Cotton

Background for 1995 Farm Legislation

Edward H. Glade, Jr.
Leslie A. Meyer
Stephen MacDonald

Introduction

Cotton is the most important textile fiber in the world, accounting for more than 46 percent of all fibers produced. While cotton is grown in over 80 countries, the United States, China, India, Pakistan, and Uzbekistan (a former Soviet republic) account for nearly three-quarters of the global supply. In 1993/94, the United States produced over 21 percent of the world's cotton and used 12 percent. Upland cotton comprises 98 percent of all cotton grown in the United States. Extra-long-staple cotton, which is considered a unique crop for program purposes, is not covered in this report.

U.S. cotton producers have experienced excess production capacity, high stocks, and low product prices over the years. Since 1986, however, strong consumer demand and export sales, combined with an effective government cotton program, have boosted cotton industry prospects. Both cotton production and use are currently at near-record levels, with supply and demand in closer balance than in many years.

Cotton production, marketing, and manufacturing affect the lives of many people, from producers through consumers. The 34,812 cotton producers scattered across the Cotton Belt received about $4.5 billion in 1993/94 from the sale of cotton lint plus $715 million from the sale of cottonseed. Ginning, warehousing, and marketing also provide significant sources of revenue and employment. Moreover, many producers and merchandisers of pesticides, fertilizers, and machinery and equipment are involved. Because cotton is a major raw material for the textile and apparel industries, spinners, weavers, finishers, and manufacturers of apparel and household and industrial products depend heavily on the cotton industry. The estimated retail value of domestically produced cotton apparel alone totals $18-$20 billion a year.

Cotton lint is used primarily in clothing and home furnishings, with lesser amounts used in industrial products. In 1993, apparel accounted for 64 percent of cotton's end uses, home furnishings 30 percent, and a large array of industrial applications 6 percent. The cottonseeds, removed from the lint during ginning, are crushed for oil, and the remaining meal is fed to livestock. The short fuzzy material on the seed--called linters--has many uses, including for padding materials, blending with other fibers and nonwoven fabrics, and also as a source of cellulose for making rayon, plastics, and other products.

In the international market, U.S. exports of raw cotton and cotton textile and apparel products have grown modestly. The cotton sector has maintained a positive balance of trade every year since 1986. Export earnings from raw cotton totaled approximately $2.1 billion in 1993, or about 5 percent of the total value of all U.S. agricultural exports.

Characteristics of the Cotton Industry

The cotton industry is a vast and dynamic industry. In the United States, more than 300,000 jobs are generated among the various sectors from farm to textile mill. While U.S. cotton is produced across the southern tier of States, textile mills are more concentrated in the Southeast. In addition, the cotton industry accounts for more than $25 billion in products and services annually.

Structure of the Cotton Industry

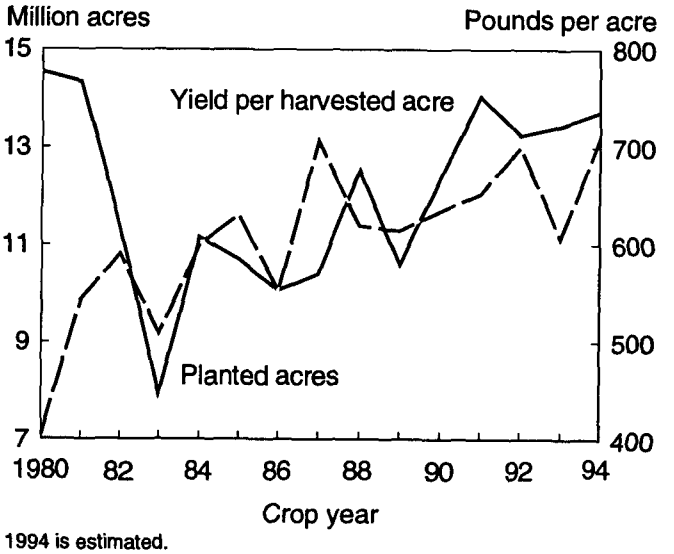
Cotton is currently produced in 17 States--from Virginia to California, with major concentrations in the Delta area of Mississippi, Arkansas, and Louisiana; the Texas High Plains and Rolling Plains; central Arizona; and California's San Joaquin Valley. The forces influencing location of production are ultimately reflected in relative returns among products that can be grown in a particular area and the cost of inputs, which determine comparative production advantages among areas. Soil type, topography, elevation, temperature, sunshine, and water availability are all important determinants of where and how well cotton can be produced. The northern limit in the United States is established by a need for at least 200 days between killing frosts and a minimum average summer temperature of 77 degrees F.

The predominant type of cotton grown in the United States is *Gossypium hirsutum*, known as American upland cotton. It typically accounts for about 98 percent of the U.S. cotton crop and is grown throughout the U.S. Cotton Belt as well as in most of the other major cotton-producing countries. The balance of the cotton grown in the United States is *Gossypium barbadense*, commonly referred to as American Pima or extra-long-staple (ELS). ELS cotton is grown chiefly in southwest Texas, New Mexico, Arizona, and California, where it is particularly well adapted to the arid environmental conditions. Relative to upland, ELS output is small due to its higher production costs. Its markets are mainly for high-value products, such as sewing thread and expensive apparel.

Trends in Acreage, Yield, and Production

Cotton acreage, yield, and production in the United States have varied significantly. Area has fluctuated since the early 1980's as acreage reduction programs (ARP's) were implemented to control excess supplies of cotton. Yields have also varied but have trended upward during this period (fig. 1). While government programs and prices of cotton and competing crops have influenced acreage, weather has been the chief

Figure 1
U.S. Cotton Acreage and Yield



1994 is estimated.

determinant of year-to-year variability in yields. Since 1980, upland cotton yields have ranged from 402 pounds per harvested acre in 1980 to a record 707 pounds in 1994. Production has varied from a low of 7.7 million bales in 1983 to an estimated high of nearly 19.4 million in 1994 (app. table 1).

Planted area in 1994 totaled 13.6 million acres, the second largest since 1981 (table 1). However, during the 1977-81 crop years, annual planted area averaged 13.9 million acres. Since 1982, the first year of ARP's, cotton acreage has varied in response to supply and demand conditions. Acreage has ranged from 1983's 7.9 million acres to 1991's 13.8 million. Cotton area averaged 11 million acres during the 1986-90 crop years. However, acreage has risen recently, averaging 13.4 million acres for the 1991-94 period.

The acreage expansion, once a westward shift, has recently turned eastward. A large portion of the recent expansion occurred in the Southeast, where acreage has more than doubled since the late 1980's. The Delta region has also responded with increased acreage. While the Southeast accounted for only about 8 percent of the U.S. planted area in 1986, its share doubled to 16 percent in 1994. During the same period, Delta acreage increased from 26 to 30 percent. In contrast, the Southwest and West regions' shares fell. Although these regions accounted for a combined 54 percent of planted area in 1994, this is well below the 66 percent recorded in 1986.

Table 1–Upland cotton acreage, yield, and production, by region, 1986-94

Crop year 1/	Southeast 2/	Delta 3/	Southwest 4/	West 5/	United States 6/
			1,000 acres		
Planted:					
1986	761	2,608	5,251	1,313	9,933
1987	832	2,820	5,121	1,506	10,259
1988	1,047	3,440	6,061	1,777	12,325
1989	853	2,984	5,022	1,351	10,210
1990	1,133	3,583	5,882	1,519	12,117
1991	1,579	4,072	6,742	1,409	13,802
1992	1,524	4,200	5,873	1,380	12,977
1993	1,727	4,180	5,922	1,420	13,248
1994 7/	2,176	4,102	5,811	1,468	13,558
Harvested:					
1986	722	2,545	3,801	1,289	8,357
1987	823	2,794	4,786	1,491	9,894
1988	988	3,282	5,736	1,753	11,759
1989	838	2,904	4,090	1,334	9,166
1990	1,123	3,510	5,371	1,500	11,505
1991	1,566	3,967	5,782	1,401	12,716
1992	1,504	4,138	3,886	1,355	10,883
1993	1,689	4,095	5,401	1,409	12,594
1994 7/	2,154	4,060	5,491	1,457	13,162
			Pounds per harvested acre		
Yield:					
1986	492	577	347	1,110	547
1987	571	788	500	1,264	702
1988	515	688	462	1,038	615
1989	602	664	357	1,220	602
1990	531	672	478	1,165	632
1991	724	774	411	1,202	650
1992	689	752	432	1,272	694
1993	552	547	477	1,290	601
1994	818	815	458	1,179	707
			1,000 480-pound bales		
Production:					
1986	741	3,057	2,746	2,982	9,525
1987	979	4,587	4,982	3,927	14,475
1988	1,061	4,707	5,519	3,791	15,077
1989	1,052	4,019	3,043	3,390	11,504
1990	1,242	4,917	5,348	3,640	15,147
1991	2,361	6,395	4,951	3,509	17,216
1992	2,160	6,486	3,475	3,590	15,710
1993	1,943	4,670	5,366	3,786	15,764
1994	3,669	6,895	5,242	3,580	19,386
			Percent		
Share of production:					
1986	7.8	32.1	28.8	31.3	100
1987	6.8	31.7	34.4	27.1	100
1988	7.0	31.2	36.6	25.1	100
1989	9.1	34.9	26.5	29.5	100
1990	8.2	32.5	35.3	24.0	100
1991	13.7	37.1	28.8	20.4	100
1992	13.7	41.3	22.1	22.9	100
1993	12.3	29.6	34.0	24.0	100
1994 7/	18.9	35.6	27.0	18.5	100

1/ Year beginning August 1. 2/ Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia. 3/ Arkansas, Louisiana, Mississippi, Missouri, and Tennessee. 4/ Kansas, Oklahoma, and Texas. 5/ Arizona, California, and New Mexico. 6/ Totals may not add due to rounding. 7/ January 1995 estimate.

Source: USDA, National Agricultural Statistics Service.

Likewise, by the beginning of the 1980's, production began shifting back toward the Delta and the Southeast. During 1981-90, the Delta produced on average 29 percent of the U.S. cotton crop. Since 1991, however, the average has climbed to 36 percent. Similarly, the Southeast accounted for only 7 percent during the 10-year period, but between 1991 and 1994, the region contributed 14.5 percent of production. The gains made in these regions were offset by declines in both the Southwest and West. During 1981-90, these two regions combined for 63 percent of the U.S. cotton crop. However, this share has fallen since 1991 to average about 50 percent.

Several factors have contributed to this reversal. One factor influencing the change in production patterns was the success of the boll weevil eradication program in the Southeast, making cotton production more profitable there. In the Delta, producers have moved to a shorter production season, reducing insect damage and resulting in improved yields and net income. The drought in California during the 1980's and early 1990's was another contributing factor in the acreage shift. During this period, available water supplies were limited for cotton as well as other crops. And with the demand for cotton rising, acreage was easily expanded in the Southeast and Delta. Cotton's primary competitors for land include soybeans and, to a lesser extent, corn in the Southeast and Delta, grain sorghum and wheat in the Southwest, and wheat, hay, and barley in the irrigated West.

Trends in Farm Numbers and Structure

According to the 1992 Census of Agriculture, the long-term trend to fewer but larger cotton farms has returned. Like most other kinds of farms, this was a reversal from the 1987 Census report.

In 1987, over 43,000 farms grew cotton in the United States, with an average of 228 acres of cotton per farm (table 2). While the average area per farm was down 11 percent from 1982, the number of farms increased by 12 percent, virtually offsetting each other. According to the data, a substantial restructuring of farm operations occurred between 1982 and 1987, with a probable explanation being producers' response to economic conditions, cotton programs, and/or tax laws during this period. By 1992, however, the Census data indicate the number of cotton farms declining to 34,812, well below 1987 and 9 percent below a decade earlier. While farm numbers have decreased, the average area per farm rose to a record 315 acres in 1992.

Table 2–Number of farms harvesting cotton and acreage per farm, by region and State

Region/State	Number of farms			Cotton area per farm		
	1982	1987	1992	1982	1987	1992
	--- Number ---			--- Acres ---		
Southeast	3,352	5,495	6,741	179	148	219
Alabama	1,458	1,820	1,469	202	190	294
Florida	81	192	220	134	124	189
Georgia	770	1,733	2,015	171	134	214
North Carolina	620	981	2,035	111	96	176
South Carolina	417	744	861	229	156	223
Virginia	6	25	141	49	73	146
Delta	10,921	13,138	11,404	214	210	353
Arkansas	2,019	2,479	2,279	201	214	416
Louisiana	2,371	2,675	2,599	237	221	319
Mississippi	3,710	4,225	3,344	264	243	399
Missouri	971	1,214	1,045	149	163	300
Tennessee	1,850	2,545	2,137	131	162	280
Southwest	19,140	19,480	12,970	258	242	302
Kansas	---	10	7	---	54	199
Oklahoma	2,848	2,913	1,726	145	124	172
Texas	16,292	16,557	11,237	278	263	322
West	4,853	4,933	3,697	393	313	419
Arizona	1,177	1,199	887	441	318	483
California	3,002	3,037	2,351	437	357	453
New Mexico	669	697	459	116	114	116
United States	38,266	43,046	34,812	256	228	315

--- = Not available.

Source: Census of Agriculture.

By region, all areas experienced a similar pattern as the total, except for the Southeast. Here, farm numbers have continued to increase, which reaffirms cotton's return to this region. However, all regions experienced larger area per farm than in either 1987 or 1982.

Table 3 provides regional farm numbers divided among three acreage categories. Farm numbers expanded only in the category of 500 or more acres. On a percentage basis, 20 percent of the farms producing cotton were in this category, up from 12 percent in 1987. Nearly half (44 percent) of the farms were in the range of 100 to 499 acres, the same percentage as in 1987 and 1982. The remaining 36 percent were farms with cotton acreage under 100 acres.

On a regional basis, the percentage of farms in the 100-to-499-acre category was virtually unchanged, except in the Southeast where actual farm numbers increased. While the number of farms of less than 100 acres declined in 1992, the number of farms with 500 or more acres of cotton rose. Although the percentage of farms grew in the latter category from 1987 to 1992, the Southwest farm numbers dropped. In contrast, the Delta doubled its number of farms of 500 or more acres, increasing the region's percentage to 24 percent, the highest among the four regions.

Share renting and cash renting of land for cotton production remain common practices. According to the 1992 Census of Agriculture, 50 percent of the farms harvesting cotton were operated by part owners, 26 percent by tenants, and 23 percent by full owners (table 4). Similarly, 58 percent of the acreage was operated by part owners, 31 percent by tenants, and 12 percent by full owners. Since 1982, the share of acreage operated by tenant farmers has jumped dramatically but at the expense of the full owner/operators.

Acreage operated by full owners continued to decline as farms increased in size and family farms dwindled. By 1992, individual or family farms comprised 73 percent of the farms and 55 percent of the acreage, compared with 81 and 66 percent, respectively, a decade earlier. Partnerships, however, have risen over this period, climbing to 18 percent of the farms and 32 percent of the acreage in 1992.

Corporate cotton farming has not changed much over the last decade. In 1992, 8 percent of the farms were incorporated, accounting for 12 percent of the acreage. The corporate form of organization, although increasing, is undertaken by farm operators chiefly to take advantage of tax policies, limited liability, or property transfer provisions. In fact, over 90 percent

of the 1992 farms and acreage designated as incorporated were family-held corporations. Cotton production has not attracted a substantial influx of capital investment by nonfarm corporations.

Trends in Domestic Cotton Use

End uses of cotton include apparel, household, and industrial products. On average, clothing accounts for about 295 pounds of total end use of a 480-pound bale of cotton delivered to a textile mill. Home furnishings and industrial products account for 133 pounds and 30 pounds, respectively, with the remaining 22 pounds attributable to nonlint waste.

Domestic cotton consumption has risen steadily since 1990, surpassing previous highs each year. Domestic consumption (U.S. mill use plus the raw fiber equivalent of textile imports minus textile exports) of cotton totaled 16.4 million bales during calendar year 1994, nearly twice the level of just 10 years ago. Before the early 1980's, competition with manmade fibers and slower real economic growth caused domestic cotton use to fall to 6.5 million bales by 1982, with per capita consumption declining to 13.5 pounds. Since 1982, there has been a steady growth in consumer demand for cotton-rich products. Gains in market share over manmade fibers account for cotton's comeback. Cotton accounted for 30 percent of total U.S. fiber consumption in 1982, but expanded its market share

Table 3--Number and percent of farms harvesting cotton in selected acreage categories, by region

Region/acres	1982		1987		1992	
	Number	Percent	Number	Percent	Number	Percent
Southeast	3,352	100	5,495	100	6,741	100
Under 100	1,784	53	3,183	58	3,150	47
100 - 499	1,276	38	2,005	36	2,768	41
500 or more	292	9	307	6	823	12
Delta	10,921	100	13,138	100	11,404	100
Under 100	5,250	48	6,064	46	3,878	34
100 - 499	4,380	40	5,737	44	4,839	42
500 or more	1,291	12	1,337	10	2,687	24
Southwest	19,140	100	19,480	100	12,970	100
Under 100	7,358	38	7,831	40	4,446	34
100 - 499	9,014	47	8,966	46	5,969	46
500 or more	2,768	14	2,683	14	2,555	20
West	4,853	100	4,933	100	3,697	100
Under 100	1,868	38	1,867	38	1,070	29
100 - 499	2,083	43	2,382	48	1,800	49
500 or more	902	19	684	14	827	22
United States	38,266	100	43,046	100	34,812	100
Under 100	16,260	42	18,945	44	12,544	36
100 - 499	16,753	44	19,090	44	15,376	44
500 or more	5,253	14	5,011	12	6,892	20

Source: Census of Agriculture.

Table 4--Comparison of U.S. cotton farms and acreage, in selected categories

Category	1982		1987		1992	
	Farms	Acreage	Farms	Acreage	Farms	Acreage
			Percent			
Tenure of operator:						
Full Owners	27	19	26	14	23	12
Part Owners	50	60	47	56	50	58
Tenants	23	20	27	30	26	31
Type of organization:						
Individual/Family	81	66	78	62	73	55
Partnership	13	19	15	26	18	32
Corporation	6	15	6	12	8	12
Other	1	1	1	1	1	1

Source: Census of Agriculture.

to about 40 percent by 1994. In addition, per capita cotton consumption has risen to over 30 pounds, the highest since 1946.

Mill use of cotton averaged only 5.6 million bales annually during the 1980-84 crop years (app. table 2). The decline began in the mid-1960's as textile imports increased and cotton lost market share to manmade fibers, particularly polyester. Cotton's share of mill consumption on the cotton system (mills and spindles adapted to the use of cotton) shrank to a low of 59 percent in 1980. Manmade fibers' strength, uniformity, and ease of handling and care accounted for much of the early decline in cotton's share. Also, costs to mills were higher for cotton than for polyester and rayon. However, cotton prices became more competitive beginning in the 1980's (fig. 2).

Meanwhile, consumer preferences shifted back to natural fiber products in the early 1980's and cotton mill consumption recovered. The shift in consumer preference for cotton has led to both increased cotton mill use and a greater share of total mill consumption, despite the rapid growth in textile imports. Since 1980, consumer demand for cotton increased and cotton's share rose to nearly 77 percent in marketing year 1994. Although manmade fibers have supplanted cotton in some end uses, such as tire cord and carpeting, cotton's share has reached levels not experienced since the mid-1960's. In 1993/94, total U.S. cotton mill use reached 10.4 million bales, the highest since 1950, and in 1994/95, mill use is estimated to exceed 11 million bales.

In addition to the increase in U.S. cotton mill use, cotton textile imports have made substantial inroads in the total domestic use of cotton. In calendar year 1980, U.S. cotton textile imports totaled an equivalent of 1.7 million bales, and by 1985, this figure had doubled to 3.4 million. Several factors accounted for the rise in imports, including a shift in domestic consumption patterns to natural-fiber products like cotton, the rise in the value of the U.S. dollar in world trade, and comparative labor cost advantages in foreign textile-producing countries, especially in the apparel sector. Record cotton textile imports have been achieved annually since 1989 and during 1994 reached 7.9 million bale equivalents (fig. 3).

Imported products increased the supply of cotton textiles available to American consumers. In 1994, 51 percent of the fibers in imported textiles were cotton, while cotton accounted for only about 32 percent of the fibers used in U.S. mills. Also, retail apparel prices have declined in real terms (adjusted for inflation), encouraging higher domestic use. The consumer price index for all urban consumers (CPI-U) for apparel products (1982-84=100) rose from 106 in 1986 to 133 in 1994. During the same period, the overall CPI-U rose from 110 to 148, implying a 6.5-percent decrease in real retail apparel product prices when compared with prices for all items.

Although overshadowed by the surge in textile imports, cotton textile exports have risen for 10 consecutive years, with most of the growth concentrated in the last 6 years (see fig. 3). In 1988, cotton textile exports totaled 688,000 bale equivalents. By

Figure 2
Raw Fiber Equivalent Prices

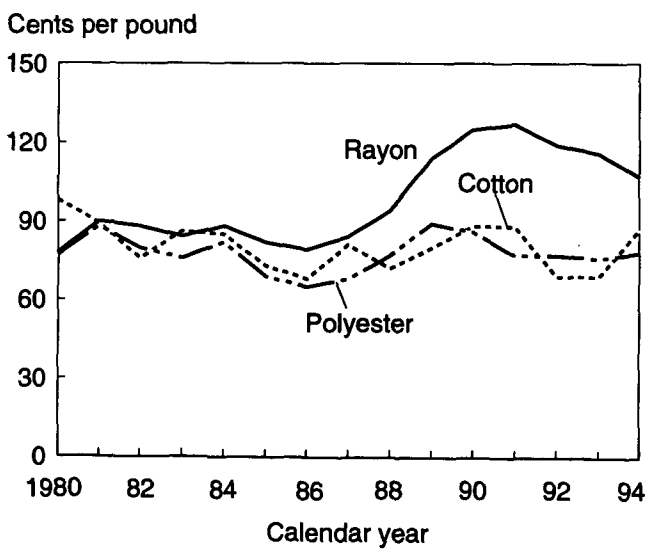
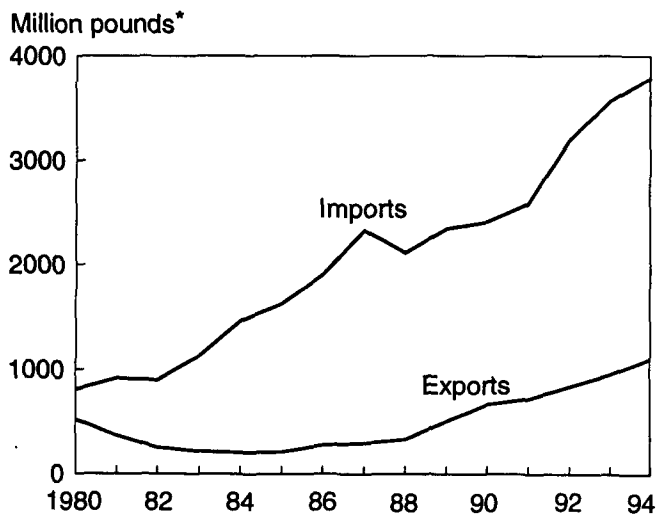


Figure 3
U.S. Cotton Textile Trade



*Raw fiber equivalent.

1994, however, exports had soared to a new record of 2.3 million bale equivalents. Despite this dramatic rise in textile exports, the U.S. cotton textile trade deficit continues to climb. In 1980, the deficit represented less than 9 percent of domestic cotton use. By 1990, the deficit had reached 3.6 million bale equivalents, or 30 percent of domestic consumption. In 1994, the deficit surpassed 5.6 million bales, totaling about 35 percent of domestic cotton use.

Financial Characteristics

Prices, costs, and returns for the cotton sector can be reported in various forms. With government programs, there are several prices to consider. Likewise, there are many ways to estimate costs and returns, and different uses for each way. For example, estimates of marginal costs and returns are valuable for analyzing individual farms as well as for certain industry analyses. Large cotton farms will usually have lower costs per acre than small cotton farms because fixed costs can be spread over more acres. Per-acre costs of irrigated cotton are usually more than three times as high as for nonirrigated cotton. Returns also vary with yields, type of farm, and other factors. However, for this section, U.S. average prices, costs, and returns are used. Average costs and returns are the only national data available. Average costs are useful for assessing the overall economic condition of the industry and government program effects.

Prices

U.S. cotton prices vary annually, but there has been no trend in nominal prices recently. Season average farm prices more than doubled in the 1970's, reaching a peak of 74.4 cents per pound in 1980/81 (app. table 3). However, with the introduction of the commodity-specfic ARP's in 1982, cotton prices have become more stable. Under the ARP's, acreage restrictions are relaxed when stocks are low and tightened when stocks are excessive. Since 1982, prices ranged from 51.5 cents per pound in 1986 to over 67 cents in 1990 and 1994 (table 5).

The low in 1986 was attributed to an excess buildup of stocks during the 1985/86 season, which was caused by the uncompetitiveness of U.S. cotton in world markets. The marketing loan provision of the Food Security Act of 1985 allowed U.S. prices to fall to world price levels in 1986/87. The high price in 1990 occurred as demand for U.S. cotton exceeded production for a second consecutive year, reducing stocks to a low 2.3 million bales and the stocks-to-use ratio to only 14 percent.

During 1991, one of the largest U.S. crops was harvested, and coupled with record foreign cotton production, reduced the average farm price to about 57 cents. In 1992, prices fell slightly as U.S. cotton found itself in a very competitive world market. U.S. exports declined to the lowest level since 1985 as foreign stocks were worked down. U.S. prices rebounded in 1993, however, when foreign producers harvested their smallest crop in 10 years and U.S. cotton use continued to expand. In 1994, another relatively small foreign crop kept world stocks from rising and pushed cotton prices higher. The United States, with its record crop, benefited as U.S. exports were projected to capture one-third of the world cotton trade.

Table 5--Upland cotton farm prices, yields, and revenue, 1986-94

Crop year	Average farm price: Current dollars	Average farm price: 1987 dollars 1/	Yield	Revenue per harvested acre
	Cents per pound		Pounds	1987 dollars
1986	51.5	53.1	547	290.46
1987	63.7	63.7	702	447.17
1988	55.6	53.5	615	329.03
1989	63.6	58.6	602	352.77
1990	67.1	59.2	632	374.14
1991	56.8	48.3	650	313.95
1992	53.7	44.4	694	308.14
1993	58.1	47.0	601	282.47
1994 2/	67.8	53.8	707	380.37

1/ Current dollars divided by the gross domestic product price deflator (1987=100).
2/ Based on January 1995 estimates. The average farm price is an August-December average, not a projection for the year.

Source: USDA.

Prices received by farmers in the 1980-92 period were above variable cash expenses but under total economic costs (fig. 4). Total economic cost is the breakeven longrun average price necessary to continue producing a crop. It includes returns to all factors of production, including land. Since 1980, the target price has exceeded total economic costs in only four seasons. The target price was frozen in 1990, but still remains below the declining total economic cost. The loan rate generally stayed above variable cash expenses and below farm prices.

Costs and Returns

Costs of producing U.S. cotton rose sharply during the 1980's, but have declined somewhat since 1990. However, cash receipts for cotton and cottonseed have not kept pace with the cost of production. In the 1980-92 period, the farm value of cotton was not enough to cover all production costs, with the exception of the 1987 crop (fig. 5). However, when government payments were included, cotton producers were able to earn a profit each year after paying all costs, with three exceptions when unpaid labor was not fully covered. Returns from cotton produc-

Figure 4
U.S. Cotton Prices and Costs

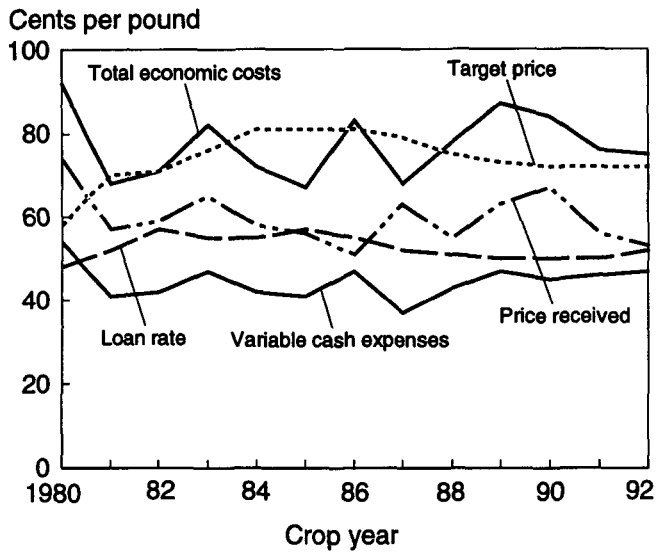
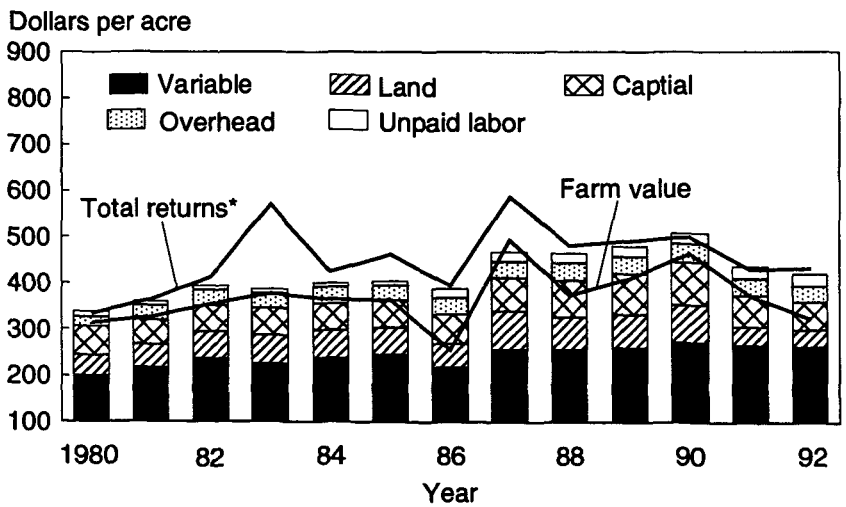


Figure 5
U.S. Cotton Costs and Returns



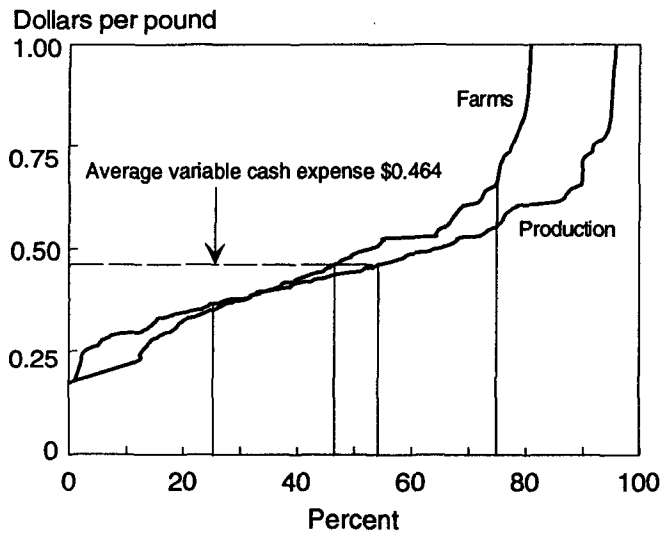
*Includes government payments.

tion peaked in 1987. Yields reached a record high and prices increased enough to pay production costs from the farm value of the crop, with the government payments adding to producers' profits. While 1994 yields are estimated to surpass the 1987 level, real prices have not been able to match those obtained in 1987. Between 1990 and 1993, real revenues consistently declined, falling nearly $100 per havested acre (table 5). However, in 1994, revenue rebounded to the highest since 1987.

Based on data from USDA's 1991 Farm Costs and Returns Survey (FCRS), the average variable cash expense of cotton production was approximately $267 per acre, or 46.4 cents per pound. Estimated variable cash expenses were converted to a per pound basis and ranked from lowest to highest to form a weighted cumulative distribution of farms and production (fig. 6). In 1991, about 47 percent of the FCRS cotton farms had variable cash expenses at or below the average, while 55 percent of the cotton harvest was produced at or below the average variable cash expense.

Cotton farms were divided into three groups (low-cost, mid-cost, and high-cost producers) according to their level of variable costs. The low-cost group included the 25 percent of farms with the lowest variable expenses, while the high-cost group comprised the 25 percent with the highest expenses. The low-cost producers had variable cash expenses of 35 cents per pound or less. This group accounted for about 23 percent of total FCRS cotton production. On the other hand, the high-cost producers, with variable cash costs of 68 cents per pound or more, contributed only 10 percent of total production. Therefore, the mid-cost group produced 67 percent of the cotton crop in 1991.

Figure 6
Cumulative Distribution of Cotton Variable Cash Expenses, 1991



In addition, cotton production costs per planted acre and per pound of lint vary considerably within and among the cotton-producing regions. During 1992, cash expenses averaged $315 per planted acre in the United States, but ranged from a low of $216 in the Southwest to a high of $628 in the West. Differences in yields, however, affect per pound costs. In the Southwest, where total cash costs are the lowest, per pound costs of 86 cents were the highest as yields averaged an unseasonally low 251 pounds per planted acre. In the West, where total cash costs are nearly double the U.S. average, a yield of 1,083 pounds per acre kept the 1992 average cost per pound at 58 cents, just slightly above the 1992 average for all regions.

There has been an upward trend in the growth of the cotton sector as a whole, as measured by output and total use. However, total economic costs have also increased so that total income above economic costs shows little or no growth over time. In 1992, real returns above total economic costs improved to 8.5 cents per pound, the highest since 1987.

World Cotton Trade

Cotton is grown or used in virtually every country in the world. The largest producers, consumers, and exporters are China, the United States, the former Soviet Union, India, and Pakistan. These countries have accounted for 77 percent of world production, 62 percent of consumption, and 66 percent of exports in recent years. Other important exporting countries include Australia, Paraguay, Argentina, and the French-speaking countries of West Africa. These countries export virtually all their production. The European Union (EU), Russia, Japan, Taiwan, South Korea, Hong Kong, and Eastern Europe traditionally have been the largest cotton importers. Southeast Asia recently has emerged as a major market for cotton imports (fig. 7).

Cotton is traded repeatedly on world markets, crossing and recrossing borders in the form of fiber, yarn, fabric, and final goods like clothing. World trade in raw cotton lint has ranged between 25 and about 35 million bales since 1986 (table 6). About half of this volume is reexported as textile and apparel products to the developed countries, including the United States.

Figure 7
Foreign Cotton Production, Consumption and Stocks

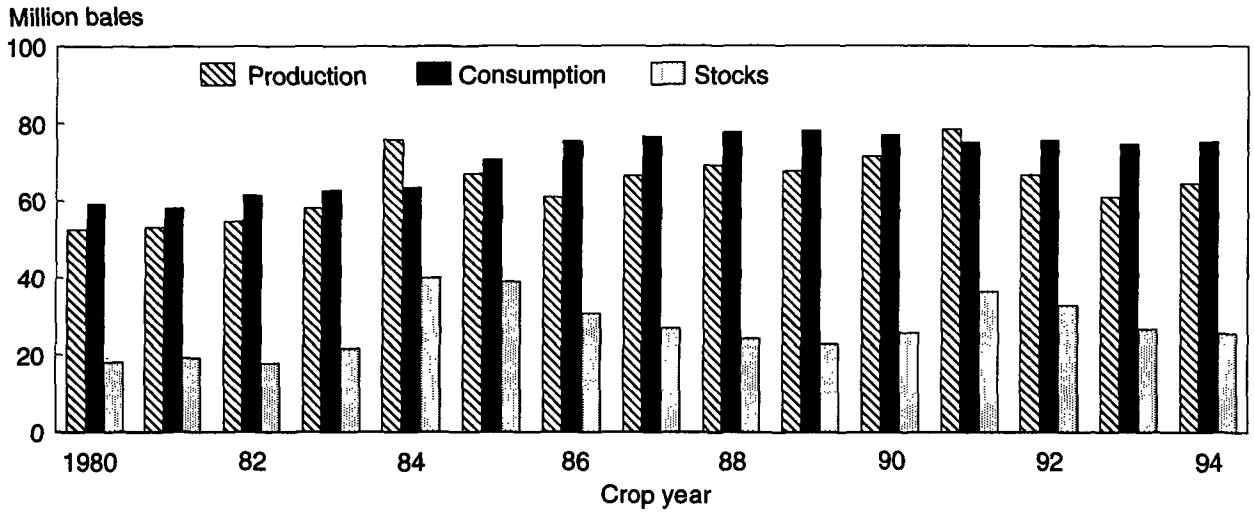


Table 6–World cotton exports and market shares, 1986-94

Crop year	World exports	U.S. exports	Market shares: United States	Market shares: Uzbekistan	Market shares: Other exporters
	Million bales		-------Percent-------		
1986	33.4	6.7	20.0	20.3	59.7
1987	29.9	6.6	22.0	21.0	56.9
1988	33.4	6.1	18.4	21.0	60.6
1989	31.3	7.7	24.6	21.8	53.6
1990	29.7	7.8	26.3	18.2	55.6
1991	28.1	6.6	23.6	18.5	57.9
1992	25.4	5.2	20.5	21.7	57.8
1993	26.8	6.9	25.6	23.1	51.3
1994 1/	27.9	9.2	33.0	19.2	47.8

1/ January 1995 forecast.

Source: USDA.

Importing Countries

In the 1980's, cotton consumption began shifting from traditional importers toward producing countries, and world trade weakened. Imported cotton currently accounts for about 30 percent of total world use, compared with 40 percent during the early 1980's. With this shift, several traditional cotton exporters have or may become net cotton importers, including Brazil, Mexico, Turkey, Egypt, Colombia, and Central America.

Since 1989, the economic restructuring of the former Soviet Union has profoundly affected world cotton trade. Russia has been the world's largest cotton importer for more than 25 years, with Eastern Europe not far behind. The reduction in their imports affected world trade and prices. Economic restructuring has reduced purchasing power in these regions, with Russia's economy contracting 20 percent in 1992 alone. The poor quality of Russian textile products, combined with the collapse of trading arrangements with other formerly centrally planned economies, also cut textile production. Russia's mill use of cotton fell from 5.8 million bales in 1989 to 2.2 million in 1993. Similarly, Eastern Europe's consumption fell about 1.5 million bales.

The other largest traditional importing countries also cut their consumption and imports after the mid-1980's. Wage rates make their textile industries increasingly less competitive, and a prolonged global economic slowdown further hampered their ability to keep spinning plants open. The EU, Japan, Taiwan, Korea, and Hong Kong suffered an aggregate consumption loss of 4.2 million bales, and their cotton imports fell to 5.5 million bales.

World trade fell after 1986 as new importers managed to only partly fill the gap left by shrinking traditional markets. Southeast Asia grew in prominence, but Latin America played a surprisingly important role, particularly Mexico, Brazil, and other countries in South America. These countries reoriented their economies in the aftermath of the world debt crisis, removing barriers to competition. No longer protecting cotton as a source of inputs for textile production--a pattern of producing for "import-substitution"--they have let market forces drive inefficient cotton production down and imports higher. As these policies took hold, Latin America was transformed from an exporter of 2 million bales to an importer of 2 million

bales. Brazil, historically the region's largest exporter of cotton, imported more cotton in 1993 than traditional importer South Korea. However, policy changes in Brazil and elsewhere do not ensure they will always be major importers, only that their imports will respond to price signals on world markets. Southeast Asia, in contrast, will remain a steady growth market for imports, due to a limited ability to produce cotton. Latin American trade could also be affected by preferential arrangements among the MERCOSUR countries--Brazil, Argentina, Uruguay, and Paraguay.

While China is neither the largest nor the most consistent importer--often exporting--it has been a net importer more often than not in recent years. The world's largest producer and consumer, China accounts for nearly 25 percent of world cotton in each case, and it has periodically ranked among the top 10 importers. Low wage rates have long made China's textile industry an important consumer of cotton, but soaring agricultural efficiency following rural economic reforms led to cotton exports during much of the 1980's. Later reforms invigorated the rest of the economy, giving China the world's fastest economic growth. As domestic consumption and textile exports grew, cotton consumption began to periodically outpace production. China exported more than 3 million bales in 1986, but since 1989 has imported cotton in 5 out of 6 years.

China's economy is increasingly market-oriented, but cotton is the most rigorously controlled major crop. Sales are prohibited outside of official procurement channels, and most imports and exports are monopolized by CHINATEX, a state-owned company. Incentives for farmers depend on government procurement prices and policies, input subsidies, and production bonuses. There have been signs of increased sales outside of the state procurement system in recent years, but the response has been intensified efforts to bring cotton trading back under government control.

Exporting Countries

The United States is the largest cotton exporter in the world, accounting for 20-30 percent of world trade since 1986 (table 7). U.S. competitiveness has improved since 1985, in part from the introduction of the marketing loan, and since 1990, by the User Marketing Certificate Program (Step 2)(see FACT Act of 1990 section). The Step 2 program is available for both cotton exporters and domestic users, but it has been most effectively used by exporters. Beginning with the 1994/95 crop year, program changes should help close this gap. The marketing loan and Step 2 program are important to maintaining U.S. competitiveness when world prices are near or below the U.S. loan rate. Most other exporters are low-cost, developing countries with extensive government economic intervention.

Table 7–U.S. raw cotton exports to selected markets, 1991/92-1994/95

	1991/92		1992/93		1993/94		1994/95 1/	
Destination	Exports	Share	Exports	Share	Exports	Share	Exports	Share
	1,000 bales	Percent	1,000 bales	Percent	1,000 bales	Percent	1,000 bales	Percent
Japan	1,107	41	839	38	790	40	1,365	74
Korea	1,024	57	1,031	60	976	60	1,000	60
Taiwan	380	26	279	22	356	28	400	31
Indonesia	739	39	429	22	653	32	725	35
Italy	240	16	144	10	96	7	100	7
Hong Kong	335	32	100	12	314	34	325	36
Thailand	368	22	150	10	277	17	400	26
Spain	54	14	26	7	21	3	25	5
Portugal	40	5	24	3	3	1	5	1
Germany	101	11	74	10	50	6	25	6
France	6	1	3	1	4	1	5	1
China	792	49	1	0	1,183	100	1,750	95
Brazil	9	1	182	19	337	18	350	21
Egypt	339	100	170	100	0	0	100	44
Mexico	213	71	556	85	653	82	575	96
Other	1,112		1,193		1,208		2,025	
World	6,646	24	5,201	20	6,862	26	9,200	33

1/ January 1995 forecast.

Source: USDA.

Uzbekistan is the second largest exporter, traditionally shipping most of its cotton to Russia. Uzbekistan--and the rest of Central Asia--has increasingly exported its cotton outside of the former Soviet Union (FSU) since 1989, often at substantial discounts from world prices. While government planners still favor cotton, production has fallen in Uzbekistan since the breakup of the FSU. Environmental degradation from prolonged monoculture, poor water management, and pesticide contamination have led to a 23-percent decline in cotton area. Efforts to increase self-sufficiency in foodstuffs have also reduced Uzbekistan's cotton area. Improved yields hold the best hope for a recovery in cotton output.

Pakistan has traditionally been the next largest exporter after Uzbekistan, although pest problems severely reduced yields and exports during the early 1990's. Since Pakistan strictly controls cotton exports and imports in order to assure that its textile industry has access to cotton below world market prices, low output has quickly cut exports. During the 1980's, Pakistan's yield gains averaged 7.7 percent annually, sustaining cotton exports during a period of phenomenal consumption growth. Pakistan's consumption more than tripled during 9 years of unbroken expansion. However, leaf-curl virus and pests after 1991 limited the effectiveness of some high-yielding varieties. While Pakistan's favorable irrigated conditions offer good future prospects for yields, a repeat of the phenomenal gains of the 1980's seems unlikely.

India is neither as large nor as consistent an exporter as Pakistan, but it is the third largest cotton producer in the world. India averaged less than half a million bales in net exports between 1980 and 1992--less than Paraguay--but the size of its crop, the variability of its production and exports, and the similarities between its cotton and U.S. cotton assure a potential impact on U.S. exports in any given year. Like Pakistan, India is an important exporter of textile products and tightly controls cotton exports and imports to assure low-priced supplies to its textile industries. Increasingly, textile production is shifting to cotton-producing countries such as India, Pakistan, and China, and away from cotton-importing countries in East Asia and Europe (table 7).

The other significant exporters are generally more price-responsive than those discussed above, particularly since the economic restructuring in many Latin American and African countries. Australia (accounting for 6 percent of world trade) has traditionally been the country most open to the influence of world markets. Other exporters include the French-speaking countries of West Africa (with 8 percent of world trade), Paraguay (2 percent), and Argentina (1 percent).

World Textile Trade

Since the beginning of the Industrial Revolution in the 18th century, textiles have been one of the first industries of each developing nation. The result has been a recurring migration of low-end textile production to a succession of low-wage countries. While the mature industries of the United States and Western Europe were once threatened by imports from Japan, Taiwan, and Korea, some of these countries now restrict imports from newer sources. Pakistan and China each supply as much as 10 percent of the world's textile exports, while--symbolic of global changes--Japan is a net importer of U.S. textiles.

In 1993, U.S. textile workers were paid an average of $11.50 per hour, while workers in Taiwan, Hong Kong, and Mexico received $5.76, $3.85, and $2.93 per hour, respectively. While these differences do not account for variations in labor productivity, exchange rates, or purchasing power, they give an indication of the advantage that lower-wage countries have over European, Japanese, and U.S. firms.

The Multifiber Arrangement (MFA) has governed world textile trade in various forms since the 1960's. The MFA was designed to allow orderly shifts in textile trade, guaranteeing exporters growth in negotiated quotas, and some flexibility in meeting them. In response to rapidly expanding exports from selected low-wage textile producers, importing signatories to the MFA were permitted to withdraw the principle of nondiscrimination enshrined elsewhere in the GATT. The principle of nondiscrimination among GATT signatories assures that every member of GATT is offered the most favorable trading rules an importer offers to any other. Under the MFA, importers can regulate imports bilaterally rather than multilaterally. By negotiating bilaterally with textile exporters, importing countries could set quotas that more effectively prevent import surges.

As a signatory to the MFA, the United States had bilateral trade agreements involving cotton textile imports with 40 countries in 1988, compared with 20 countries in 1983. In addition to the broader country coverage in 1988, the agreements are more comprehensive in product coverage. In 1988, 14 of the 40 agreements covered all cotton imports, compared with 6 of the 20 agreements in 1983. Countries with comprehensive coverage accounted for 63 percent of U.S. textile cotton imports in 1987. Although not all U.S. cotton textile imports in 1988 were charged against

import quotas, tariffs covered all textile imports. U.S. import tariffs on cotton yarn, woven cotton fabrics, and wearing apparel and accessories averaged 7.6, 9.2, and 20.3 percent, respectively, of customs value in 1988.

In addition to quotas and tariffs, the quantity of U.S. cotton textile imports is highly influenced by domestic economic conditions and the international value of the U.S. dollar. For instance, a 1-percent improvement in the performance of the domestic economy is likely to raise cotton textile imports by 1.7 percent. Likewise, a 1-percent increase in the trade-weighted exchange value of the dollar is likely to result in a proportionate increase in cotton textile imports. Thus, as the U.S. economy strengthens (weakens), imports of cotton textile products will likely increase (decline).

The completion of the Uruguay Round will eventually increase the importance of economic factors in determining textile imports by the United States and other developed countries. Under the new Agreement on Textiles and Clothing, quotas will be phased out over a 10-year period, and growth rates will rise for quotas still in place during the transition. In addition to supplanting the MFA, the new Agreement will bring all other textile trade relations between GATT members into conformance with international trade rules, since many countries, both developed and developing, use non-MFA trade restrictions on textile and clothing imports. Nonmembers of GATT will not necessarily benefit from this liberalization, and major exporters such as China and Taiwan are not GATT members at this time.

Cotton Programs

The Food, Agriculture, Conservation, and Trade (FACT) Act of 1990 provides the framework for the Secretary of Agriculture to administer agriculture and food programs for the 1991-95 period. Commodity programs, including cotton, are traced back to the Agricultural Adjustment Acts of 1933 and 1938, and the Agricultural Act of 1949 (referred to as the permanent legislation). Thus, the current cotton program is legislated under the 1949 Act as amended by previous legislation and by the FACT Act of 1990.

A detailed history of these early cotton programs is found in *Fibers: Background for 1990 Farm Legislation*, AIB-591, Economic Research Service, USDA, March 1990. The foundation and basis for the FACT Act of 1990, however, was the Food Security Act of 1985. It was by this act that the guiding principles and provisions of the current cotton program were developed. Therefore, an understanding of the cotton provisions of the 1985 Act, and how well they performed in a more market-driven environment, is important in providing perspective on the forces that led to the 1990 Act.

Food Security Act of 1985

The primary objective of the cotton provisions of the Food Security Act of 1985 was to make U.S. cotton competitive in the world market. Prior to the 1985 Act, the upland cotton loan rate placed an artificial floor under U.S. prices. This encouraged foreign production. When world supplies were excessive, world cotton prices would drop below the U.S. loan rate, the United States would become a residual supplier, and exports would decline. Because of the relatively high fixed loan rate, foreign competitors were often able to set prices below the loan rate and erode U.S. world market share.

The 1985/86 marketing year was a prime example of these conditions. The U.S. loan rate was well above world prices, and U.S. exports dropped sharply to less than 2 million bales from the preceding 5-year average of 6.1 million bales. Lower exports and a relatively large 1985 crop pushed stocks from 4 million bales at the beginning of 1985/86 to 9.3 million at season's end.

The Food Security Act of 1985 continued many of the major features of past farm acts, including acreage limitations, nonrecourse loans, and target prices, but also gave the Secretary of Agriculture more discretionary authority for administering annual commodity programs. The act provided for greater market orientation and more flexibility in promoting market competitiveness. The act reversed the upward trend in target prices as it specified declining target price minimums through 1990. Farm program yields were frozen at 1985 levels for 1986-90 crops, halting the upward trend. Loan rates continued to be tied to an average of past market prices, but the minimum loan rate for base quality was set at 50 cents a pound through 1990 and loan rates could be reduced more than 5 percent from one year to the next. Important new provisions were included for allowing loans to be repaid at levels below the loan rate if market competitiveness might be hampered by the formula-determined rate.

A major new provision for the 1985 Act, the marketing loan, provided a loan repayment plan if the basic loan rate was not competitive on world markets. The marketing loan was an attempt to keep U.S. cotton

competitive in world markets and at the same time retain the basic loan program, including a statutory minimum loan rate that at times has been greater than the world price. Under this program, USDA each week calculates and publishes an adjusted world price (AWP). The AWP is the prevailing world market price of cotton adjusted to U.S. base quality and location. The procedure for establishing the weekly AWP is based on a specified formula developed by USDA. Congress gave the Secretary of Agriculture discretionary authority to develop and modify this formula as deemed necessary to keep U.S. cotton competitive.

If the world price of cotton, as determined by the Secretary, was below the loan rate, one of two loan repayment plans had to be implemented. Under Plan A, the Secretary could lower the loan repayment rate by up to 20 percent, thus allowing farmers to redeem their crops and sell them at a more competitive price. The repayment level had to be announced when the Secretary announced the loan rate (by November 1) and could not be changed during the season.

Under Plan B, the repayment rate varied periodically during the year to keep pace with world markets. For the 1987-90 crops, if the AWP was below 80 percent of the basic loan rate, a loan repayment level under Plan B could be set at any level between the adjusted world price and 80 percent of the loan rate. Plan A was chosen for the 1986 crop, with a loan repayment rate equal to 80 percent of the basic loan rate for each quality of cotton. Plan B was subsequently selected for the 1987-90 crops.

If either Plan A or Plan B of the marketing loan program failed to make U.S. cotton fully competitive in world markets and the AWP was below the loan repayment rate, negotiable marketing certificates redeemable only for cotton would be issued to cotton buyers (first handlers). The value of the certificates was based on the difference between the loan repayment rate and the adjusted world price.

The 1985 Act froze the upland cotton target price for the 1986 crop at the 1985 level of 81 cents per pound. Subsequent mandated minimum target prices were 79.4 cents per pound in 1987, 77.0 cents in 1988, 74.5 cents in 1989, and 72.9 cents in 1990. However, the Agricultural Reconciliation Act of 1987 reduced the minimum to 75.9 cents in 1988 and 73.4 cents in 1989.

If the Secretary determined that the supply of cotton was excessive, he would authorize an acreage limitation program or paid diversion program, or both. The act specified that, to the extent practicable, an acreage limitation program should create a carryover of 4 million bales of upland cotton.

Deficiency payments were made available to eligible producers in an amount computed by multiplying the payment rate by the individual farm program acreage times the farm program payment yield. The payment rate was equal to the target price minus the higher of the national average market price received by producers during the calendar year that includes the first 5 months (August-December) of the marketing year or the basic loan rate determined for the crop. If an acreage limitation program was in effect, and if producers planted cotton for harvest on at least 50 percent but no more than 92 percent of the permitted acreage (base acreage less required reduction), and if the remaining permitted acreage was placed in conservation uses or certain approved nonprogram crops, then deficiency payments were made on 92 percent of the permitted acreage. This requirement is commonly known as the "50/92" provision. If producers planted less than 50 percent of their permitted acreage, or planted 92 percent or more of their permitted acres, then deficiency payments were made on the acreage planted for harvest. If no acreage limitation program was in effect, payments were reduced by an allocation factor if total harvested acreage exceeded an announced national program acreage.

The act specified that the total combined deficiency and diversion payments of a producer could not total more than $50,000 annually during 1986-90 under one or more programs for wheat, feed grains, upland cotton, ELS cotton, and rice. Disaster payments were limited to $100,000 per person. Exempted from the payment limits were loans or purchases, gains realized from repayment of loans under the marketing loan provisions of the act, loan deficiency payments received by participating producers who agreed to forgo obtaining loans in return for such payments, and inventory reduction (payment-in-kind) payments received by producers who agreed to forgo loan and deficiency payments and reduce acreage by half the announced average reduction. The inventory reduction program was never implemented.

In October 1986, Congress established a new ceiling of $250,000 on total farm payments, effective with all 1987 commodity programs. The new ceiling included the $50,000 payment limit for regular deficiency payments and land diversion payments, as well as all other government payments except crop support loans, grain reserve storage payments, upland cotton

first handler marketing certificate payments, and rice marketing certificate payments.

Marketing Loan Modifications

The marketing loan program provisions initially functioned as intended. World prices declined sharply in the months following enactment of the 1985 Act, as many major foreign competitors lowered their prices in an effort to sell their cotton prior to implementation of the new U.S. program on August 1, 1986. Foreign acreage was lowered about 3.5 percent in 1986 from 1985. U.S. cotton was once again competitive in the world marketplace. Exports of upland cotton rebounded to 6.6 million bales in 1986/87, while U.S. textile mills were running at near capacity. Domestic cotton use grew by 1 million bales in 1986/87. Stocks were reduced sharply from the 9.3 million bales at the beginning of the 1986 season to 5.0 million on July 31, 1987, 25 percent above the level (4 million) targeted under the 1985 Act. Stronger demand and falling stocks caused cotton prices, both domestic and foreign, to increase throughout the 1986/87 season, more than doubling during the period. The AWP went above the loan rate in April 1987 and stayed above until mid-July 1988, eliminating the marketing loan for more than 15 months.

At the beginning of the 1987/88 season, U.S. cotton prospects were very encouraging. But higher cotton prices caused both foreign and U.S. cotton production to expand by about 5 million bales. As the season progressed, foreign prices declined more sharply than U.S. prices because of the equity (premium above loan) demand by producers. By February 1988, U.S. cotton was no longer competitive in the world markets. U.S. export sales dropped and stocks began to build. The marketing loan program did not work as intended.

A number of changes aimed at improving the effectiveness of the marketing loan program were made by USDA at the recommendation of the cotton industry on August 19 and August 22, 1988. Additional changes were also made effective February 3, 1989. These changes, at the discretion of the Secretary of Agriculture, primarily affected the way in which the AWP was calculated, the payment of storage and interest, and several other adjustments which attempted to fine-tune the program.

Despite all the changes, U.S. cotton remained uncompetitive throughout much of the 1988/89 season. U.S. exports declined by 400,000 bales compared with the 1987 season. In addition, the 1988 crop totaled 15.1 million bales, the largest since 1981. The increased production and lower exports resulted in a further substantial buildup in stocks. Stocks on August 1, 1989, totaled 7.0 million bales, 1.3 million above the beginning of the season.

As a result, additional changes in the marketing loan program were announced on October 3, 1989. In an effort to keep U.S. cotton competitive in world markets, discretionary authority was added to reduce the AWP if:

- The formula-derived AWP is less than 115 percent of the current crop year base loan rate and
- The Friday-through-Thursday average price quotation for the lowest priced U.S. growth as quoted for Middling (M) 1-3/32-inch cotton, c.i.f. Northern Europe (U.S. Northern Europe price) exceeds the Friday-through-Thursday average price quotation for the five lowest priced growths quoted for M 1-3/32-inch cotton, c.i.f. Northern Europe (Northern Europe price).

Also, beginning with the 1989 crop, changes were made to make it more costly for producers to hold cotton off the market. Producers who extended loans for the additional 8-month period were required to pay interest and warehouse charges during the loan extension period regardless of the level of the AWP.

Further, if the loan collateral were forfeited to the Government, the producer was required to pay the Government 8 months of storage charges plus a handling fee of $1.00 per bale on the forfeited cotton.

The 1989/90 and 1990/91 marketing years were highlighted by tight U.S. and world stocks. U.S. production was curtailed by a 25-percent ARP in 1989 and a 12.5-percent ARP in 1990. U.S. farm prices and the AWP were well above the loan rate. The marketing loan was not a factor in either season. U.S. cotton was competitive and farm program costs were low compared to earlier years.

Food, Agriculture, Conservation, and Trade Act of 1990

The cotton situation and outlook was dramatically different during development of the 1990 farm legislation than during development of the Food Security Act of 1985. In contrast to the earlier period, stocks of cotton were low, and domestic use and exports were high. The primary objectives of the new farm legislation were to provide farmers with additional planting flexibility, reduce the overall cost of

the programs, and assure that the noncompetitive situation of 1988 would not be repeated.

Title V of the FACT Act of 1990 established cotton farm policy for the 5 crop years 1991/92-95/96. The Omnibus Budget Reconciliation Act of 1990 amended several provisions in order to reduce program costs. Later, the FACT Act Amendments of 1991 made a number of technical corrections and other modifications to the program.

Target prices and deficiency payments were continued but the minimum target price for 1991-95 was set at the 1990 level of 72.9 cents per pound. The Budget Reconciliation Act set the maximum payment acreage (MPA) at 85 percent of the crop acreage base (CAB) minus the acreage reduction program (ARP) requirement. Previously the MPA equaled the CAB minus the ARP.

The same loan rate formula and minimum loan rate continued, but the 1990 Act authorized the base quality to be determined by the Secretary of Agriculture. The Secretary changed the base quality beginning with the 1991 crop. Strength was added as a quality factor and the micronaire base (which measures fineness and maturity of the fiber) was changed from a single range of 3.5 through 4.9 to either 3.5 through 3.6 or 4.3 through 4.9. A loan premium was added for micronaire 3.7 through 4.2 for the higher qualities. The 1991 crop loan rate was set at 50.77 cents per pound and the 1992 rate at 52.35 cents per pound.

The marketing loan program was continued with some modifications. Plans A and B were eliminated. The minimum loan repayment rate was set at 70 percent of the loan rate. If the AWP falls below 70 percent of the loan rate, payments must be made to first handlers of cotton. The payment rate equals the amount that the AWP is below 70 percent of the loan rate. Loan deficiency payments must also be made available to producers who forgo loan eligibility. The payment rate equals the difference between the loan rate and the loan repayment rate. The 1990 Act requires loan deficiency payments to be made available on total production, whereas the 1985 Act limited those payments to the program yield.

A new 3-step procedure was included in the 1990 Act to help keep U.S. cotton price-competitive in domestic and export markets.

- Step 1 incorporated into law the discretionary AWP adjustment that USDA implemented on October 3, 1989.
- Step 2 requires payments, in either cash or marketing certificates, to be made to domestic users and exporters for documented purchases in a week following a consecutive 4-week period in which the weekly U.S. Northern Europe price exceeds the Northern Europe price by more than 1.25 cents per pound. A second condition for these payments is that the AWP does not exceed 130 percent of the current crop year loan rate. However, no payments will be issued if, for the preceding consecutive 10-week period, the weekly U.S. Northern Europe price, adjusted for the value of any payments issued, exceeds the Northern Europe price by more than 1.25 cents per pound.
- Step 3 requires that a special import quota be opened if, for a consecutive 10-week period, the U.S. Northern Europe price, adjusted for the value of any payments issued under Step 2, exceeds the Northern Europe price by more than 1.25 cents per pound. The amount of the quota is equal to 1 week's domestic mill consumption. Importers have 90 days to purchase and 180 days to enter the cotton into the United States after the quota proclamations. Quota periods can overlap.

The Step 3 import quota is in addition to the special import quota required whenever the average spot market price for a month exceeds 130 percent of the average spot market price for the preceding 36 months. This quota, provided for by the Food and Agriculture Act of 1977, equals 21 days of domestic mill consumption and exporters have 90 days to purchase and enter the cotton into the United States. Neither of these special import quotas can be established if the other is already in effect.

Authority for ARP's and paid land diversion (PLD) was continued with some modifications. The 1990 Act provides for an ARP of 0 to 25 percent. Based on projections at the time of the announcement, an ARP must be established at a level that will result in a stocks-to-use ratio of 30 percent at the end of the marketing year. A preliminary ARP must be announced by November 1 and a final ARP by January 1 preceding the marketing year.

The 1990 Act also changed the method of determining the amount of land required to be idled under an ARP--the acreage conservation reserve, or ACR. Beginning with the 1991 crop, the ACR is determined by multiplying the ARP percentage by the crop acreage base (CAB). Previously, the ACR was calculated from planted acreage. Another new provision requires producers, except in arid and summer fallow

areas, to plant a cover crop of 50 percent of the ACR not to exceed 5 percent of the CAB.

A PLD can be announced either with or without an ARP. However, the 1990 Act mandates a PLD of up to 15 percent of the CAB if carryover stocks at the time of final ARP announcement are projected to be 8 million bales or more. The diversion payment rate must be not less than 35 cents per pound.

Another new provision of the 1990 legislation permits producers to plant up to 25 percent of any CAB to any commodity except fruits and vegetables (including potatoes, dry edible beans, peas, and lentils) and mung beans. This acreage is known as flex acreage. The 15 percent of the CAB not eligible for deficiency payments is called normal flex acreage or NFA. Because deficiency payments are not made on NFA, producers' planting decisions are heavily influenced by market prices, rotation requirements, and other nonprogram factors. The remaining 10 percent is called optional flex acreage, or OFA. The base crop is eligible for deficiency payments on these acres. Crops that may be planted on flex acreage are any other program crop (wheat, corn, grain sorghum, barley, oats, and rice), any oilseed, any industrial or experimental crop designated by the Secretary, and any other crop except fruits and vegetables. The Secretary may, however, prohibit the planting of any specific crop. Crops planted on flex acreage may be eligible for loans but not deficiency payments.

The 50/92 provisions were continued but modified to reflect the 15-percent reduction in payment acres (NFA). Producers who plant between 50 and 92 percent of the MPA to cotton and devote the remaining acreage to conserving uses or approved nonprogram crops are eligible for deficiency payments on 92 percent of the MPA. In addition, a special prevented planting provision was included. Producers who devote prevented planting acreage to conserving uses are eligible for deficiency payments provided the sum of prevented plantings and actual plantings equal at least 50 percent of the MPA. Payments under the 50/92 and prevented planting provisions are guaranteed at no less than the payment rate projected at the time of sign-up. The guarantee does not apply to actual plantings.

The method of determining upland cotton CAB's was changed. For 1991-95, the CAB will equal the average acreage planted and considered planted (P&CP) during the immediately preceding 3 years. However, a transition was included for those farms that did not participate in the upland cotton program in 1989, 1990, and 1991. Such farms could base their CAB's for 1991 (for those who first planted in 1989) and 1992 (for those who first planted in 1990) on the average P&CP for the preceding 5 years, excluding the year with zero plantings, but the CAB cannot exceed the average P&CP during the preceding 2 years. The transition rules are the same rules that were in effect in 1986-90. Another new provision prohibits a producer who is eligible to receive a deficiency payment for any program crop or ELS cotton from using P&CP acreage to increase a CAB for subsequent years. That is, a producer cannot stay out of one program and build a base if the producer is participating in any other program in which a deficiency payment is made. Producers who do not plant any acreage can protect the CAB by certifying that zero acreage was planted, provided that any fruits or vegetables planted on that farm do not exceed the normal acreage for those crops planted on the farm.

For each of the 1991-95 crops, the total amount of payments a person may receive under one or more of the commodity programs (including oilseeds) may not exceed:

- $50,000 for deficiency and diversion payments;
- $75,000 for marketing loan gains, loan deficiency payments, and any wheat or feed grain emergency compensation payments resulting from a reduction in the basic loan level (Findley payments); and
- A total of $250,000 for the above two limits and any payments for resource adjustment (excluding diversion payments) or public access for recreation, and any inventory reduction payments.

Total disaster payments are limited to $100,000. Technical changes to the payment limitation provisions were also included with respect to spouses, growers of hybrid seeds, and irrevocable trusts. Other payment limitation provisions of the Food Security Act of 1985 were extended for the 1991-95 crops.

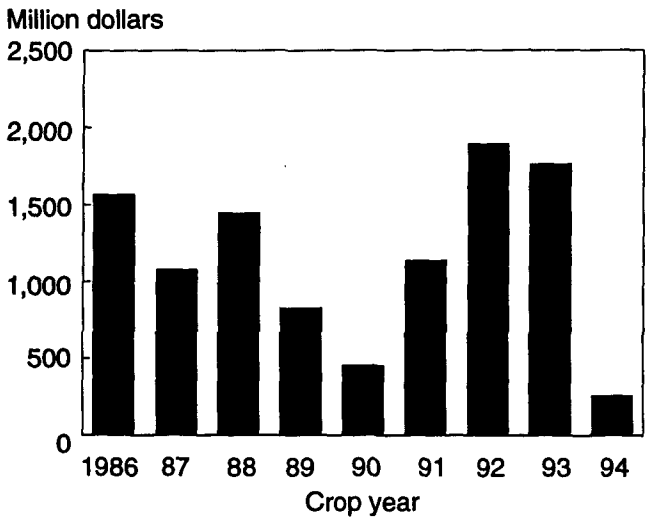
Program Performance

The marketing loan program (1985 Act) and the 3-step competitive adjustment procedures (1990 Act) have supported the significant turnaround in the overall health of the U.S. cotton economy. Cotton production and total offtake (mill use and exports) have increased sharply despite intense competition from foreign supplies. Since the 1991/92 season, cotton production (upland and ELS) has exceeded 16 million bales--the highest level in over 40 years. Combined disappearance has exceeded 15 million

bales, representing a growth of over 50 percent in market demand for U.S. raw cotton since the inception of the marketing loan program. U.S. textile mills are consuming cotton at rates not seen since the 1950 season. Exports of raw cotton and cotton textiles have also expanded and remain competitive on the world market. Also, large carryover stocks of cotton have been eliminated under the current cotton program.

While the current legislation has helped stabilize farm income and encouraged U.S. production and consumption, these benefits were achieved at a relatively high government cost (fig. 8). Commodity Credit Corporation (CCC) outlays are primarily a function of the ARP level, program participation, and the levels of U.S. and world (AWP) cotton prices. The ARP level and participation rates determine the amount of payment acres, while market prices determine the deficiency payment rate and, for the most part, costs associated with the marketing loan. Although the Government sets the ARP, the other factors are heavily influenced by the world cotton supply and demand situation. The potential price differential subsidized by the CCC is practically unlimited; in the worst case scenario, it is the difference between the target price (72.9 cents a pound) and the minimum AWP, which is 70 percent of the minimum loan rate (70 percent of 50 cents is 35 cents a pound). The largest subsidy under the new legislation was in 1992/93 when the average AWP was around 42 cents a pound, compared to the 72.9-cent target price.

Figure 8
Upland Cotton Program Costs*



*Includes marketing loan gains when applicable.

The breakup of the Soviet Union partly accounted for the unusually high cotton program costs during crop years 1991-93. About 5 million bales of Central Asian cotton were dumped on the world market, greatly depressing world prices. Much of this cotton, usually consumed in Russia, Ukraine, and other Eastern European countries, was traded under special barter arrangements or sold at "below cost" to obtain much needed foreign exchange and consumer products. As a result, world cotton prices generally trended downward from June 1991 through November 1993. The loan repayment rate or AWP was less than the loan rate for most of this period. As a result, marketing loan costs were substantial. U.S. farm prices followed world prices down, at least to near the loan rate, and government deficiency payment outlays increased sharply.

Figure 9
"A" Index and U.S. Northern Europe Quote, 1991/92 - 1993/94

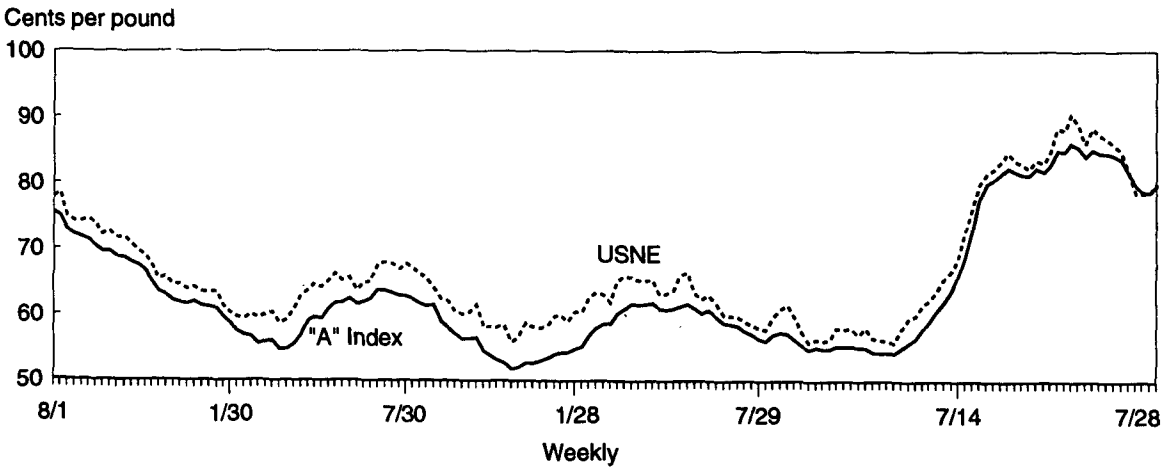


Fig. 9 illustrates the degree of U.S. cotton competitiveness during the 1991-93 crop years. The weekly Northern Europe price quote ("A" Index), the indicator of world price levels, and the corresponding cheapest U.S. price quote delivered to Northern Europe markets (USNE) are shown. The difference between these two price series is used to establish the value of the weekly marketing certificates paid to exporters and domestic users of U.S. cotton.

For the 156 weeks shown, U.S. quotes remained above the "A" Index until the last month of the 1993/94 season. In addition, for 130 weeks out of the total, or 83 percent of the time, U.S. quotes exceeded the "A" Index by more than the prescribed 1.25 cents a pound--triggering the issuance of Step 2 marketing certificates.

Certificate values for current crop cotton ranged from less than one-tenth of a cent a pound to almost 5.3 cents. Beginning in the spring of 1992, forward certificates were also available for new crop cotton to be delivered after September 30. The first forward rate was 5.5 cents a pound in April 1992 and a record 6.6 cents in the spring of 1993. About 48 percent of total 1992/93 exports were committed for sale using the forward certificates, and over 71 percent of 1993 crop exports utilized the forward certificates.

Even though U.S. quotes were above the "A" Index, U.S. exporters have been able to utilize the Step 2 certificates in competing with foreign-produced cotton. For 133 weeks out of the 156 weeks, U.S. cotton was included in the "A" Index as one of the five cheapest growths. Over 85 percent of the time U.S. cotton was selling competitively on the "world market."

During the 1991/92 season, U.S. Northern Europe quotes averaged about 3.3 cents a pound above the "A" Index, as world prices fell throughout most of the year (table 8). The value of marketing certificates averaged 2.08 cents a pound, and U.S. exports totaled 6.6 million bales, or 23 percent of world cotton trade.

The 1992/93 season began with continued low U.S. stocks, and aggressive foreign competition, especially from Central Asia. Special barter arrangements and "below-cost" pricing helped push the "A" Index below 58 cents a pound for most of the season. The average price gap between U.S. and competing foreign cotton widened to nearly 5.5 cents a pound and certificate values increased to an average of 4.2 cents. Less competitive U.S. prices and a 10-percent drop in world cotton trade caused U.S. exports to fall sharply to 5.2 million bales. The certificate program moderated the U.S. loss in market share as it dropped to about 21 percent.

U.S. cotton supplies increased in 1993/94 and world trade prospects improved. World and U.S. prices moved upward, increasing sharply as crop shortages in several major producing countries (India, Pakistan, and China) became apparent. The average price gap between U.S. Northern Europe quotes and the "A" Index narrowed to about 2.17 cents a pound, with later certificate values averaging only 0.72 cents a pound. U.S. exports rose sharply, totaling 6.9 million bales, and market share reached 26 percent. U.S. exporters used the forward certificates, which were locked in at high rates in the spring, to become aggressive sellers when world prices increased later in the season.

Prospects for the 1994/95 season indicate a continuation of present trends. However, government program costs should be reduced substantially if domestic and world cotton prices remain strong.

Although the cotton ARP was raised to 11 percent for 1994, U.S. cotton production is expected to expand to over 19.7 million bales as stronger prices encouraged production outside the program. The normal flex acres provision boosted cotton acres by about 350,000. U.S. mill consumption is projected to ex-

Table 8–U.S. cotton competitiveness, 1991-93

Crop year	Average price gap ("A" Index-USNE)	Average certificate value	U.S. exports	U.S. share of world trade
	----Cents per pound----		Million bales	Percent
1991/92	3.33	2.08	6.6	23.7
1992/93	5.47	4.22	5.2	20.4
1993/94	2.17	0.72	6.9	25.8

Source: USDA.

ceed 11.0 million bales--6 percent above last season, and exports could grow to about 9.2 million bales. An increase in world consumption and tight foreign supplies should allow the United States to provide a larger-than-normal share of world trade.

If projections materialize, U.S. cotton program costs during 1994/95 could drop by about 70 percent from 1993/94's high level. In contrast to the 1985 Act, where the constant fine-tuning of program mechanics was necessary, the current program has required little modification during the 3-1/2 years of operation. The only major change was in the Step 2 user marketing certificate program.

The availability of high forward-certificate rates early in the season caused disruptions to normal marketing patterns. Large export sales were committed at the beginning of the season. Many of the contracts were made by exporters to their own foreign affiliates, and the final destinations listed as unknown. This practice was deemed a disadvantage to smaller exporters without foreign affiliates who may not be able to arrange for final sales so far in advance. In addition, domestic mills, ineligible for forward-payment rates, compete with foreign users of U.S. cotton that may have purchased U.S. cotton at lower prices made possible by the high forward-payment rates.

After consultation with the cotton industry and others, USDA announced new Step 2 procedures in April 1994. The revisions apply only to the payment rate calculation for forward export sales (for shipment after September 30 of the next marketing year). No changes were made in the calculation for current export sales (for shipment before September 30 of the next marketing year) or to domestic mills. The revision phases in the forward-certificate payment rate to exporters, but allows them to earn a payment on forward crop sales beginning earlier in the marketing year with a 2.5-cents-a-pound maximum rate. These changes are expected to support the program intentions of competitively priced U.S. cotton.

Program Effects

The effects of the cotton provisions of the 1990 FACT Act and related legislation on producers, consumers, and taxpayers are distributed unevenly among sectors. Producers have generally improved their level of income through price supports and government payments; consumers have experienced only very small retail price effects; but taxpayer costs, or government expenditures, have been substantial in some years.

Producers

The degree of producer benefits from cotton programs is associated with rates of participation, the level of government support, and the acreage and production involved.

Program Participation. Potential net revenue is the bottom line in a producer's decision to participate in government programs. Depending on the various program provisions and cropping alternatives, the decision can be complex. Program provisions important to this decision include price support and target price levels, the payment base, acreage reduction or diversion requirements, cross-and-offsetting-compliance requirements, and payment limitations. Other important decision variables include expected market price and expected yields of cotton and alternative crops.

The loan program is used by many growers. The program enables cash expenses to be met until the crop can be marketed, and it can eliminate a portion of price and weather risk. The availability of loans undoubtedly promotes participation of some producers, but the guiding philosophy since the mid-1960's has been that the loan rate should not attract additional resources into cotton production if the market is not calling for those resources.

The unique feature of the marketing loan program is that producers may repay their loan at the loan rate or the current AWP, whichever is *lower*. This enables cotton to move into the market instead of accumulating in government inventories when market prices are low. When producers repay loans at less than the loan rate there is added income to the producer, but this is not considered a direct payment by the CCC. Producers' marketing loan gains are accounted for as a loss on CCC loan activity.

While participation in recent cotton programs has been voluntary, only program participants have been eligible for price support loans, target price protection, and other direct program benefits. Participation has been relatively high because of these attractive benefits.

During the 1986-94 period, participation rates ranged from 84 percent in 1991--a year with very low beginning stocks and a strong market price outlook--to 93 percent in 1987 (table 9). However, there is greater variation among participation rates for the four major cotton-producing regions, due to the unique situation each region faces. The Southwest usually has the highest rates because of greater yield and production