a woven fabric.
Weaving	Weaving is a method of crossing the warp and weft threads to produce certain aspect (plain, satin) or to form a design visible on the surface of the cloth. Certain important forms of weaving are plain weave, twill weave, and satin weave.

5. THE IMPACT OF GLOBAL COTTON MARKETS ON RURAL POVERTY IN PAKISTAN

David Orden, Abdul Salam, Reno Dewina, Hina Nazli,
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5.1. Introduction

The incidence of rural poverty in Pakistan increased during the late 1990s after having declined during the 1980s and early 1990s. Household surveys indicate that rural poverty rose from 27.0 percent in 1993 to 34.7 percent in 1999, and further to 39.0 percent in 2002 as reported by the FBS (2003). Although part of this increase is due to changes in the survey design, there is widespread concern that agricultural growth has not translated into rural poverty reduction.

A number of structural factors have been identified as contributing to rural poverty in Pakistan. Health and education spending by the government of Pakistan is lower than in other countries with similar income levels. Partly as a result, educational achievement and health indicators are lower than might be expected. In addition, the gender gap in education and literacy is large, even compared to other countries in South Asia. The distribution of farmland is unequal, with large numbers of households depending on sharecropping and selling labor for their livelihoods. According to the 2001–2002 Pakistan HIES, these two groups include about one fifth of the rural population and have the highest incidence of poverty.

These structural factors help explain the levels of poverty in Pakistan but not the increase in poverty in the late 1990s. One hypothesis is that the increase in rural poverty is the result of an adverse trend in world commodity prices, particularly cotton, a major commercial crop, and other agricultural commodities such as wheat. The world price of Index B cottons, which include Pakistani cotton, declined in U.S. dollars from a peak of \$92.20 per 100 pounds in 1994–1995 to a trough of \$38.95 in 2001–2002, and then partly rebounded to \$51.20 in 2004–2005, as discussed in Section 2. If passed through to domestic prices, a decline in world prices of this magnitude over a period of seven years or more must have a deleterious effect on the incomes of households producing cotton in Pakistan. This would contribute to rising poverty in cotton-producing areas, which are some of the poorest in the country.

Drought, a decline in remittances from the Middle East, overstatement of growth in livestock (and hence agricultural) value-added, and declining real wages—which in part may be due to falling commodity prices—have been suggested as other contributing factors to rising rural poverty in Pakistan (Malik, 2005). The effect of cotton prices on poverty is separate from the effects of fluctuating yields and production due to weather and other factors. Identifying the effects of prices on cotton income and poverty is an empirical issue of importance to policymakers, who need to understand the causes of rising rural poverty levels. In this chapter, we investigate the effects of cotton prices on poverty in rural Pakistan using household data from the 2001–2002 HIES.²⁰

5.2. Household Characteristics and Consumption Expenditures

The HIES for 2001–2002 carried out by the government of Pakistan's FBS consists of an adjusted sample of 16,182 households within seven provinces/regions: Punjab, Sindh, the Northwest Frontier Province, Balochistan, Azad Jammu and Kashmir, the northern areas, and the federally administered tribal areas. For this analysis, following FBS (2003) and Malik (2005), the paper focuses on the four provinces, represented by a sample of 14,522 households. Table 5.1 provides some summary household statistics by

²⁰This chapter is drawn from “The Impacts of Global Cotton and Wheat Markets on Rural Poverty in Pakistan” by David Orden, Abdul Salam, Reno Dewina, Hina Nazli, and Nicholas Minot. This report was prepared by IFPRI for the Asian Development Bank, Islamabad Resident Mission's, Pakistan Poverty Assessment update, March 10, 2006. It has also been published under the report title in the *Pakistan Development Review* 45: Part II (Winter 2006): 601-617.

location and agricultural activities for the national level, the provinces of Punjab and Sindh, and the primary cotton-producing districts of both provinces. The results reported in Table 5.1 and in subsequent tables are nationally representative and based on weighted sample data.

At the national level, 29.4 percent of households are urban and 70.6 percent, rural. Households engaged in farming comprise 40.7 percent of the total sample. Farmers are concentrated in rural areas, where more than half of households engage in some farming activity. A small set of households (1.9 percent of all households nationally) are classified as urban and also engage in some farming activity. These households are 6.5 percent of urban households.

Table 5.1. Distribution of households by location and agricultural activity

Household	National ^a	Province		Primary Cotton-Producing Districts ^b		
		Punjab	Sindh	Punjab ^c	Sindh ^d	
		All Households, %				
Total population	100.0	59.8	23.6	25.9	8.5	
Nonfarmers	59.3	34.4	15.3	11.9	4.3	
Farmers	40.7	25.4	8.3	14.1	4.1	
Urban population	29.4	17.0	9.8	3.7	1.9	
Nonfarmers	27.5	15.9	9.4	3.2	1.6	
Farmers	1.9	1.2	0.5	0.5	0.3	
Rural population	70.6	42.8	13.8	22.2	6.6	
Nonfarmers	31.8	18.5	6.0	8.6	2.8	
Farmers	38.8	24.2	7.8	13.6	3.8	
		Farm Households, %				
Among farmers	100.0	62.4	20.3	34.6	10.2	
Livestock only	23.4	17.4	4.0	9.4	1.8	
Producing crops	76.6	45.0	16.3	25.2	8.4	
Landowners	55.4	35.8	7.6	19.7	3.9	
Sharecroppers	13.9	4.1	8.0	2.6	4.1	
Other land tenures ^e	7.3	5.1	0.7	2.9	0.4	
of which producing:						
Cotton	24.0	17.0	6.8	15.1	6.2	
Landowners	16.6	13.1	3.3	11.4	2.9	
Sharecroppers	5.1	1.9	3.2	1.8	3.0	
Other land tenures ^e	2.3	2.0	0.3	1.9	0.3	
Wheat, but not cotton	42.7	24.5	6.7	8.7	1.7	
Landowners	31.8	19.9	3.1	7.1	0.8	
Sharecroppers	6.9	2.1	3.3	0.8	0.8	
Other land tenures ^e	4.0	2.5	0.3	0.8	0.1	
Neither cotton nor wheat	9.9	3.5	2.8	1.4	0.5	

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Note:^aBased on Punjab, Sindh, the Northwest Frontier Province, and Balochistan.

^bPrimary cotton-producing districts are determined as districts with more than 1 percent of national acreage from 2001–2002 to 2003–2004.

^cIncludes the districts of Bahawalpur, Rahimyar Khan, Vehari, Lodhran, Rajanpur, Khanewal, M. Garh, Bahawalnagar, Multan, Dera Ghazi Khan, Sahiwal, Jhang, Toba Tek Singh, Pakpatan, Faisalabad, and Layyah.

^dIncludes the districts of Ghotki, Sanghar, Khairpur, Nawab Shah, Hyderabad, Mirpurkhas, Nowshero Feroze, and Sukkur.

^eIncludes other types of land arrangement and nonrespondents.

Of all farmers nationally, 23.4 percent produce only livestock and 76.6 percent grow at least one crop. Among farmers, 24.0 percent produce cotton and almost all cotton farmers also produce wheat (not shown separately in the table). Among households growing cotton, 16.6 percent own some or all of their land whereas 5.1 percent are sharecroppers with no land ownership; 2.3 percent have other tenure

arrangements. Another 42.7 percent of farmers nationally produce wheat rather than cotton; only 9.9 percent of all farmers nationally grow only crops other than cotton or wheat.

At the provincial level, Punjab accounts for 59.8 percent of households and Sindh for 23.6 percent. In Punjab, the proportion of the population that is rural is 71.6 percent (from $42.8/59.8 = 0.716$ in Table 4.1), similar to the national average; Sindh has a smaller rural population (58.5 percent of households in Sindh are rural). The proportion of farmers is also similar to the national average in Punjab (42.5 percent, from $25.4/59.8$) but somewhat lower in Sindh (35.2 percent, from $8.3/23.6$). Cotton is produced by a slightly higher proportion of farmers in Punjab and Sindh (27.2 percent (from $17.0/62.4$) and 33.5 percent (from $6.8/20.3$), respectively) than nationally. These two provinces account for almost all the households producing cotton in Pakistan. Among cotton farmers in Punjab, most own at least some land, but in Sindh, land tenure arrangements are more evenly split between landowners and sharecroppers.

Within the provinces, cotton production is concentrated in specific districts. One classification of districts is by agroclimatic zone. The “primary cotton-producing districts” referred to in this paper include those districts with more than 1 percent of national acreage of cotton during 2001–2002 to 2003–2004 (see the notes to Table 5.1 for a list of these districts). Overall, 88.7 percent of households growing cotton in Pakistan fall within the primary cotton-producing districts (from $[15.1 + 6.2]/24.0 = 0.887$). These areas differ from the provincial averages in several ways: first, the percentage of farmers is higher (54.4 percent and 48.2 percent, respectively); second, within the primary cotton-producing districts, 43.6 percent of farmers produce cotton in Punjab (from $15.1/34.6$) and 60.8 percent in Sindh (from $6.2/10.2$). Thus, 23.7 percent of households in the primary cotton-producing districts of Punjab and 29.3 percent in the corresponding districts in Sindh produce cotton.

Table 5.2 reports average per capita consumption expenditure among households on an adult-equivalent basis for the geographic areas and population groups identified in Table 5.1.²¹ In these derivations, the average annual per capita consumption expenditure among households is 13,946 Pakistan Rupees (PRs), with a lower average for Punjab and a higher one for Sindh. The corresponding average annual consumption expenditures per household derived from the 2001–2002 HIES data for the total, urban, and rural populations for Pakistan, Punjab, and Sindh, are close to but slightly below those that can be calculated from the monthly total receipts utilized for consumption expenditures (HIES summary in FBS 2003).²² Nationally and within all regions, urban household expenditure is higher than rural household expenditure (Table 5.2). Urban households have substantially higher per capita expenditures in Sindh than Punjab, but rural households have slightly higher average per capita expenditures in Punjab than Sindh.

²¹ Adult equivalents per household are determined using the weights reported by the Poverty Reduction Strategy Paper secretariat (Government of Pakistan, 2003).

²² Table 5.2 reports average household per capita consumption expenditures, whereas FBS (2003) reports average household total consumption expenditures. Household size has to be taken into account in computing a comparison. The FBS average annual household consumption expenditures are PRs 80,573 nationally, PRs 74,834 for Punjab, and PRs 94,863 for Sindh. This study derives comparable average annual household consumption expenditures from the 2001–2002 HIES data of PRs 78,561, PRs 72,919, and PRs 92,392, respectively. Its estimates of average total consumption expenditures among households are within a few percentage points of the FBS (2003) estimates.

Table 5.2. Average per capita (adult-equivalent) annual consumption expenditures by households at the national, provincial, and primary cotton-producing district levels

Household	National	Province		Primary Cotton-Producing Districts	
		Punjab	Sindh	Punjab	Sindh
		Per Capita Household Consumption Expenditures (PRs)			
Total population	13,946	13,554	16,036	11,176	11,332
Nonfarmers	15,696	14,535	19,197	10,958	12,200
Farmers	11,951	12,498	10,602	11,316	10,436
Urban population	19,338	17,509	23,469	13,633	14,200
Nonfarmers	19,801	17,628	24,109	13,363	14,534
Farmers	15,405	16,606	13,442	14,592	12,693
Rural population	11,703	11,981	10,736	10,767	10,487
Nonfarmers	11,693	11,621	11,218	10,027	10,870
Farmers	11,708	12,195	10,408	11,142	10,228
Among farm households producing					
Cotton	11,567	12,065	10,321	11,852	10,402
Landowners	12,204	12,415	11,400	12,181	11,559
Sharecroppers	9,439	9,837	9,207	9,856	9,280
Other land tenures	11,642	11,840	10,345	11,784	10,345
Wheat but not cotton	12,370	13,473	9,795	11,055	10,733
Landowners	13,071	13,928	10,727	11,162	11,790
Sharecroppers	9,447	10,157	8,779	8,977	9,595
Other land tenures	11,801	12,622	11,744	12,137	12,513
Neither cotton nor wheat (all other farmers)	11,771	11,936	11,534	11,852	10,309
At least some crops	11,797	12,815	11,157	11,427	10,762
Livestock only	11,764	11,818	11,745	10,856	10,217

Source: Based on weighted sample from 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Among rural households, farm and nonfarm per capita expenditure levels are similar nationally, but farmers have higher expenditures than do nonfarmers in Punjab, with the converse occurring in Sindh. Among farmers in Punjab, consumption expenditures are highest among households producing wheat but not cotton; this is, however, not the case in Sindh. Cotton farmers have expenditure levels close to the average among all farmers, but consumption expenditures are lower among sharecroppers than they are among landowners. For urban, rural, farm, and nonfarm population groups, average annual per capita consumption expenditures are generally below the national averages in the primary cotton-producing districts in both provinces.

Table 5.3 provides an additional perspective on the distribution of households within the national population, based on consumption expenditures. Similar to the summary tables in FBS (2003), Table 5.3 shows the percentage of households in selected groups that fall within each quintile of the national distribution of households based on per capita consumption expenditures. Consistent with their average levels of expenditure, wealthier quintiles disproportionately represent urban and nonfarm households, and poorer quintiles disproportionately represented rural nonfarm and farm households. Nationally, 45.7 percent of rural nonfarm households and 48.3 percent of rural farm households fall in the lowest two quintiles (40 percent) of all households, based on their consumption expenditures per adult-equivalent household member.

Table 5.3. Distribution of households by per capita (adult-equivalent) consumption expenditure quintiles at the national level

Household	Per Capita Expenditure Quintile				
	Poorest	2	3	4	Richest
	Households in Quintile, %				
Total Population	20.0	20.0	20.0	20.0	20.0
Nonfarmers	17.8	18.0	19.2	19.8	25.2
Farmers	22.5	22.2	21.0	20.3	14.0
Urban population	10.8	13.3	17.6	22.0	36.3
Nonfarmers	10.3	12.8	17.4	22.3	37.1
Farmers	14.6	17.6	19.4	19.5	29.0
Rural population	23.9	22.8	21.0	19.1	13.2
Nonfarmers	23.1	22.6	21.1	20.3	13.0
Farmers	25.2	23.1	20.9	17.3	13.6
Among households producing					
Cotton	24.2	23.0	20.8	19.9	12.1
Landowners	19.5	21.7	22.3	22.7	13.8
Sharecroppers	38.8	26.7	17.1	13.1	4.3
Other land tenures	25.9	24.3	18.6	14.6	16.6
Wheat but not cotton	17.6	22.4	22.4	22.6	15.0
Landowners	13.9	20.8	22.7	24.8	17.8
Sharecroppers	32.5	31.1	20.3	11.8	4.3
Other land tenures	21.6	19.9	23.3	23.8	11.4
Neither cotton nor wheat (all other farmers)	26.0	21.7	19.9	18.3	14.1
At least some crops	19.4	24.2	22.0	21.2	13.2
Livestock only	27.6	21.1	19.3	17.6	14.4

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Note: Quintiles based on national consumption expenditure distribution of all households.

Among cotton farmers, 47.2 percent of households fall within the lowest two quintiles nationally, whereas 40.0 percent of farmers producing wheat but not cotton are in the lowest two quintiles, matching the national distribution. Among landowner cotton-producing households, 41.2 percent are in the lowest two quintiles. Sharecropper households producing cotton are heavily concentrated in the lowest two quintiles, with 38.8 percent in the lowest quintile and 26.7 percent in the second lowest quintile (65.5 percent in the lowest two quintiles). Landowners producing wheat but not cotton are relatively wealthy compared to the national distribution (only 34.7 percent in the lowest two quintiles), whereas sharecroppers producing wheat but not cotton and farmers producing livestock only are again concentrated in the lowest two quintiles of the national consumption expenditure distribution (63.6 percent and 48.7 percent, respectively).

5.3. Sources of Income of Cotton-Producing Households

The 2001–2002 HIES also provides information on sources and levels of income among households (FBS, 2003). Table 5.4 reports aggregate national calculations of the average levels of urban and rural household and per capita net income calculated from six different sources. Net crop income is assumed to include all commodities including byproducts, less crop production costs (i.e., seeds, fertilizer, pesticides, utilities, taxes, transportation, hired labor, and others), and payments to landlords. Net livestock income is calculated as the value of sales of all types of animals and byproducts, as well as household consumption of meat, less expenditures on livestock production, and purchases. Cash and in-kind wages are also included, and net transfers accounted for by deducting transfer payments from each household's receipts while omitting life insurance and other insurance claims and inheritance from the transfer measure (see the notes to Table 5.4 for additional details).

Table 5.4. Sources of income of urban and rural households at the national level

Source	Households earning income (%)	Average net income over all households (PRs per year)		Share of household income (%)
		Household	Per Capita	
Urban population				
Crops	4	2,199	368	2.4
Livestock	9	1,024	156	1.1
Rental	7	3,299	737	3.5
Nonfarm business	32	26,125	4,101	28.0
Wages	73	52,065	9,635	55.9
Transfers	71	8,458	1,988	9.1
Total		93,170	16,985	100.0
Rural population				
Crops	42	17,218	2,699	30.8
Livestock	55	3,610	620	6.4
Rental	9	2,128	437	3.8
Nonfarm business	18	7,398	1,282	13.2
Wages	53	18,561	3,182	33.2
Transfers	72	7,071	1,398	12.6
Total		55,986	9,618	100.0

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Note: Crop income (Section 10M of surveys) covers all commodities, including byproducts. Crop production expenses (seeds, fertilizer, pesticides, utilities, taxes, transportation, hired labor, and others) and payments to proprietors are excluded to derive net crop income.

Livestock income (Section 10M) includes all types of animals and byproducts and household meat consumption. Purchases of livestock and livestock production expenses (feeds, medicine, labor, and others) are deducted to derive net livestock income.

Rental income (Section 9M, Part A) includes all types (agricultural and nonagricultural land, residential and commercial buildings, and agricultural machinery (Section 10M, Part B)).

Nonfarm business (Section 11M) includes revenue less operating costs.

Cash and in-kind wages (Section 1M and Section 6) are included for each household member.

Cash transfers (Section 8M and Section 6) deduct transfer payments from receipts for each household to derive net transfers. In-kind assistance is also included, but life insurance and inheritance and other insurance claims are omitted.

At the national level, the measure of urban household net income averages PRs 93,170 annually, and the average based on per capita income of urban households is PRs 16,985. Average net income is PRs 55,986 annually among rural households and PRs 9,618 based on the per capita income of rural households. According to the study's estimates, 42 percent of rural households earn crop income and 55 percent earn livestock income. Net crop income accounts for 30.8 percent of national rural household income, whereas net livestock income accounts for 6.4 percent. Wages comprise another substantial part of household income. Of all rural households, 53 percent include one or more wage earners, and wages provide 33.2 percent of total household income. Eighteen percent of rural households earn nonfarm business income and 3.8 percent earn rental income (agricultural and nonagricultural), accounting for 13.2 and 3.8 percent of total rural household incomes, respectively. Finally, 72 percent of rural households receive or make income transfers, accounting for 12.6 percent of total rural income.

For both urban and rural households, estimates of net per capita income from the sources given in Table 5.4 are lower than the estimates derived for per capita consumption expenditures (Table 5.2). The study's estimates of total household net income are also lower than the sum of "disposable income" and "total monthly receipts" per household reported by FBS (2003).²³ However, it is difficult to determine

²³ For example, for the rural population at the national level, FBS (2003) reports an average monthly income (net of taxes) per rural household of PRs 6,016 and other receipts per rural household of PRs 3,363, which yields average monthly household "total receipts" of PRs 9,379 or PRs 112,548 annually. This differs substantially from the study's estimate of net income computed as described in the text.

fully why the study's net income estimates derived from household survey data should differ from the income and receipts reported by FBS (2003). The subsequent analysis uses estimates of the incidence and depth of poverty based on consumption expenditures, for which its results are similar to those of FBS (2003) and which are generally considered more accurately measured than income in household surveys. The effects of a change in cotton price on poverty are evaluated based on the initial consumption expenditures plus the increase in household farm revenue from the cotton production included in the study's household income measure. This analysis of the effects of changes in cotton price will not be sensitive to the different ways other net income sources have been calculated compared to FBS (2003).

Tables 5.5 and 5.6 provide further information on the sources of income of landowner and sharecropper cotton-producing households, shown by geographic area. The average income of landowner cotton-producing households is estimated to exceed the national average among rural households, whereas sharecroppers farm less acreage and report lower incomes. Reported net incomes are higher in Sindh than Punjab. Among landowner cotton farmers nationally, crops account for 78.9 percent of average household net income and wages for 10.0 percent. Distributing crop production expenses in proportion to the acreage of each crop, cotton accounts for 48.9 percent of net crop income or 38.6 percent of household total net income for landowners. For sharecroppers, income from crops accounts for 77.5 percent of total net income at the national level and cotton income for an estimated 57.5 percent of crop income and 44.6 percent of total income. Thus, cotton income is important to the well-being of landowner and sharecropper households.

Table 5.5. Sources of income of landowner cotton-producing households at the national, provincial, and primary cotton-producing district levels

Income Source	National	Province		Primary Cotton-Producing Districts	
		Punjab	Sindh	Punjab	Sindh
Annual Income (PRs)					
Total	77,721	69,672	108,915	67,383	112,575
Percentage					
Crops	78.9	73.5	93.7	75.0	93.1
Livestock	3.0	6.2	(5.5)	5.4	(5.2)
Rental	1.4	1.8	0.3	1.9	0.3
Nonfarm business	5.1	6.5	1.6	5.1	1.8
Wages	10.0	9.8	9.9	10.0	10.3
Transfers	1.7	2.2	0.0	2.6	(0.3)
Among crops	100.0	100.0	100.0	100.0	100.0
Cotton	48.9	44.4	56.9	45.8	57.3
Wheat	29.5	32.6	23.9	32.6	24.0
Sugarcane	8.8	6.1	14.3	5.5	14.1
Rice	1.0	1.3	0.5	1.0	0.4
Maize	0.1	0.2	0.0	0.2	0.0
Pulses	0.3	0.5	0.0	0.4	0.0
Fruits/vegetables	2.1	2.4	1.5	2.3	1.5
Fodder	5.4	7.4	1.5	7.0	1.3
Other	3.9	5.2	1.3	5.2	1.3
Farm size, hectares	4.7	4.2	6.7	4.2	6.9

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Table 5.6. Sources of income of sharecropper cotton-producing households at the national, provincial, and primary cotton-producing district levels

Income Source	National	Province		Primary Cotton-Producing Districts	
		Punjab	Sindh	Punjab	Sindh
Annual Income (PRs)					
Total	47,123	51,642	44,488	52,478	44,627
Percentage					
Crops	77.5	59.1	90.0	58.2	90.4
Livestock	(3.4)	5.0	(9.2)	5.5	(9.4)
Rental	1.1	2.5	0.1	2.5	0.1
Nonfarm business	7.5	15.4	2.1	15.6	2.2
Wages	15.6	13.5	17.0	13.7	16.7
Transfers	1.7	4.4	0.0	4.5	0.0
Among crops	100.0	100.0	100.0	100.0	100.0
Cotton	57.5	46.9	62.2	47.9	62.7
Wheat	26.6	38.4	21.4	38.0	21.4
Sugarcane	7.6	1.4	10.4	1.4	10.7
Rice	1.0	1.3	0.8	1.2	0.2
Maize	0.0	0.1	0.0	0.1	0.0
Pulses	0.1	0.2	0.0	0.2	0.0
Fruits/vegetables	0.1	0.4	0.0	0.4	0.0
Fodder	3.9	6.5	2.8	5.7	2.8
Other	3.1	4.9	2.3	4.9	2.3
Farm size, hectares	3.3	3.6	3.1	3.6	3.1

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Within Punjab, crop income accounts on average for 73.5 percent of total income among landowner households producing cotton, and cotton for 44.4 percent of crop income and 32.6 percent of total income. Sharecroppers in Punjab are somewhat less dependent on crop income (59.1 percent of total income), with higher percentages accruing from nonfarm business (15.4 percent) and wages (13.5 percent). Cotton accounts for 46.9 percent of the crop income, and 27.7 percent of the total income of sharecropper cotton-producing households in Punjab. Crop and cotton income appear to be more important for landowner and sharecropper cotton-producing households in Sindh than in Punjab.

In Sindh, crops account on average for 93.7 percent of the total income of landowner cotton-producing households and 90.0 percent for sharecroppers. The higher proportion of net income reported from crops arises largely because of reported losses on livestock, which offset earnings from other sources.²⁴ Cotton accounts for 56.9 percent of average crop income and 53.3 percent of total income among landowner cotton-producing households in Sindh (and 62.2 percent and 56.0 percent, respectively, for sharecroppers). The averages shown in Tables 5.5 and 5.6 are broadly representative in each province of landowner and sharecropper households in the separate quintiles based on per capita consumption expenditures. An exception is that poorer landowner cotton-producing households are relatively more dependent on cotton income than are the wealthier ones in Sindh.

5.3.1. Effect of Cotton Prices on Wages of Hired Pickers

Another group directly affected by cotton prices is workers hired to pick cotton. In Pakistan, cotton is picked by hand and is a source of employment and supplementary income for farm as well as nonfarm households in rural areas. It engages a substantial number of women and children in the cotton-growing

²⁴ Overall, cotton farmers in Sindh report average feed costs of PRs 17,453 versus gross revenue from livestock of PRs 12,793, resulting in negative net income reported for livestock.

regions during harvest. During peak season, there is generally a shortage of cotton pickers and farmers may transport pickers from neighboring villages.

Cotton picking normally starts in August and can extend to January, depending on crop size and market prices. There are usually from three to five pickings in a season. The female members of farm households supervise pickers, but larger landlords sometimes hire *munshis* (overseers) to manage the cotton-picking operation.

Payment to cotton pickers is generally in kind, so the value of cotton-picker earnings varies directly with the price of cotton. Pickers are paid from 6 to 10 percent of the crop. In the initial and end periods of the cotton season, the rate for picking is higher—it takes more time in these periods to pick the same quantity because there are fewer bolls per plant. During the main season, pickers are paid a 1/16th share of the harvest. The farm household usually estimates payment informally. The harvest or pickers' shares are not usually weighed, although some larger landlords have their farm managers or *munshis* do so. Some farmers also pay their pickers in cash and sometimes, progressive farmers offer higher payments to encourage clean picking of cotton, which brings a market price premium.

Because cotton picking is an important source of employment and supplements the household income of landless, marginal, and small farmers in cotton-growing areas, cotton prices directly affect the value of their earnings through their in-kind wages. Unfortunately, the HIES survey data (FBS, 2003) does not identify specific households earning income from cotton picking or the levels of these earnings. Thus, it is difficult to trace explicitly the effects of higher cotton prices on poverty among cotton pickers. However, there is a direct price effect that results from a share of the harvest going to pickers.

5.4. Direct Effects of Cotton Prices on Household Incomes and Poverty

To measure the linkages between global cotton prices and rural poverty in Pakistan, this study utilizes a simulation analysis following the approach used by Minot and Daniels (2005) to assess the effects of lower cotton prices on rural poverty in Benin. In particular, the direct effects of changes in cotton price on incomes and poverty among cotton-producing households are assessed, assuming no change in production levels. The direct effects on the incomes of and poverty among these households are also assessed, allowing for a supply response by the farmers.

5.4.1. Methodology

Direct effects with fixed supply. The direct effects of changes in cotton price are analyzed based on survey information on the value of cotton sales by households. For cotton farmers who own their land, per capita income derived from a price change can be calculated as

$$\Delta y_i = \frac{1}{H_i} (Q_{ci} \Delta P_c) \quad (1)$$

where Δy_i is the change in per capita income of household i due to a change in the price of cotton; Q_{ci} is the quantity of cotton sold by household i ; ΔP_c is the change in the real price of cotton; and H_i is the number of members in household i . If a household does not grow cotton, then $Q_{ci} = 0$ and the direct effect of cotton prices is zero ($\Delta y_i = 0$), but if $Q_{ci} > 0$, then a price reduction ($\Delta P_c < 0$) implies that income will fall ($\Delta y_i < 0$). Conversely, a price increase implies that income also rises. From equation 1, the change in per capita income can be calculated for each household in the sample to provide a detailed picture of the distributional impact of lower or higher cotton prices. Sharecroppers only retain half the cotton they produce, and equation (1) is modified accordingly. This 'micro-simulation' approach makes it possible to estimate the change in income for any sample group defined by income, farm size, or other variables.

Poverty Measures. The simulated impact of price changes on poverty is evaluated using the Foster-Greer-Thorbecke (1984) measures of poverty, defined as

$$P_{\alpha} = \frac{1}{N} \sum_i \left[\frac{\mu - y_i}{\mu} \right]^{\alpha} \quad (2)$$

where P_{α} is the poverty measure, N the number of households, μ the poverty line, and y_i the income or expenditure of poor household i (the summation occurs only over poor households). Different values of α ($\alpha = 0, 1, \text{ and } 2$) yield different measures of poverty, giving different weights to the degree of poverty and inequality among the poor. When $\alpha = 0$, the poverty measure P_0 is the incidence of poverty, i.e., the proportion of households whose income is below the poverty line. When $\alpha = 1$, the poverty measure P_1 is the poverty-gap measure. The poverty gap is equal to the incidence of poverty multiplied by the average gap between the poverty line and the income of a poor household, expressed as a percentage of the poverty line. Thus, it takes into account the depth of poverty as well as the percentage of households that are poor. If $\alpha = 2$, then the poverty measure P_2 takes into account the degree of inequality among poor households, as well as the depth of poverty and number of poor households. This ‘poverty-gap squared’ is referred to as a measure of the severity of poverty.

Supply response direct effect. To further assess the poverty impacts of changes in cotton price on cotton-producing households, the analysis takes into account the fact that farmers will, at least to some extent, substitute away from cotton and reduce input use when cotton prices fall, and substitute into cotton production and expand input use when cotton prices rise. To the extent that such substitution occurs, the supply-response direct impact on household income of a decline in cotton prices is smaller (in absolute terms) than the direct impact with fixed supply. The supply-response impact of a cotton price increase is larger than its impact with fixed supply. This analysis uses the following equation to describe the supply-response direct impact of the change in cotton price on landowners who grow cotton

$$\Delta y_i = \frac{1}{H_i} \left[(Q_{ci} \Delta P_c) + \left(\frac{1}{2} (\Delta P_c)^2 \varepsilon_c \frac{Q_{ci}}{P_c} \right) \right] \quad (3)$$

where ε_c is the general equilibrium supply elasticity of cotton and P_c the price of cotton (Mushtaq and Dawson, 2000). The second term is positive regardless of whether the price change is positive or negative, implying that the supply-response effect of a price change is more positive (or less negative) than the fixed-supply effect. If production alternatives are limited, the two effects will be similar. The elasticity of supply has to be estimated or assumed based on available studies. Like the impact with fixed supply, the supply-response impact of lower or higher cotton prices on rural income and rural poverty can be disaggregated by different subcategories of household.

5.4.2. Simulated Direct Effects of Cotton Price on Incomes and Poverty

We carried out simulations based on the 2001–2002 HIES to evaluate the direct effects of cotton prices on incomes and poverty in Pakistan. Since the base data refer to a period of low cotton prices, the simulations incorporated a range of increases in the farm-level price of seed cotton (ΔP_c), consistent with recent historical experience. To evaluate whether or not a household was in poverty, the study compared its annual per capita (adult-equivalent) consumption expenditure with a per capita poverty line based on the recognized level for the 2001–2002 HIES of PRs 748/person/month. We assumed additional income resulting from an increase in cotton prices to be utilized to increase household consumption.

Average annual consumption expenditures by cotton-producing households and the effects on their incomes of 10–40 percent increases in cotton price are shown in Tables 5.7 and 5.8 for landowners and sharecroppers, respectively. Table 5.9 aggregates these results for all cotton farmers (landowners, sharecroppers, and other types of land tenure). Separate results are shown for Punjab, Sindh, and the national level. Total household consumption expenditures are higher among landowners than among

sharecroppers, as observed earlier for per capita household consumption expenditures. Total consumption expenditures are higher in Sindh than Punjab despite lower per capita expenditures in Sindh because households are larger.²⁵

In the simulations analysis, every 10 percent increase in the price of cotton raises a landowner's average household income by PRs 4,806 in Punjab and PRs 11,700 in Sindh, assuming fixed levels of production.²⁶ Among sharecroppers, every 10 percent increase in the price of cotton raises average household income by PRs 3,914 in Punjab and PRs 4,894 in Sindh. We assume a modest supply elasticity of 0.3 for supply response simulations (a 10 percent increase in price raises output by 3 percent with additional costs of production also incurred). This leads to slightly higher gains in household income (for example, PRs 4,878 and PRs 11,876 for landowners in Punjab and Sindh, respectively) for every 10 percent increase in cotton price.

Table 5.7. Simulated effects of increased cotton prices on poverty among landowner cotton-producing households at the provincial and national levels

Item	Effect on Cotton-Producing Households					
	Punjab		Sindh		National	
	Fixed Supply	Supply Response	Fixed Supply	Supply Response	Fixed Supply	Supply Response
Base Expenditures (PRs)	79,015		84,835		80,376	
Net Income per 10% Cotton Price Increase (PRs)	4,806	4,878	11,700	11,876	6,181	6,273
Poverty Incidence (P0)	Percent (as Proportion)					
Base	0.32		0.43		0.34	
With Cotton Price Increase of:						
10%	0.28	0.28	0.29	0.29	0.28	0.28
20%	0.25	0.25	0.22	0.21	0.24	0.24
30%	0.23	0.23	0.12	0.11	0.20	0.20
40%	0.21	0.20	0.09	0.08	0.18	0.17
Poverty Gap (P1)						
Base	0.064		0.089		0.068	
With Cotton Price Increase of:						
10%	0.053	0.053	0.052	0.051	0.053	0.052
20%	0.045	0.045	0.031	0.030	0.042	0.041
30%	0.039	0.038	0.020	0.019	0.035	0.034
40%	0.033	0.032	0.014	0.013	0.029	0.028
Poverty Gap Sq. (P2)						
Base	0.019		0.028		0.020	
With Cotton Price Increase of:						
10%	0.015	0.015	0.014	0.014	0.015	0.014
20%	0.012	0.012	0.008	0.008	0.011	0.011
30%	0.010	0.010	0.005	0.005	0.009	0.009
40%	0.009	0.008	0.004	0.003	0.007	0.007

Source: Based on weighted sample from 2001-2002 Household Integrated Economic Survey.

²⁵ The average household size nationally is 7.0. Among cotton farmers, it is 7.8 nationally, 7.3 in Punjab, and 8.9 in Sindh. These estimates are based on the weighted sample data but are not adjusted to an adult-equivalent basis.

²⁶ With production fixed, this represents an increase in gross and net income from cotton, whereas the initial net income from cotton is reported (as a percentage of net crop income) in Tables 5.5 and 5.6.

Table 5.8. Simulated effects of increased cotton prices on poverty among sharecropper cotton-producing households at the provincial and national levels

Item	Effect on Cotton-Producing Households					
	Punjab		Sindh		National	
	Fixed supply	Supply response	Fixed supply	Supply response	Fixed supply	Supply response
Base Expenditures (PRs)	60,861		66,211		64,241	
Net Income per 10% Cotton Price Increase (PRs)	3,914	3,973	4,894	4,967	4,533	4,601
Poverty Incidence (P0)	Percent (as Proportion)					
Base	0.56		0.58		0.57	
With Cotton Price Increase of:						
10%	0.44	0.44	0.53	0.53	0.49	0.49
20%	0.38	0.38	0.45	0.44	0.42	0.42
30%	0.34	0.34	0.34	0.33	0.34	0.33
40%	0.34	0.32	0.29	0.28	0.31	0.29
Poverty Gap (P1)						
Base	0.118		0.144		0.135	
With Cotton Price Increase of:						
10%	0.090	0.089	0.110	0.110	0.103	0.102
20%	0.072	0.071	0.082	0.081	0.078	0.077
30%	0.058	0.057	0.062	0.060	0.061	0.059
40%	0.048	0.046	0.047	0.044	0.047	0.045
Poverty Gap Sq. (P2)						
Base	0.035		0.049		0.044	
With Cotton Price Increase of:						
10%	0.024	0.024	0.033	0.033	0.030	0.030
20%	0.017	0.017	0.023	0.023	0.021	0.021
30%	0.013	0.013	0.016	0.015	0.015	0.014
40%	0.010	0.009	0.011	0.010	0.011	0.010

Source: Based on weighted sample from 2001-2002 Household Integrated Economic Survey.

Table 5.9. Simulated effects of increased cotton prices on poverty among all cotton-producing households at the provincial and national levels

Item	Effect on Cotton-Producing Households					
	Punjab		Sindh		National	
	Fixed supply	Supply response	Fixed supply	Supply response	Fixed supply	Supply response
Base expenditures (PRs)	75,942		75,013		75,848	
Net income per 10% cotton price increase (PRs)	4,857	4,930	8,305	8,430	5,839	5,927
Poverty incidence (P0)	Percent (as proportion)					
Base	0.36		0.50		0.40	
Cotton price increase						
10%	0.31	0.31	0.39	0.39	0.33	0.33
20%	0.27	0.27	0.32	0.31	0.28	0.28
30%	0.24	0.24	0.22	0.21	0.24	0.23
40%	0.21	0.21	0.18	0.17	0.20	0.20

Table 5.9. Continued

	Effect on Cotton-Producing Households					
	Punjab		Sindh		National	
	Fixed supply	Supply response	Fixed supply	Supply response	Fixed supply	Supply response
Poverty gap (P1)			Percent (as proportion)			
Base		0.073		0.113		0.084
Cotton price increase						
10%	0.058	0.058	0.077	0.077	0.063	0.063
20%	0.047	0.046	0.054	0.053	0.049	0.048
30%	0.039	0.038	0.039	0.038	0.039	0.038
40%	0.032	0.031	0.029	0.027	0.031	0.030
Poverty gap squared (P2)						
Base		0.021		0.036		0.025
Cotton price increase						
10%	0.016	0.016	0.023	0.022	0.017	0.017
20%	0.012	0.012	0.015	0.014	0.013	0.013
30%	0.010	0.009	0.010	0.010	0.010	0.009
40%	0.008	0.008	0.007	0.007	0.008	0.007

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Note: Includes cotton-producing households that are landowners, sharecroppers, or subject to other land tenures. Net income per 10 percent cotton price increase exceeds that of landowners or sharecroppers shown in Tables 5.7 and 5.8 for Punjab because of the higher gross cotton income of cotton-producing households in the other land tenures category, which includes 11.8 percent of cotton-producing households in the province.

The effects of increases in cotton price on the level, depth, and severity of poverty among cotton-producing households are shown in the lower part of Tables 5.7, 5.8, and 5.9. Based on the 2001–2002 HIES data, we estimate 32 percent of landowner cotton-producing households in Punjab to have per capita expenditures below the poverty line, with a corresponding 43 percent in Sindh. A 20 percent rise in cotton prices—such as would offset the decline in real domestic prices observed between three-year averages centered on the peak and trough years of 1994–1995 and 2001–2002—is estimated to reduce the rate of poverty among landowner cotton-producing households to 25 percent in Punjab and 22 percent in Sindh. These represent 22 percent and 49 percent reductions in the poverty level among landowner cotton farmers. Cotton price increases also reduce the depth and severity of poverty, as the measures of poverty gap (P1) and poverty gap squared (P2) show.

Among sharecroppers, a 20 percent increase in cotton prices reduces initial poverty rates of 56–58 percent in Punjab and Sindh to 38 percent and 45 percent, respectively. These represent declines in the initial poverty rate of 33 percent in Punjab and 23 percent in Sindh. Again, the depth and severity of poverty also fall. Overall, cotton prices have quite a significant effect on rural poverty among cotton-producing households. When farmers respond to a price increase by expanding cotton production, the estimated reductions in poverty are similar even though the supply response increases their average household incomes somewhat more.

The aggregated results shown in Table 5.9 encompass poverty reductions among all cotton-producing households. For the nation as a whole, 40 percent of cotton-producing households are estimated to have per capita consumption expenditures below the poverty line in 2001–2002, based on the 2001–2002 HIES data (FBS, 2003). A 20 percent increase in cotton prices reduces the poverty rate among cotton-producing households to 28 percent. Using the population estimate of 148 million in 2002, assuming a national average household size of 7.0, and an estimated 9.8 percent of households producing cotton, there are an estimated 828,800 cotton-producing households below the poverty line. With a 20 percent increase in cotton prices, this falls to 580,160 households in poverty. Cotton-producing

households have an average size of 7.8 persons, and thus we estimate a 20 percent increase in cotton prices to reduce poverty in Pakistan by 1.939 million people.

5.4.3. Effects of Farm Household Poverty on Regional Poverty Levels

Although the rate and degree of poverty among households producing cotton is strongly affected by cotton prices, only a subset of farm households are cotton producers. The broader impact on poverty levels of direct reductions in poverty among cotton farmers depends on the area of geographic aggregation, as shown in Tables 5.10 and 5.11.

Within the primary cotton-producing districts of Punjab and Sindh, cotton farmers account for 23.7 percent and 29.3 percent of households, respectively. When cotton prices rise by 20 percent, poverty levels within these geographic regions decrease by 2 percent in Punjab and 6 percent in Sindh because of the direct effect on incomes of cotton-producing households. Cotton farmers account for 11.6 percent and 11.8 percent, respectively, of the population of Punjab and Sindh. At the provincial level, overall poverty falls by only 1–3 percent as a direct effect of a 20 percent increase in cotton prices. At the national level, overall poverty falls by 1 percent and rural poverty by 2 percent since households producing cotton are only 9.8 percent of all households.

Table 5.10. Simulated effects on increased cotton prices on poverty at the primary cotton-producing district, provincial, and national levels

	Effect on Regional Population				
	Primary Cotton-Producing Districts of		Province		National
	Punjab	Sindh	Punjab	Sindh	
Base expenditures (PRs)	62,268	72,939	72,919	92,392	78,561
Poverty incidence (P0)	Percentage (as Proportion)				
Base	0.45	0.43	0.34	0.32	0.33
Cotton price increase					
10%	0.44	0.39	0.33	0.30	0.33
20%	0.43	0.37	0.33	0.29	0.32
30%	0.42	0.34	0.33	0.28	0.32
40%	0.42	0.32	0.32	0.28	0.31
Poverty gap (P1)					
Base	0.108	0.091	0.077	0.067	0.072
	With cotton price increase of:				
10%	0.105	0.080	0.075	0.063	0.070
20%	0.102	0.073	0.074	0.060	0.068
30%	0.100	0.068	0.073	0.058	0.067
40%	0.098	0.066	0.072	0.057	0.067
Poverty gap squared (P2)					
Base	0.037	0.028	0.026	0.021	0.023
Cotton price increase					
10%	0.035	0.024	0.025	0.019	0.022
20%	0.034	0.022	0.025	0.018	0.021
30%	0.034	0.020	0.024	0.017	0.021
40%	0.033	0.019	0.024	0.017	0.021

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Table 5.11. Simulated effects on increased cotton prices on rural poverty at the primary cotton-producing district, provincial, and national levels

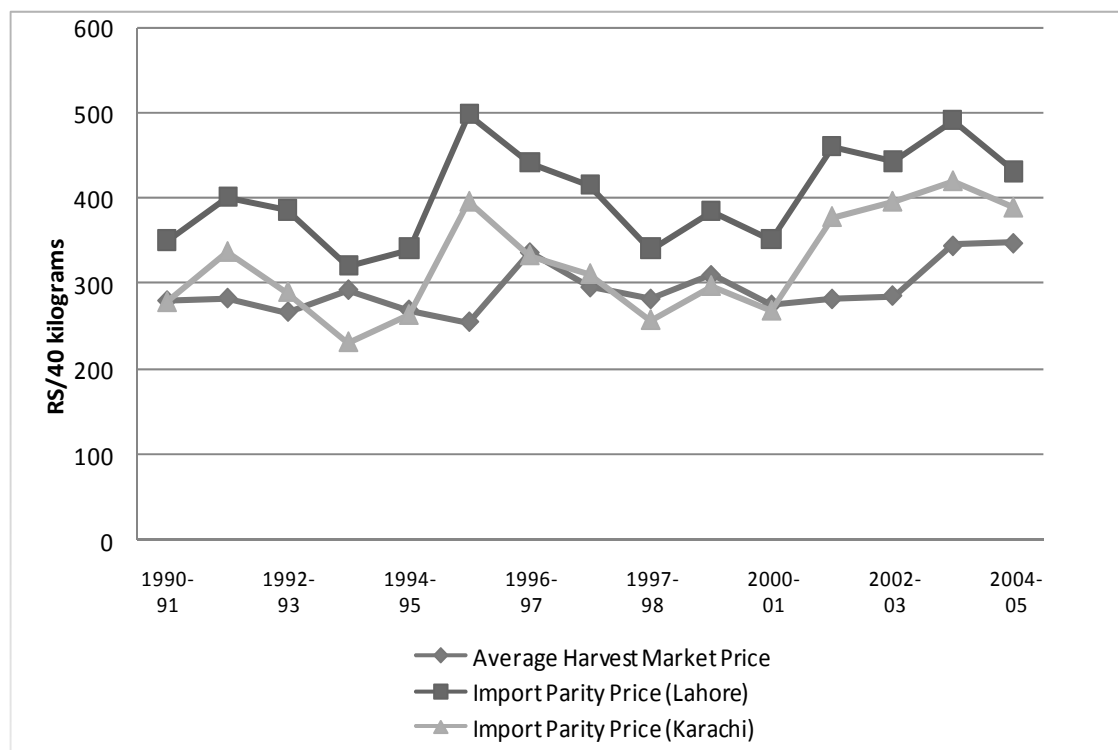
	Effect on Regional Rural Population				
	Primary Cotton-Producing Districts		Province		National
	Punjab	Sindh	Punjab	Sindh	
Base expenditures (PRs)	59,819	68,795	64,674	68,494	67,642
Poverty incidence (P0)	Percentage (as Proportion)				
Base	0.47	0.47	0.39	0.45	0.39
Cotton price increase					
10%	0.45	0.43	0.38	0.43	0.38
20%	0.44	0.40	0.37	0.41	0.37
30%	0.43	0.36	0.37	0.39	0.37
40%	0.42	0.34	0.36	0.39	0.36
Poverty gap (P1)					
Base	0.111	0.103	0.088	0.100	0.085
Cotton price increase					
10%	0.107	0.090	0.086	0.093	0.082
20%	0.104	0.081	0.084	0.088	0.080
30%	0.101	0.075	0.083	0.085	0.079
40%	0.100	0.072	0.082	0.083	0.078
Poverty gap squared (P2)					
Base	0.038	0.033	0.029	0.032	0.027
Cotton price increase					
10%	0.036	0.028	0.028	0.029	0.026
20%	0.035	0.025	0.028	0.027	0.025
30%	0.034	0.023	0.027	0.026	0.025
40%	0.034	0.022	0.027	0.026	0.025

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

5.5. Comparative Results for Wheat

To put the results for cotton into a broader context, we also examined the evolution of wheat prices internationally and domestically from 1990–1991 to 2004–2005 and assessed the direct effects of wheat prices on poverty among wheat-producing households and nationally. World prices of wheat declined during the late 1990s but by less than cotton prices. We find that nominal wheat prices in Pakistan closely track the estimated import parity prices in Karachi through the 1990s but fall below these import parity prices after the large domestic harvest in 2000. In real terms (2000–2001 PRs), the overall level of domestic wheat prices at the farm level is found to have been quite stable in Pakistan, as shown in Figure 5.1, although with some annual variability.

Figure 5.1. Harvest and Lahore and Karachi import parity real prices of wheat



To assess the effects of an increase of wheat prices on poverty, we undertake a simulation analysis for price increases of 5 percent to 20 percent. Results for all households producing wheat are shown in Table 5.12. Although 24.0 percent of farm households in Pakistan produce cotton, most of these households also produce wheat as do another 42.7 percent of farm households that do not grow cotton. Thus, wheat prices affect the income of more farm households as well as the cost of a key food consumption commodity for farm and nonfarm households. The net incomes of farm households producing wheat are less dependent on its production than are the net incomes of households producing cotton on cotton income (as shown for landowner and sharecropper households producing both cotton and wheat in Tables 5.5 and 5.6). Moreover, a change in wheat price affects household income only for that portion of the wheat produced that is sold commercially. For these reasons, the effects of a given increase in wheat prices on incomes of households producing wheat, and the reduction of the initial rates of poverty among these households, are less than the effects of the same percentage increase of cotton prices on those households producing cotton. For example, a 10 percent increase in wheat prices reduces poverty among all wheat-producing households nationally from 34 to 32 percent (Table 5.12), whereas a 10 percent increase in cotton prices reduces poverty among all cotton-producing households nationally from 40 to 33 percent. Because more households produce wheat and taking into account non-wheat-producing households, the net result is that the overall effects of a given percentage change in wheat prices on poverty levels among all farmers, and on poverty measured at the provincial or national level, are similar to the deeper but more concentrated effects of an equal percentage increase in cotton prices (Orden et al., 2006). In interpreting the simulation results for wheat, it must be kept in mind that wheat prices did not decline as much as cotton prices in the late 1990s.

Table 5.12. Simulated effects at the provincial and national levels of increased wheat prices on poverty among all households producing wheat

Item	Effect on Wheat-Producing Households					
	Punjab		Sindh		National	
	Fixed quantities	Quantity response	Fixed quantities	Quantity response	Fixed quantities	Quantity response
Base expenditures (PRs)	78,455		75,277		79,570	
Net income per 10% wheat price increase (PRs)	2,211	2,260	2,520	2,577	2,007	2,053
Poverty incidence (P0)	Percentage (as Proportion)					
Base	0.31		0.50		0.34	
Wheat price increase						
5%	0.30	0.30	0.48	0.48	0.33	0.33
10%	0.29	0.29	0.46	0.46	0.32	0.32
15%	0.28	0.28	0.44	0.44	0.31	0.31
20%	0.28	0.27	0.43	0.42	0.30	0.30
Poverty gap (P1)						
Base	0.062		0.111		0.069	
Wheat price increase						
5%	0.059	0.059	0.106	0.106	0.066	0.066
10%	0.057	0.057	0.101	0.100	0.064	0.063
15%	0.055	0.054	0.096	0.096	0.061	0.061
20%	0.052	0.052	0.092	0.091	0.059	0.059
Poverty gap squared (P2)						
Base	0.018		0.036		0.020	
Wheat price increase						
5%	0.017	0.017	0.033	0.033	0.019	0.019
10%	0.016	0.016	0.031	0.031	0.018	0.018
15%	0.015	0.015	0.030	0.029	0.017	0.017
20%	0.015	0.015	0.028	0.027	0.017	0.017

Source: Based on weighted sample from the 2001–2002 *Household Integrated Economic Survey* (FBS, 2003).

Note: Quantity response includes supply and demand responses to higher prices.

5.6. Conclusions

In this section, we evaluate the importance of cotton production and prices to the incomes of households based on the 2001–2002 HIES. We distinguished between landowners and sharecroppers and report results separately for Punjab and Sindh as well as for the primary cotton-producing districts within each province. Cotton income accounts on average for 32.6 percent of the total income of landowner households producing cotton in Punjab. Sharecroppers in Punjab are slightly less dependent on their cotton income. Cotton income is more important to landowner and sharecropper households producing cotton in Sindh based on the 2001–2002 HIES. Cotton accounts for an average of 53.3 percent of total income of landowner cotton-producing households in Sindh and 56.0 percent for sharecroppers.

Among all cotton-producing households, 47.2 percent are in the lowest two quintiles of the distribution of households within the national population based on per capita consumption expenditures. Among landowner households producing cotton, 41.2 percent are in the lowest two quintiles. Sharecropper households producing cotton are more heavily concentrated in the lower end of the national distribution, with 65.5 percent in the lowest two quintiles.

A simulated increase of low cotton prices in 2001–2002 approaching the higher levels of earlier years moves a substantial number of cotton farmers out of poverty. The study estimates that an increase of real cotton prices by 20 percent reduces the poverty rates among landowner cotton households in Punjab

and Sindh from initial levels of 32 percent and 43 percent, respectively, to 25 percent and 22 percent, respectively. Among sharecropper households producing cotton, a 20 percent increase in cotton prices lowers rates of poverty from 56–58 percent in Punjab and Sindh to 38 percent and 45 percent, respectively. At the national level, a 20 percent increase in cotton prices causes poverty among all cotton-producing households to fall from 40 percent to 28 percent. We estimate that this reduces poverty in Pakistan by 1.939 million people.

To place these results for cotton in a broader context, we also briefly examine the effects of changes in wheat prices on rural poverty in Pakistan. Although, 24.0 percent of farm households in Pakistan produce cotton, most of these households also produce wheat as do another 42.7 percent of farm households that do not grow cotton. Thus, wheat prices affect the income of more farm households as well as the cost of a key food consumption commodity for farm and nonfarm households. The net incomes of farm households producing wheat are less dependent on its production than are the net incomes of households producing cotton on cotton income. Moreover, a change in wheat price affects household income only for that portion of the wheat produced that is sold commercially. For these reasons, the effects of a given increase in wheat prices on incomes of households producing wheat and the reduction of the initial rates of poverty among these households is less than the effects of the same percentage increase of cotton prices on those households producing cotton. Moreover, in interpreting the simulation results for wheat, it must be kept in mind that wheat prices did not decline as much as cotton prices in the late 1990s.

The analysis presented has several implications. Focusing on cotton, maintaining competitiveness of production is vital to the incomes of cotton producers, many of whom are in poverty. The direct effect of lower cotton prices in Pakistan resulting from the decline in world prices in the second half of the 1990s contributed to the rising levels of poverty among cotton-producing households. This is clearly not the only factor affecting the increase in rural poverty that has been reported: the study estimates that an increase of cotton prices by 20 percent from its relatively low level in 2001–2002 would reduce rural poverty by as much as 6 percent in the cotton-producing districts of Sindh and by 2 percent nationally, compared to a reported overall increase in rural poverty nationally of 12 percent from 1993 to 2002. But cotton prices are clearly an important exogenous factor to be taken into account in designing antipoverty strategies and are of substantial importance for the cotton-producing districts, which are some of the poorest in the country.

Finally, it is quite important to recognize that the direct effects of cotton prices on rural poverty that are assessed in this study are only a partial measure of the effects that changes in cotton prices could have on the Pakistan economy. Higher cotton prices raise the cost of a key input into the textile and apparel sectors, which provide a large proportion of Pakistani industrial employment and merchandise exports. These and related effects need to be evaluated in a more general model. Thus, there remains a great deal of analysis to be undertaken to fully assess the effects of world cotton prices on Pakistan's economy. This study provides one important component by evaluating at a disaggregated household level the effects of changes in cotton prices on poverty among farmers.

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