

# COTTON: MARKET SETTING, TRADE POLICIES, AND ISSUES

*John Baffes*

Cotton—by far the most common natural fiber of the 19th and 20th centuries—has been used as a raw material for clothing for at least 5,000 years. Its use expanded significantly after 1793, when the invention of the cotton gin introduced mechanical separation of lint from seed. The industrial revolution, which reduced the cost of producing textiles, accelerated cotton's progress.<sup>1</sup>

Cotton's most important competitors are natural and synthetic man-made fibers such as rayon and polyester.<sup>2</sup> Although large-scale commercial production of man-made fibers did not begin until after World War II, experimentation was taking place as early as the late 1800s. In 1925, rayon, a natural man-made fiber produced from cellulose, accounted for 1.6 percent of the world's total fiber consumption. Twenty years later, this share had increased to 11.8 percent. The share of all man-made fibers in total fiber consumption reached 22 percent in 1960 and now stands at about 57 percent.

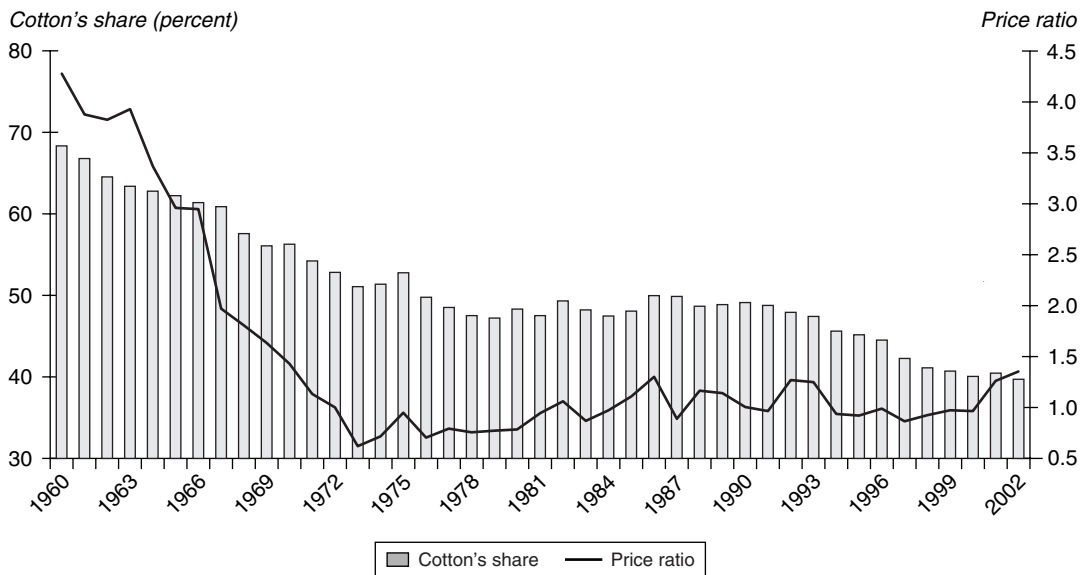
As production of man-made fibers expanded, cotton's share fell (figure 14.1). Between 1960 and 2002, man-made fiber consumption grew at an annual rate of 4.7 percent, compared to just 1.8 percent for cotton.

Synthetic (noncellulose) man-made fibers such as polyester and nylon have traded at prices compa-

table to cotton's since the early 1970s. Between 1960 and 1972, the polyester price indicator declined from \$12 to \$2.50 per kilogram, mainly a reflection of the technological improvements (and consequent cost reductions) that took place in the chemical fiber industry. After reaching parity with cotton prices in 1972, the ratio of polyester to cotton prices has increased at an average rate of 1 percent per year, implying that while cotton and polyester are priced at similar levels, polyester has made small pricing gains (see figure 14.1).

## **The Global Cotton Balance**

Cotton is produced in many countries, but the Northern Hemisphere accounts for 90 percent of global output. More than two-thirds of the world's cotton is produced by developing countries. Between 1960 and 2001, global cotton output doubled—from 10.2 million to 20 million tons. Most of this growth came from China and India, which tripled and doubled their production, respectively, during this 40 year period. Other countries that significantly increased their share of cotton production were Turkey, Greece, and Pakistan. Some new entrants also contributed. Australia, which produced only 2,000 tons of cotton

**FIGURE 14.1 Cotton's Share in Total Fiber Consumption and Polyester to Cotton Price Ratio, 1960–2002**

Source: International Rayon and Synthetic Fibers Committee.

in 1960, averaged 650,000 tons a year during the late 1990s. Francophone Africa, which produced less than 100,000 tons in the 1960s, now produces almost 1 million tons. The two dominant producers during the 1960s, the United States and the Central Asian republics of the Soviet Union, have maintained their output levels at about 3.5 million and 1.5 million tons, respectively, thereby halving their shares. Several Central American countries that used to produce almost 250,000 tons of cotton annually now produce almost none. The share of East African cotton producers, too, has declined considerably during this period.

The two largest cotton producers, China and the United States, each account for approximately 20 percent of world output, followed by India (12 percent), Pakistan (8 percent), and Uzbekistan (5 percent). Other significant cotton producers are the countries of Francophone Africa, Turkey, Brazil, Australia, and Greece, which account for a combined 18 percent of global output.

The consumption pattern of cotton is primarily determined by the size of the textile industries of the dominant cotton consumers. China, the leading textile producer, absorbed more than a quarter of global cotton output during the late 1990s. Other major textile producers (and hence major cotton consumers) are India, the United States, and Turkey, which, together with China, account for

three-quarters of global cotton consumption. Several East Asian countries have emerged recently as important cotton consumers. For example, Indonesia, Thailand, the Republic of Korea, and Taiwan (China) consumed only 130,000 tons in 1960 (1.2 percent of global consumption), but 1.5 million tons in 2002 (7.2 percent of global consumption).

Growth in the demand for cotton has been slow. Between 1960 and 2000, cotton demand grew at the same rate as population (1.8 percent a year), implying that per capita cotton consumption has remained stagnant.

Stocks, which historically have fluctuated between 20 and 50 percent of global output, have affected the cotton market considerably, especially in the area of price variability. The stockholding policies of the United States and China, the two major holders of cotton stocks, have affected the level and volatility of prices. Two major cotton destocking episodes are associated with periods of considerable price variability: the 1985 shift in U.S. policy from stockholding to price support and the 1999 reforms in China.

One-third of cotton production is traded internationally. The four dominant exporters—United States, Uzbekistan, Francophone Africa, and Australia—account for more than two-thirds of the world's exports. Four major producers, China,

India, Pakistan, and Turkey do not export cotton and occasionally import to supply their textile industries. Imports of cotton are more uniformly distributed than exports.

During the 2000–01 season, the eight largest importers (Indonesia, India, Mexico, Thailand, Turkey, Russia, Italy, Korea) accounted for more than one-half of world cotton imports. Apart from Russia (which before 1990 was considered a major producer but not an importer because Central Asian cotton production was considered internal trade), most of the remaining cotton importers are new in the sense that they have been importing cotton to supply newly developed textile industries. For example, four East Asian textile producers (Indonesia, Thailand, Taiwan, and Korea) accounted for less than 3 percent of world cotton imports in 1960, compared to 22 percent in 2002.

The International Cotton Advisory Committee (ICAC) collects data comparing costs of production among cotton producers. Its most recent 2001 survey, based on a questionnaire of 28 cotton-producing countries, suggests that West Africa (especially Benin, Mali, and Burkina Faso), Uganda, and Tanzania are among the lowest-cost cotton producers. High-cost producers are the United States, Israel, and Syria. The two European cotton producers, Greece and Spain, are probably the world's highest-cost cotton producers, although they did not participate in the survey. Calculating and comparing the costs of producing cotton in various countries is, admittedly, a difficult task, involving assumptions about the cost of land and capital as well as various hidden subsidies and distortions. The ICAC (2001) warns that its data must be used carefully: "Differences in production practices, variations in the input supply among countries, and direct and indirect technical and financial support to farmers in the form of free seed, technical advice, etc., make comparisons difficult among countries."

Population growth for the current decade is projected at 1.2 percent a year. In the absence of policy reforms by major players, ICAC (2003a and 2003b) projects that annual consumption growth during the decade will be about 1.8 percent, implying that by 2010 world cotton consumption will be 23.6 million tons. That may be optimistic, however, considering that for the last 15 years cotton consumption grew at an annual rate of just 0.7 percent.

## Price Trends and Variability

Real cotton prices over the last two centuries have followed a declining pattern showing temporary spikes and troughs. The reasons for the long-term decline are similar to those behind the price declines in most primary commodities—reduction in the costs of production due to technological improvements, slow demand growth, and strong competition from substitutes (in this case, chemical fibers). The declining pattern of cotton prices has not been smooth, and it appears that a structural break took place in the mid-1980s. Between 1960 and 1984 real cotton prices averaged \$2.62 per kilogram. Following a sharp decline in 1984 (from \$2.45 per kilogram in 1984 to \$1.83 in 1985 and \$1.27 in 1986), they have been fluctuating around \$1.49 per kilogram. Between 1985 and 2002, prices declined 0.9 percent a year (as opposed to just 0.2 percent a year during 1960–84).

Reductions in the costs of production stem primarily from yield increases—from 300 kilograms per hectare in the early 1960s to 600 kilograms per hectare in the late 1990s. The phenomenal yield growth is attributable to the introduction of improved cotton varieties, expansion of irrigation, use of chemicals and fertilizers, and mechanical harvesting. To these improvements one should add developments in genetically modified seed technology and precision farming during the late-1990s, which are expected to further reduce the costs of production. Innovations in transportation and information technology have lowered costs of transporting cotton and reduced the need to hold large inventories. Substantial technological improvements in the textile sectors have made it possible to obtain high-quality fabric from lower-quality cotton, a trend that holds for many products whose main input is a primary commodity.

The prime movers behind the 1984–85 decline in cotton prices were the structural shift in the support policy of the United States and the shift in China's trade policy (MacDonald 1997). During the 1950s the U.S. Commodity Credit Corporation bought and sold most American cotton. For example, between 1962 and 1966, it accounted for almost two-thirds of cotton stocks. Although its role was reduced after 1970, the United States still accounted for 35 percent of world cotton stocks (exclusive of Chinese stocks). Following enactment of the 1985

Farm Bill, support prices for cotton (that is, “loan rates,” the equivalent of a floor price) were substantially reduced, and most of the U.S. stocks were released to the market, depressing the world prices. 1985 also marked the beginnings of large exports by China, which for the previous 20 years had been a net importer. In fact between 1980 and 1985, China went from the world’s largest importer to the world’s largest exporter.

Visual inspection of the 1984–85 price decline suggests a structural break in the series, something also supported by statistical tests. However, it may be argued that if the policy shift in the United States, which caused massive destocking, had been the main reason behind the price decline, a new stock equilibrium level would have brought a price increase, making the 1984–85 decline temporary. In reality, the U.S. policy shift accelerated a price decline that would have taken place even without it. Real cotton prices did rise somewhat after the shift but never reached pre-1984 levels.

While falling, cotton prices have been volatile. Admittedly, measuring volatility is a difficult (and often tricky) task precisely because prices have shown a long-term, nonlinear decline, making it difficult to isolate a meaningful average around which variability can be defined. Defining volatility

as variability from one year to another shows that during 1985–2002 volatility was 2.5 times higher than in 1960–72 but only half of the level in 1973–84. Note that 1973 reflects the commodity price boom, while 1985 coincides with the U.S. change in cotton policy and the subsequent disposal of large cotton stocks. In summary, cotton prices were very stable before 1974, highly volatile until 1985, and then less volatile, but not as stable as before 1974.

### Cotton and the Developing Countries

Although cotton trade is insignificant on a global scale—accounting for just 0.12 percent of total merchandise trade—it is an important cash crop for several developing countries at both the farm and national levels. Cotton accounted for between 30 and 44 percent for total merchandise exports in five West African countries (Burkina Faso, Benin, Chad, Mali, Togo) during 1998–99 (table 14.1). The corresponding figures for Uzbekistan, Tajikistan, and Turkmenistan are 32, 15, and 12 percent. Cotton’s contribution to the gross domestic product (GDP) of these countries has been substantial, ranging between 3.6 percent

**TABLE 14.1 Cotton’s Importance to Developing and Transition Economies, 1989–99 Average**

Country <sup>a</sup>	Cotton Exports			Merchandise Exports (millions of dollars)	Per Capita GDP <sup>b</sup>
	Millions of Dollars	Percent of Merchandise Exports	Percent of GDP		
Burkina Faso	127	43.9	5.1	289	249
Benin	164	39.1	7.1	419	398
Uzbekistan	1,038	32.2	6.5	3,227	467
Chad	76	32.2	4.7	236	224
Mali	180	29.5	6.7	611	285
Togo	67	21.3	4.7	315	341
Tajikistan	97	15.1	8.2	643	352
Turkmenistan	110	12.3	3.6	891	1,126
Tanzania	44	7.6	0.5	576	185
Syrian Arab Rep.	214	6.7	1.4	3,177	858
Sudan	41	6.0	0.4	688	290

a. Countries ranked by decreasing order of cotton exports in merchandise exports; b. Constant 1995 U.S. dollars.

Source: FAOSTAT, and World Bank, World Development Indicators, various years.

(Turkmenistan) and 8.2 percent (Tajikistan). With the exception of Turkmenistan and Syria, the per capita annual GDP in these countries is well below \$500. In most (especially in Africa), cotton is typically a smallholder crop and the main cash crop. It is grown in rain-fed land with minimal use of purchased inputs such as chemicals and fertilizers.

According to FAO (Food and Agriculture Organization) estimates, as many as 100 million rural households may have been involved in cotton production during 2001. In China, India, and Pakistan about 45, 10, and 7 million rural households, respectively, were engaged in cotton production. The total number of rural households depending on cotton in major African producing countries, including Nigeria, Benin, Togo, Mali, and Zimbabwe, was 6 million.

The high dependence on cotton in these countries has important ramifications for poverty, especially when prices change suddenly. In a study of Benin, Minot and Daniels (2002) estimated that a 40 percent reduction in farm-gate cotton prices—equivalent to the price decline that occurred between December 2000 and May 2002—implied a 7 percent reduction in rural per capita income in the short run and a 5–6 percent reduction in the long run. They also estimated that the incidence of poverty among cotton growers will rise in the short run from 37 percent to 59 percent, while the average incidence of rural poverty (among cotton growers and other farmers) will increase from 40 percent to 48 percent.

In terms of policy interventions, the cotton sector in developing countries has been traditionally taxed either explicitly through export taxes or implicitly through price-fixing arrangements or exchange-rate misalignments. The pattern, however, changed somewhat during the 1990s, as a number of cotton producers undertook policy reforms. However, several African and all Central Asian cotton producers still tax their cotton sectors.

### **Nonconventional Cotton Production**

Recent trends in growing cotton focus on cost reductions through less intensive use of inputs, especially chemicals. These include the use of genetically modified seed technology and organic methods of production. Genetically modified

cotton (sometimes referred to as  $B_t$  cotton) has not faced the degree of opposition faced by genetically modified food crops, allowing more rapid adoption. Organic cotton has been embraced enthusiastically by environmental activists but not by consumers. Hence, while there is plenty of room for expanding genetically modified cotton, the scope for expanding organic cotton appears to be limited.

Genetically modified cotton, a result of technological developments of the 1990s, has the potential of reducing the cost of production and hence increasing profitability of the early adopters of this technology. Like other genetically modified products, it provides insurance against pests, insects, and weeds. Growers pay a premium for the resistant seed, as they would when buying insurance.

Genetically modified cotton was first grown in the United States in 1996. Among the cotton-producing countries that have introduced it since then are China, India, and Mexico in the Northern Hemisphere and Argentina, Australia, and South Africa in the Southern. Other countries are in the process of approval or at the trial stage, including Brazil, Indonesia, Israel, Pakistan, and Turkey. Major producers that had not used or approved genetically modified cotton as of 2003 were the European Union, Central Asia, and Francophone Africa (except Burkina Faso, which is conducting trials).

It is estimated that about 22 percent of the world's cotton plantings are now in genetically modified varieties, up from 2 percent in 1996–97. The largest user of such cotton is the United States, which during the 2003–04 season is estimated to have sown 70 percent of its cotton area with genetically modified varieties. In Australia about 44 percent of cotton area was sown to such varieties in 2002–03, up from 40 percent two years earlier. In China, which adopted the new technology at an experimental stage in 1996, more than 20 million hectares were planted with genetically modified varieties in 2002, corresponding to more than 20 percent of cotton acreage. In addition to the imported genetically modified varieties, China has developed 11 of its own varieties. According to Pray and others (2001), the major share of the benefits from growing  $B_t$  cotton in China went to farmers (most of whom are smallholders). In contrast, most of the benefits associated with genetically modified products in the other cotton-producing countries

go to biotech and seed companies. They also found that the increased use of genetically modified cotton in China was associated with considerable positive health effects—notably fewer hospitalizations from pesticide poisoning. Farmers who did not use  $B_t$  cotton had to spray 12 times on average, whereas farmers who used  $B_t$  cotton had to spray only 3–4 times. If the conversion to genetically modified cotton varieties continues at rates experienced during the last few years, as much as half of the world's cotton (from 40 percent of total cotton acreage) will be of genetically modified origin within five years.

The second trend, organic cotton, may be a small market niche to be exploited by developing countries. Many developing countries can be classified as “organic” cotton producers without altering their current production practices because of their low reliance on chemicals and fertilizers. The potential for organic cotton appears to be limited, however. Organic cotton initiatives have taken place in many countries, including in Africa, but the scale is still insignificant compared to global production of conventional cotton. Myers and Stolton (1999) reported that in 1997, about 8,150 tons of certified organic cotton fiber was produced worldwide—2,600 tons was produced in the United States, 1,175 in India, 1,800 in Turkey, 1,570 in Africa, and 845 in Latin America.

Significant expansion of organic cotton faces difficulties on both the supply and demand sides. On the supply side, the certification process (especially in African cotton-producing countries where the majority of growers are smallholders) is costly to implement and monitor. On the consumption side, demand for organic cotton is not as strong as it is for other commodities such as coffee and tea. There are three reasons for this. First, there is a “distance” in the eyes of the consumer between the primary product (cotton) and the final product (cloth). Second, consumers of clothing (as opposed to consumers of, say, beverages) must pay attention to a host of factors before they make their purchasing decision. The decision involves brand, color, style, size, type of cotton (typically identified by its country of origin), content (for example, 80 percent cotton, 20 percent polyester), and care instructions. Adding to that already congested list information on whether the cotton is of organic origin is rather difficult. Note that this decision-making

process compares unfavorably with much simpler labeling for, say, coffee or tea where something like “Organically grown from Costa Rica” or “Organic of Kenyan origin” is likely to suffice. Third, organic products are typically associated with health-related benefits that do not apply to nonfood products such as cotton.

### Distortions in the Cotton Market

Cotton has been subject to various marketing and trade interventions. Townsend and Guitchouts (1994) estimated that in the early 1990s, more than two-thirds of cotton was produced in countries that had some type of government intervention, including taxation and subsidization policies. The ICAC (2002 and 2003), which has been monitoring the level of assistance to cotton production by major producers since 1997–98, found that eight countries provided direct support to cotton production—Brazil, China, Arab Republic of Egypt, Greece, Mexico, Spain, Turkey, and the United States (table 14.2). For 2001–02, direct government assistance to U.S. cotton producers reached \$3.9 billion; China's support totaled \$1.2 billion; and the European Union's was almost \$1 billion. Producers in Brazil, Egypt, Mexico, and Turkey received a combined total of \$150 million in support. India also supported its cotton sector in 2001–02 with an estimated \$0.5 billion.

In addition to domestic support, some border restrictions apply, mainly in the form of import tariffs. Most countries that impose import quotas are cotton exporters, some with large textiles sectors. Import tariffs rates for 2003 were: Argentina (7.5 percent); Brazil (7.5 to 10 percent); China (3 percent within quota, 90 percent outside quota<sup>3</sup>); Egypt (5 percent); India (10 percent); United States (4.4 cents per kilogram within quota and 31.4 cents per kilogram outside quota<sup>4</sup>); Uzbekistan (10 percent); and Zimbabwe (15 percent duty plus 5 percent import tax).

The remainder of this section analyzes the structure and degree of interventions in the United States, European Union, and China. It also looks at Uzbekistan, a country that taxes its cotton sector.

#### United States

The main channels of support in the United States are decoupled payments (formerly known as

**TABLE 14.2 Direct Government Assistance to Cotton Producers, 1997–98 to 2002–03**  
(US\$ millions)

Country	1997–98	1998–99	1999–2000	2000–2001	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	—	220	199	106	59	57
Brazil	29	52	44	44	10	—
Mexico	13	15	28	23	18	7
Egypt, Arab Rep.	290	—	20	14	23	33

— Not available. Data for 2001–02 are preliminary.

Source: ICAC 2002 and 2003, U.S. Department of Agriculture, and European Union.

**TABLE 14.3 Government Assistance to U.S. Cotton Producers, 1995–96 to 2002–03**  
(US\$ millions)

Policy Instrument	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02	2002–03
Coupled payments	3	0	28	535	1,613	563	2,507	248
PFC/DP	0	599	597	637	614	575	474	914
Emergency/CCP	0	0	0	316	613	613	524	1,264
Insurance	180	157	148	151	170	162	236	194
Step-2	34	3	390	308	422	236	196	—
Total	217	759	1,163	1,946	3,432	2,148	3,964	2,620

— Not available.

Note: PFC denotes production flexibility contracts, DP denotes direct payments, CCP denotes countercyclical payments.

Source: U.S. Department of Agriculture (assistance); International Cotton Advisory Committee (production); and author's calculations.

production flexibility contracts), loan deficiency payments (through the loan-rate mechanism), insurance, subsidies to domestic mills (the so-called Step-2 mechanism, also referred to as export subsidy), and emergency payments (introduced in 1998 to compensate for the loss of income caused by low commodity prices but made “permanent” under the 2002 Farm Bill) (table 14.3). Direct payments, predetermined annual payments based on historically enrolled areas of cotton, were introduced with the 1996 Farm Bill to compensate farmers for “losses” stemming from elimination of earlier loan deficiency payments. Market price payments are designed to compensate cotton growers for the difference between the world price and the loan rate (the target price) when the latter exceeds the

former. Export subsidies, or Step-2 market payments, are made to eligible cotton exporters and domestic end users of cotton when domestic U.S. prices exceed c.i.f. (cost, insurance, and freight) prices in northern Europe by a certain level and the world price is within a certain level of the base loan rate. The objective of the Step-2 payment is to bridge the gap between higher U.S. domestic prices and world prices so that U.S. exporters and textile mills maintain their competitiveness.

In 2002 the U.S. Congress passed a farm bill that is expected to be in place for the next six years. The 2002 Farm Bill retained the earlier support through various loans, flexibility contracts, and insurance, as well as the Step-2 payment, while legitimizing emergency assistance under the term “countercyclical payments.” If cotton prices remain at their

2001–02 levels, then U.S. support to its cotton sector is expected to be in the order of \$3.5 billion to \$4.0 billion for the next six years, implying the U.S. cotton producers will be receiving close to twice the world market price.

### *European Union*

In the 1960s there were three cotton producers in Europe. Greece and Spain produced an average of 85,000 tons each; Bulgaria produced 25,000 tons. Throughout the 1970s Bulgaria's output declined, while that of Greece and Spain stayed at the levels seen during the 1960s. Cotton production by the three countries taken together declined by 0.4 percent a year between 1960 and 1982. With the European Union's expansion and the subsequent accession of Greece and Spain, cotton production grew by an annual average of 7.3 percent during the 1990s, averaging 325,000 and 78,000 tons in Greece and Spain, respectively.

Under the EU Common Agricultural Policy (CAP), support is given to cotton growers based on the difference between the market price and a guide (support) price. Advance payments are made to ginners based on estimates of seed cotton production. They pass the subsidy on to growers by paying higher prices. The policy also influences the quantity of cotton produced by setting a maximum guaranteed quantity of seed cotton for which assistance is provided—782,000 tons of seed cotton for Greece, and 249,000 for Spain, approximately equivalent to 255,000 and 82,000 tons of cotton lint.

The European Union reformed its cotton program in 1999 (European Commission 2000). While the guide price level and the maximum guaranteed quantity of seed cotton for which assistance is provided have been maintained, "penalties" (that is, reductions in subsidy) for excess production over the maximum guaranteed quantity increased. Under the reformed policy, for each 1 percent of excess production, the level of subsidy is lowered by 0.6 percent of the guide price as opposed to 0.5 percent prior to 1999. As production increases, the penalty becomes stiffer, effectively, putting an upper limit on the budgetary outlays to the cotton sector. It is important to note that this quantitative restriction (the so-called maximum quantity guaranteed) applies at the aggregate (that is, country)

level, implying that when this restriction is converted to individual basis, it creates not only administrative complexities but also leads to misallocation of resources (see chapter 5 on decoupling for more on this issue). Karagiannis and Pantzios (2002) found that the current system failed as a surplus containment mechanism and also resulted in farm income losses.

Between 1995–96 and 1999–2000 the budgetary expenditure on cotton aid ranged between €740 million and €903 million, implying that, on average, EU cotton producers received more than twice the world price of cotton. Note that even in periods of high prices, EU cotton producers would receive support since the amount allocated to the cotton sector had to be disbursed. In addition to output subsidies, EU cotton producers receive subsidies on inputs such as credit for machinery purchase, insurance, and publicly financed irrigation. On September 23, 2003, the EU Commission proposed to reform its cotton, sugar, and tobacco sectors (European Commission 2003). Under the cotton reform proposal, EU support to the cotton sector will consist of the following parts: a single farm payment scheme; a production aid scheme, granted as an area payment; and development measures.

### *China*

China is currently the largest producer, consumer, and stockholder of cotton. China's cotton sector became fully government-controlled in 1953 after the introduction of the first Five-Year Plan (Zhong and Fang 2003). The central planning policies adopted then were similar to those of the Soviet Union and remained in place for the next 35 years. The central government set production targets and procurement quotas. This monopoly was easily exercised because all ginning facilities were owned by the cooperatives. A step to boost cotton production was taken in 1978 by increasing the price of cotton as well as supplying more fertilizer. A second boost came in 1980 with the partial abolition of the communal production system under the Household Responsibility System, which gave land use rights to individual farmers.

Evidence suggests that the government of China protects its cotton sector through support prices, import tariffs, export subsidies, and public stockholding. The government sets a reference price for



cotton, typically above world prices. China also maintains tariffs on imports that bridge the gap between domestic and world prices. Following its WTO (World Trade Organization) accession arrangements the tariffs will be reduced to 15 percent, but at the same time a tariff-related quota system will be implemented to manage imports.

The International Cotton Advisory Committee found that support to the cotton sector in the six seasons beginning in 1997–98 ranged from \$0.8 billion to \$2.6 billion. Huang, Rozelle, and Chang (2004) estimated that during 2001 the nominal rate of protection for cotton averaged 17 percent. Fang and Beghin (2003), however, estimated that between 1997 and 2000, the nominal protection coefficient for cotton has averaged 0.80, implying that China taxes its cotton sector by 20 percent. The different views on the nature and degree of intervention, however, should not be surprising given the complexities of China's agricultural policies as well as the unreliability of the data.

In September 1999 the government of China announced reform measures which included the creation of a cotton exchange to facilitate domestic spot trading; the reduction of prices paid to producers; and a reduction in stocks. In some sense the reforms have worked: China's stocks declined from 4.1 million tons in 1998–99 to 2.3 million tons in 2000–01. In September 2001 further reforms were announced and are currently under way (Zhong and Fang 2003). First, the internal cotton market would be open to cross-regional trade. Second, various enterprises would be allowed to buy cotton directly from producers with approval granted by the provincial government. Third, ginning operations would be separated from marketing cooperatives, in effect making them commercial enterprises.

### *Uzbekistan*

Uzbekistan, the world's fifth largest cotton producer and second largest cotton exporter, produces more than 1 million tons of cotton annually, most of which is exported. During 1998–99 cotton exports accounted for one-third of total merchandise exports, while the sector contributed an average of 6.4 percent to the country's GDP. Before 1991 all aspects of Uzbekistan's cotton sector were under state control (of the Soviet Union). Most

cotton was either consumed by mills in Russia (then considered domestic trade) or shipped to Eastern European countries under barter arrangements. Following the collapse of the Soviet Union, Uzbekistan began exporting its cotton to Western countries in exchange for foreign currency (until 1996 some cotton still went to Russia in barter trade terms).

Although 12 years have passed since the change in the trade regime, most aspects of production, marketing, and trade of the sector closely resemble pre-1991 arrangements. Numerous entities are involved in all postproduction activities of cotton. The three most important ones are the state company handling ginning; the state trading organizations handling exports; and the Ministry of Foreign and Economic Relations, handling financial transactions.

All pre- and post-ginning operations of cotton are handled by UzKhlopkoprom/UzPakhtasanoitish (UKP), a state company that used to be a ministry. UKP is responsible for collecting, storing, ginning, and classifying cotton, making payments to growers, and providing inputs. UKP owns considerable assets, including all ginning and storage facilities as well as handling machinery and equipment.

The second important entities are the three state trading organizations (STOs) in charge of handling all aspects of cotton exports. The main responsibilities of these organizations include contracting cotton merchants for the sale of cotton, organizing the availability and shipment of cotton, receiving payments and converting them into local currency, and paying UKP. Although these organizations have a number of other responsibilities (such as purchasing machinery and equipment on behalf of the government), exporting cotton is their core activity. Because each organization has been allocated a quota of cotton to be exported, there is no competition involved in the export process.

The third important entity is the Ministry of Foreign Economic Relations, which reports directly to the government. Its main function is to manage cotton export operations, including setting prices, selecting buyers, and monitoring dollar receipts. Several other entities are involved in the sector including the state company responsible for domestic and international transportation of cotton, the organization responsible for quality monitoring, and the customs agency.

It appears that cotton growers are heavily taxed both directly through the lower price received by UKP (which, in turn, receives a fixed price from the STOs, as dictated by the Ministry) and indirectly through the exchange rate regime. A recent study (Uzbekistan 2003) found that at an ex-ginnery price of \$1.03 a kilogram, the STOs receive the equivalent of \$0.63 a kilogram (these calculations were based on a Cotlook A Index (price) of \$1.24 a kilogram). With respect to the difference between \$1.03 and \$0.63 a kilogram, the study concluded: "It is not clear exactly where this profitability figure is allocated. It is alleged that, after a marketing fee is deducted, the balance is paid to the Ministry of Finance as an export duty." The declared price to be paid to farmers by UKP is 126,000 Sum per ton of seed cotton, which, at an exchange rate of 960 Sum per U.S. dollar and a 32 percent ginning out-turn ratio, implies a price of \$0.41 a kilogram, about one-third of the A Index.

Perhaps, it is not unreasonable to conclude that even though cotton exports from Uzbekistan moved from a barter to a commercially oriented structure, the sector is still tightly controlled by the government. Moreover, growers are taxed heavily, receiving only about one-third of the export price of cotton.

### **Impact of Distortions and Prospects for Reform**

The ICAC (2003a) concluded that in the absence of direct subsidies, average cotton prices during the 2000–01 and 2001–02 seasons would have been 17 and 31 cents a pound higher, respectively. If the United States alone removed its subsidies during these two seasons, world cotton prices would have been 6 and 11 cents higher, respectively. These figures imply cotton prices 30 and 71 percent higher than the actual averages of 57.2 and 41.8 cents a pound. The study, which is based on a short-run partial equilibrium analysis, does acknowledge that while removal of subsidies would result in lower production in the countries that receive them (and hence higher prices in the short term), such impact would be partially offset by shifting production to nonsubsidizing countries in the medium to longer terms; similarly higher prices are likely to reduce the growth of cotton consumption, making the long-run impact less striking.

Quirke (2002) estimated that removal of production and export subsidies by the United States and the European Union are likely to induce a 20 percent reduction in U.S. cotton production and a 50 percent reduction in U.S. cotton exports, with much higher figures for the European Union. He also estimated that if support was not in place, world cotton prices would be 10.7 percent higher compared to their 2001–02 levels.

Based on a partial equilibrium model, Tokarick (2003) found that multilateral trade liberalization in all agricultural markets (including cotton) is expected to induce a 2.8 percent increase in the world prices of cotton, with 0.8 percent coming from the removal of market price support and the remaining 2 percent coming from the removal of production subsidies (removal of market price support most likely applies to the United States Step-2 payment). Tokarick also calculated that global reforms would lead to \$95 million in total change in welfare a year.

FAPRI (2002) found that under global liberalization (that is, removal of trade barriers and domestic support of all commodity sectors), the world cotton price would increase over the baseline scenario by an average of 12.7 percent over the 10-year period (table 14.4). The largest gains in trade would go to Africa, which would increase its exports by an average of 12.6 percent. Exports from Uzbekistan and Australia would increase by 6.0 and 2.7 percent, respectively, while exports from the United States would decline by 3.5 percent. The most dramatic impact is on the production side where the European Union's cotton output would decline by more than 70 percent. The latter outcome should not be a complete surprise, considering that the European Union's cotton output during the late 1990s was, on average, three times as much as it was before CAP took effect on the cotton sector.

Prospects for policy reforms by major producers subsidizing the sector are mixed. Support for cotton in the European Union is unlikely to increase for two reasons. First the countries expected to join the EU are not cotton producers and hence there will be no budgetary pressure. Second, the current support scheme is subject to an upper spending cap that appears to be a binding constraint; both Greece and Spain, being among the world's highest-cost cotton producers, are unlikely to

**TABLE 14.4 Estimated Effect of Removal of Distortions**  
(percentage changes over baseline)

Variable	2003–04	2005–06	2007–08	2009–10	2011–12	Average <sup>a</sup>
World price	15.6	13.7	13.0	12.2	11.7	12.7
Exports						
Africa	12.1	15.1	14.0	13.1	12.3	12.6
Australia	3.9	3.0	2.7	2.3	2.1	2.7
United States	-8.4	-6.6	-4.0	-1.5	0.9	-3.5
Uzbekistan	5.4	6.9	6.7	6.4	6.2	6.0
World	3.9	5.6	6.2	6.7	7.3	5.8
Production						
Africa	4.5	7.5	7.1	6.7	6.3	6.0
European Union	-77.4	-77.7	-78.3	-78.8	-79.0	-70.5
United States	-18.3	-7.9	-5.9	-4.1	-2.3	-6.7
Uzbekistan	3.1	4.7	4.6	4.4	4.2	4.0

a. Average is taken over the 10-year period 2001–02 to 2010–11.

Source: FAPRI 2002.

increase production given the reduced support they would receive if they exceed the current output levels. At the same time, support is not expected to be eliminated because it supposedly goes to low-income areas and hence it is regarded as a poverty reduction program.

The nature of support is shifting away from direct price support toward partially decoupled payments. Beginning in 2006, the EU cotton sector will go through another reform. Under the Luxembourg Council's decisions of April 22, 2004 (which was based on the September 2003 proposal), an estimated €700 million will fund two support measures, with 65 percent of the total coming in the form of a single farm payment decoupled from current production decisions and the remaining 35 percent in the form of an area payment. Eligibility for the decoupled payment will be limited to growers who produced cotton during the three-year period from 1999 to 2001. The area payment will be given for a maximum area of 380,000 hectares in Greece, 85,000 hectares in Spain, and 360 hectares in Portugal and will be proportionately reduced if claims exceed the maximum area allocated to each country. To receive decoupled payments, cotton growers must keep the land in good agricultural use. To receive area payments they must plant (not necessarily produce) cotton. Karagiannis (2004) estimated that the reformed regime is likely to reduce EU cotton production between 10 and 25 percent (depending on the assumed elasticity of supply).

The United States took a step in the right direction with the replacement of the deficiency payment system by decoupled payments in 1996, but all progress was eliminated with the 2002 Farm Bill, which effectively legitimized emergency payments introduced in 1998–99 following the sharp decline in prices; renamed them as countercyclical payments; increased target prices; and made it more convenient for larger farmers to increase the support they receive. Historically, U.S. farm bills either give what they promise or give more than they promise (as the recent experience showed). Hence, if history is any guide, it is reasonable to expect that U.S. cotton farmers will be receiving generous support for the next six years, unless the support exceeds WTO commitments, in which case the U.S. secretary of agriculture has the discretion to intervene and reduce it.

A number of factors may induce some early reforms, however. First, the substantial increase of the support to the U.S. cotton sector along with 30-year record low prices and the fact that 10 percent of U.S. cotton growers receive 90 percent of the support (hence falsifying the claim that support preserves the small farm), is likely to put pressure for altering the nature of policy sooner. Second, Brazil's request for consultations at the WTO regarding U.S. cotton subsidies may create some pressure to lower subsidies (WTO 2002). Third, four West African cotton-producing countries (Benin, Burkina Faso, Chad, and Mali) pressed for removal

of support to cotton sector through the WTO. In an unusual move, the president of Burkina Faso addressed the WTO on June 10, 2003, asking for financial compensation for cotton-producing low-income countries to offset the injury caused by support. This compensation, according to the request, should be in place for as long as subsidies are in place.

China appears to be the most promising case of reform. The reforms undertaken in 1999 and more recently in 2001 indicate that its cotton sector will be soon exposed to internal and external competition. China is also in the process of establishing a cotton futures exchange, indicating that market forces within the sector are likely to play a more significant role in the future (Shuhua 2003).

On the international side, while the phase-out of the Agreements on Textiles and Clothing (ATC) is supposed to end the distortions imposed on the location of the textile industries, it is uncertain whether the expected benefits will be fully realized.

- First, ATC is back-loaded, with most of the reforms expected to take place in the last year, thus increasing the risk of noncompliance.
- Second, a number of (mainly European Union) countries have repeatedly sought to impose antidumping duties on textile imports from Asia in recent years.
- Third, a number of provisions under the ATC allow for the imposition of temporary duties in the case that current domestic textiles suffer “significant damage” following the phaseout.

### **Reform Initiatives in Africa**

During the 1990s, a number of African cotton-producing countries undertook substantial reforms. The reform process and its outcome have been studied extensively. See, for example, Kähkönen and Leathers (1997) for Zambia and Tanzania; Sabune (1996) and Lundbæk (2002) for Uganda; Larsen (2002) for Zimbabwe; Baffes (2001) for Uganda, Zimbabwe, and Tanzania; Baffes (2000), Badiane and others (2002), and Goreux and Macrae (2003) for Francophone Africa; Baffes (2004) and Gibbon (1999) for Tanzania. Poulton and others (2004) looked at the cotton sectors of six African countries, while Shepherd and Farolfi (1999) reviewed export commodity sectors for a number of sub-Saharan African countries.

Reforms in East African cotton-producing countries were in response to the inefficiencies faced by the parastatals that used to handle most (and in some occasions all) aspects of marketing and trade. For the most part, policy reforms meant elimination of the monopoly powers of the parastatals. Although the outcome of these reforms appears to have been mixed, if one considers that the countries that undertook reforms also faced the most difficulties, one may argue that reforms have been successful. For example, during the eight-year period starting in 1995–96, cotton output in Uganda has averaged 17,000 tons, an almost three-fold increase compared with the eight seasons before 1995–96. The corresponding world price average before 1995–96 was \$1.56 a kilogram; after it was \$1.40 a kilogram. The farmers’ share in world prices rose from less than 50 percent to 70 percent after the reforms, while a number of new traders and exporters entered the sector. This success came despite the failure of most credit mechanisms that were launched after the reforms.

In Zimbabwe reforms appear to have been successful. First, cotton production is up substantially. During the eight seasons since 1995–96, cotton output has averaged 115,000 tons, 50 percent higher than the eight-year period average before 1995–96. Some 30 percent of the 1997–98 cotton harvest was marketed entirely by private entities. Private companies now transport most of the cotton. Competition has pushed the price farmers receive to close to 80 percent of international prices, and producers are being paid faster. Zimbabwe has also retained the premium for quality it used to receive in the world market.

The outcome of cotton reforms in Tanzania has been mixed. On the positive side, the share of producer prices increased to 51 percent (from 41 percent before the reforms). Furthermore, cotton growers receive payments quickly, a major achievement compared with the delays encountered before the reforms. Contrary to what many reports show, quality of cotton appears not to have suffered considerably. At the same time, cotton production since 1995–96 has averaged less than before reforms (55,000 after, compared with 61,000 tons before). On the policy side, the Cotton Board along with the two line ministries (Agriculture and Food Security, and Cooperatives) still play a major role in the sector that goes far beyond the regulatory role they are supposed to play. Collection and dissemination of

data (as well as accuracy of statistics) are poor even by the government's own admission.

Reforms are also under way in West Africa. The World Bank has argued that the discipline and responsibility that a free-entry competitive system imposes on market participants would make for a more resilient, flexible, self-reliant, and innovative national cotton sector. Improved competition through market reforms offers important opportunities for regional trade and cooperation, the latter in areas such as research, phytosanitary regulations, and seed development and certification. Most important, improved sector performance would contribute to alleviating poverty by raising cotton prices to levels enjoyed by farmers elsewhere in the world.

Significant developments have taken place during the last few years, which indicate the future direction of institutional changes in the region's cotton sector. Three countries, Benin, Côte d'Ivoire, and Togo, have now opened their sector to private growers. Benin and Côte d'Ivoire have eliminated the monopoly power of their national companies and transferred key responsibilities to the private sector.

### Summary and Conclusions

Cotton is very important to a number of low-income African and Central Asian countries, in some cases contributing as much as 40 percent to merchandise exports and between 5 and 10 percent to GDP. Considering that in most countries cotton is a smallholder crop, the implications of price changes (either induced by market forces or policy interventions) as well as changes in market share are enormous. For example, a 40 percent reduction in price (the equivalent of the price decline that took place from December 2000 to May 2002) implies a 7 percent reduction in rural income in Benin—a typical cotton-producing country in West Africa. Cotton also faces intense competition from chemical fibers, especially following technological improvements in the early 1970s that brought their prices down to cotton price levels. Since 1975, polyester and cotton have been traded at roughly the same price levels. Currently, the share of cotton in total fiber consumption is 40 percent (down from 68 percent in 1960).

Although cotton faces minimal border restrictions, there is considerable domestic support.

Major subsidizers are the United States, \$3.96 billion in 2001–02 and the European Union—Greece and Spain—\$0.98 billion (compare this to \$20 billion, the value of world's cotton production, evaluated at 2001 prices and quantities). This level of support implies that prices received by U.S. and EU cotton producers are 87 and 160 percent above world prices. China reportedly has been supporting its cotton sector during the last few seasons by an estimated \$1.5 billion annually. Many cotton-producing countries have reacted to low prices by introducing offsetting support. Support in Turkey, Brazil, Mexico, Egypt, and India, totaled \$0.6 billion during 2001–02. Further, Brazil initiated a WTO consultation process claiming losses to its cotton exports due to subsidies by the United States. WTO determined in its interim ruling that indeed the U.S. cotton program has violated the Agreement on Agriculture. Not only is this decision an important victory for Brazil, but it may also trigger similar cases, especially in view of the expiration of the Peace Clause in the Uruguay Round Agreement on Agriculture. More recently, four West African cotton-producing countries (Benin, Burkina Faso, Chad, and Mali) pressed for removal of support to the cotton sector through the WTO (the so-called "cotton initiative"). This compensation, according to the request, should be in place for as long as subsidies are in place.

Given the highly distorted nature of the cotton market and the fact that millions of rural poor households in developing countries depend on this commodity, what are the alternatives? As discussed earlier, a number of developing countries, especially in Sub-Saharan Africa have undertaken policy reforms during the 1990s. Setting aside the lively debate on the motives of the reforms, in many respects the reforms have been successful. For example, in the few cases reviewed here, cotton growers received a higher share of f.o.b. prices, they also received payments more promptly, and there was considerable supply response. In an environment of declining commodity prices, these are not trivial achievements. In a number of cases, however, the reform process has either not been completed (Tanzania), has been reversed (Zimbabwe), has been slow (West Africa), or has not even started (Uzbekistan). In these cases further reforms are the only feasible alternative.

A second issue that should receive attention is the enabling policy environment regarding the use

of genetically modified cotton. In China for example, where genetically modified cotton is used extensively by smallholders, the costs of producing cotton declined by 20–25 percent. This cost reduction meant doubling the net income for cotton growers. One should also note that genetically modified cotton has not been subject to negative consumer reaction as has been the case with genetically modified food products.

A third issue (and one closely related to genetically modified cotton) is organic cotton. Producers of organic products typically command significant premiums. However, organic cotton production has not been as profitable as other organic crops (such as coffee and tea). The main reason is weak demand, which appears to be a reflection of the “distance” between the farm product—cotton—and the final product—cloth. It is because of this distance that genetically modified cotton has not faced resistance by the consumers, which further reinforces the conclusion that genetically modified cotton is something that developing countries should consider seriously.

The price prospects (and consequently the export shares of low-cost producers, including many African countries) can be improved considerably if support by developed countries is reduced substantially or eliminated altogether. Given the low probability of eliminating support, however, a second-best alternative would be for support to be given in a nondistortionary manner. A type of support with minimal distortionary effects—the so-called decoupled support mechanisms—has regained popularity recently. Income transfers under decoupled mechanisms are based on past production and prices and thus have no effect on current production decisions. What makes decoupled support in the cotton sector an interesting (and potentially applicable) alternative is that almost all support comes in the form of domestic measures. Therefore, changing the nature of support does not require changing the sources of funding, as it would in the case of border measures.

## Notes

1. A more detailed version of this chapter is presented in Annex 14 of the attached CD-ROM.

2. Fibers include a wide variety of products that can be divided into two broad categories: natural and man-made. Natural fibers can be further divided into fibers of plant origin (such as cotton and linen) and fibers of animal origin (such as

wool and silk). Likewise, man-made fibers can be further divided into inorganic and organic fibers. Inorganic fibers are materials such as ceramic, glass, and carbon (typically not used in garments.) Organic man-made fibers, on the other hand, are mostly used in garment production either as substitutes or as complements to natural fibers. Organic fibers are further subdivided into natural and synthetic polymers. Natural polymers (often called cellulosic) are made from wood. The most common natural polymer is viscose, also known as rayon. The synthetic polymers are made from crude oil. The most common synthetic polymers are polyester, acrylic, and polyamide (also known as nylon). Per capita chemical fiber consumption in 1960 and 2000 was 1.75 and 4.52 kilograms, respectively. China is the world’s dominant producer of chemical fibers, accounting for 6.7 million tons each year.

3. China’s 2003 tariff rate quota of 856,250 tons was exhausted.

4. The U.S. tariff rate quota for 2002 was 73,207 tons, while cotton imports totaled 6,295 tons.

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