

Cotton

Background for 1990 Farm Legislation

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Introduction

Upland cotton comprises 98 percent of all cotton grown in the United States. Extra-long staple (ELS) cotton, which historically has been considered a unique crop for program purposes, is not covered in this report. Cotton is the single most important textile fiber in the world, accounting for about 67 percent of all fibers used. Cotton is grown in about 75 countries. China, the Soviet Union, and the United States account for about 60 percent of world production. During 1986-88, the United States produced about 20 percent of the world's cotton and used 10 percent.

Cotton has been a major cash crop and an important source of foreign exchange in the United States for nearly 200 years. Cotton was first grown in the United States at Jamestown in the early 17th century, but it remained a minor crop until 1793 when Eli Whitney invented the cotton gin to separate the seed from the lint. This development spurred production, with most of the lint being exported to textile mills in England. In 1850, for example, nearly 90 percent of lint production was exported, with the earnings offsetting the costs of about two-thirds of all goods imported into the United States. U.S. exports of raw cotton during 1980-82 accounted for about 30 percent of world cotton trade. Export earnings averaged about \$2 billion, or about 5 percent of the total value of U.S. agricultural exports.

In 1982, cotton ranked fifth (\$4.5 billion) among the major field crops in value of farm production, following corn (\$12.1 billion), soybeans (\$10.3 billion), wheat (\$5.4 billion), and harvested hay (\$9.1 billion).

Cotton lint is used chiefly in clothing and home furnishings, with lesser amounts used in industrial products. The seeds are crushed for oil and the remaining meal is fed to livestock as a protein meal. The short fuzz on the seed, called linters, has many uses, including padding materials, nonwoven fabric, and as a source of cellulose for making rayon, plastics, and other products.

Structure of the Cotton Industry

Production Characteristics

Cotton is currently produced in 17 States from California to Virginia, with major concentrations in the Delta areas of Mississippi, Arkansas, and Louisiana; the Texas High Plains and Rolling Plains; central Arizona; and the San Joaquin Valley of California. Forces influencing location of production are ultimately reflected in relative returns among products that can be grown in an area and costs of inputs, which determine comparative advantages of production among areas. Soils, topography, elevation, temperature, and water availability are 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.

The predominant type of cotton grown in the United States, Gossypium hirsutum, is better known as American upland cotton. It typically accounts for about 98 percent of the total U.S. cotton crop. It is grown throughout the Cotton Belt as well as in most of the major cotton producing countries. Another type of cotton grown in the United States, Gossypium barbadense, is commonly referred to as American-Pima, or extra-long staple (ELS) cotton. ELS cotton is grown chiefly in West Texas, New Mexico, and Arizona where it is particularly well adapted to environmental conditions. The production of ELS cotton is small relative to that of upland cotton because its production costs per pound are higher and its markets are chiefly high-value products such as sewing thread and expensive apparel items.

Trends in Acreage, Yield, and Production

Cotton acreage in the United States increased from less than 8 million acres at the end of the Civil War to more than 44 million acres in the mid-1920's. Production over that period ranged from about 2 million bales in 1866 to about 18 million bales in 1926. Cotton yields averaged about 180 pounds per harvested acre and rarely exceeded 200 pounds during the 1866-1930 period.

From 1930 to the mid-1960's, acreage trended down but yields moved upward (fig. 1). Yields increased from 269 pounds per harvested acre in 1950 to 527 pounds in 1965, about 4.5 percent per year. Since 1965, yields have shown considerable fluctuation but no obvious trend until the 1980's when average yield began to climb. While Government programs and prices of cotton and competing crops have influenced acreage, weather has been the chief determinant of year-to-year variability in yields. U.S. production has averaged more than 12 million bales a year during the past decade, fluctuating from a low of 7.8 million bales in 1983 to a high of 15.6 million bales in 1981.

The westward shift of U.S. cotton production seems to have ended. In 1980, the West (California, Arizona, and New Mexico) accounted for about 41 percent of U.S. output, up from 16 percent in 1970

(table 1). In contrast, the southeastern share had declined to about 5 percent of the total. The Southwest (Texas and Oklahoma) and the West accounted for nearly 74 percent of U.S. cotton production by 1980, compared with 51 percent in 1970. This regional shift was due chiefly to lower average farm production costs in the West and Southwest and to the elimination of marketing quotas and the restrictive acreage allotments that were tied to historical locations of production. Since 1980 the share of production in the Southeast and the Delta has increased. By 1987 the share of production in the West and Southwest had dropped to about 60 percent.

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 crops, and barley in the irrigated Far West. Competition from soybeans has resulted in significant fluctuation in cotton acreage in the Delta in recent years.

Number and Size of Farms

The trend to fewer and larger cotton farms appears to have ended (table 2). Like most other kinds of farms, there has been a long-term trend to fewer but larger cotton farms in response to economic and technological forces. In 1949 there were 1,110,000 farms growing cotton in the United States with an average of 24 acres of cotton per farm. By 1982 the number of farms dropped to 38,000 and average acreage increased to 256 acres. Cotton acreage

Figure 1
U.S. cotton acreage and yield

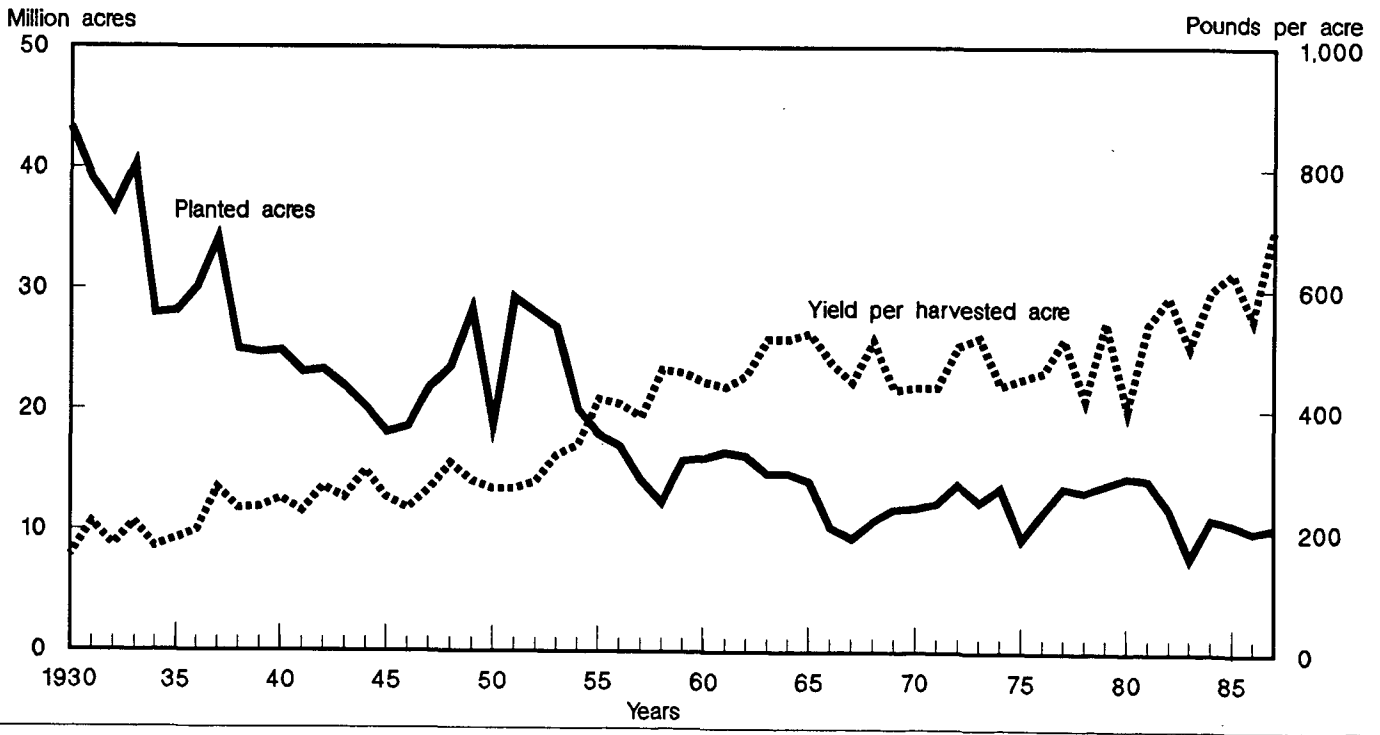


Table 1--Cotton acreage harvested, yield per harvested acre, and production, by region, 1965-87

Crop year 1/	Southeast 2/	Delta 3/	Southwest 4/	West 5/	United States 6/
<u>1,000 acres</u>					
Acreage:					
1965	2,280	3,974	6,293	1,068	13,615
1970	1,375	3,355	5,487	938	11,155
1975	690	2,616	4,317	1,173	8,796
1976	898	3,611	4,913	1,492	10,914
1977	808	3,388	7,129	1,949	13,275
1978	574	2,862	6,936	2,028	12,400
1979	613	2,412	7,552	2,254	12,831
1980	672	2,846	7,565	2,132	13,215
1981	764	2,943	7,971	2,163	13,841
1982	623	2,381	4,847	1,882	9,734
1983	470	1,683	3,930	1,264	7,347
1984	697	2,629	5,095	1,058	10,379
1985	807	2,595	5,030	1,797	10,229
1986	722	2,545	3,801	1,289	8,357
1987	819	2,814	4,801	1,481	9,915
<u>Pounds per acre</u>					
Yield:					
1965	453	610	401	1,112	527
1970	410	546	310	846	438
1975	422	457	293	1,050	453
1976	413	382	348	1,083	465
1977	313	542	411	967	520
1978	473	493	297	725	420
1979	501	609	392	1,013	547
1980	355	409	232	1,021	404
1981	541	554	376	1,142	542
1982	749	747	302	1,082	590
1983	415	564	323	1,042	508
1984	722	701	367	1,029	600
1985	741	689	404	1,131	630
1986	493	577	347	1,110	547
1987	581	788	495	1,262	700

See footnotes at end of table.

Continued --

Table 1--Cotton acreage harvested, yield per harvested acre, and production, by region, 1965-87--Continued

Crop year 1/	Southeast 2/	Delta 3/	Southwest 4/	West 5/	United States 6/
<u>1,000 bales</u>					
Production:					
1965	2,150	5,051	5,262	2,475	14,938
1970	1,175	3,819	3,545	1,653	10,192
1975	607	2,491	2,636	2,567	8,302
1976	733	2,874	3,565	3,368	10,580
1977	527	3,827	6,109	3,927	14,389
1978	566	2,939	4,288	3,063	10,856
1979	639	3,061	6,172	4,757	14,629
1980	498	2,424	3,664	4,536	11,122
1981	862	3,394	6,244	5,146	15,646
1982	972	3,707	3,049	4,235	11,963
1983	406	1,979	2,643	2,743	7,771
1984	1,049	3,842	3,992	4,098	12,982
1985	1,246	3,723	4,313	4,151	13,432
1986	740	3,057	2,746	2,982	9,525
1987	992	4,622	4,951	3,895	14,460

Percent

Regional shares
of U.S. production:

1965	14.4	33.8	35.2	16.6	100
1970	11.5	37.5	34.8	16.2	100
1975	7.3	30.0	31.7	30.9	100
1976	7.3	27.2	33.7	31.8	100
1977	3.7	26.6	42.5	27.3	100
1978	5.2	27.1	39.5	28.2	100
1979	4.4	20.9	42.2	32.5	100
1980	4.5	21.8	32.9	40.8	100
1981	5.5	21.7	39.9	32.9	100
1982	8.1	31.0	25.5	35.4	100
1983	5.2	25.5	34.0	35.3	100
1984	8.1	29.6	30.7	31.6	100
1985	9.3	27.7	32.1	30.9	100
1986	7.8	32.1	28.9	31.3	100
1987	6.9	32.0	34.2	26.9	100

1/ Year beginning August 1. 2/ Virginia, North Carolina, South Carolina, Georgia, Florida, and Alabama. 3/ Missouri, Arkansas, Tennessee, Mississippi, Louisiana, Illinois, and Kentucky. 4/ Texas, Oklahoma, and New Mexico. Includes a small quantity of ELS cotton. 5/ California, Arizona, and Nevada. Includes a small quantity of ELS cotton. 6/ Totals may not add due to rounding.

per farm increased 87 percent from 1974 to 1982 while the number of farms dropped by 43 percent. However, preliminary data from the 1987 Census of Agriculture indicate that the number of farms producing cotton is up about 10 percent since 1982 and the number of acres of cotton per farm is down about 10 percent.

Acres harvested in 1987 were slightly less than in 1982, so the increase in number of farms growing cotton was not due to increased area in production. A probable explanation for the change in the long-term trend toward fewer and larger cotton farms is a substantial restructuring of farm ownership and operation in response to economic conditions, tax laws and other regulations, and cotton programs.

The largest number of cotton farms in 1987 was in the class with sales between \$100,000 and \$250,000 (table 3). Gross, net, and family income went up as sales increased, but the largest sales class earned less off-farm income than the next smaller sales class. However, a larger proportion (28.9 percent) of farms

Table 2--Number of farms harvesting cotton and acres of cotton per farm, by region and State

Region/State	Number of farms			Cotton area per farm		
	1974	1982	1987	1974	1982	1987
	----- Number -----			----- Acres -----		
Southwest	16,020	3,265	4,297	82	181	162
Alabama	6,827	1,458	1,820	79	202	190
Georgia	4,279	770	1,733	87	171	134
North Carolina	2,405	620	<u>1</u> /	60	111	<u>1</u> /
South Carolina	2,509	417	744	102	229	156
Delta	34,228	10,921	13,138	123	214	210
Arkansas	7,585	2,109	2,479	147	201	214
Louisiana	4,486	2,371	2,675	130	237	221
Mississippi	1,277	3,710	4,225	150	264	243
Tennessee	8,119	1,850	2,545	61	131	162
Missouri	2,761	971	1,214	109	149	163
Southwest	33,918	19,839	20,167	152	253	237
Oklahoma	6,089	2,848	2,913	82	146	126
Texas	26,334	16,292	16,557	171	278	263
New Mexico	1,459	699	697	98	112	114
West	5,152	4,179	4,236	301	438	346
Arizona	1,143	1,177	1199	351	441	318
California	4,009	3,002	3037	287	437	357
United States	89,536	38,266	41,838	137	256	232

1/ Preliminary 1987 Census summary data did not include cotton for North Carolina.

with sales over \$500,000 had negative net farm income than any other sales class. Net family income was calculated by subtracting \$17,400 from net income from all sources.

Farms from the smallest sales class had the largest proportion of farms with negative family income (42.8 percent), but over 28 percent of the farms in the largest sales class also had negative net family income.

There is little vertical or horizontal integration in cotton production. 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. Cotton production has not attracted a substantial influx of capital investment by nonfarm corporations.

Tenure of Farm Operators

Share renting and cash renting of land for cotton production are common practices in all cotton production regions. According to the 1982 Census of Agriculture, about 45 percent of the farms harvesting cotton were operated by part-owners, 25 percent by tenants, and 30 percent by full owners.

Table 3--Income of cotton farms by sales class, 1987 ^{1/}

Sales class	Number of farms	Income				Farms with negative income	
		Gross farm	Net farm	Off-farm	Family ^{2/}	Net farm	Net ^{3/} family
	<u>Number</u>	-----\$1,000-----				----- <u>Percent</u> -----	
\$39,999 or less	5,807	27.7	8.5	17.9	26.4	24.6	42.8
\$40,000 to \$99,999	5,903	81.6	23.1	15.2	38.2	15.9	28.8
\$100,000 to \$249,999	7,099	186.8	48.7	19.9	68.5	20.0	22.4
\$250,000 to \$499,999	2,033	392.0	115.6	28.3	143.9	14.5	14.2
\$500,000 or over	1,783	978.3	141.4	27.8	169.2	28.9	28.7
All farms	22,611	199.2	44.9	19.5	64.5	20.3	29.1

^{1/} Farms for which cotton constitutes 50 percent or more of either sales or acres harvested.

^{2/} Net farm income plus off-farm income.

^{3/} Calculated after \$17,400 is subtracted from family income for estimated family living expenses.

Over 80 percent of the farms harvesting cotton in 1978 were individual family operations, 13 percent were partnerships, and 4 percent were corporations. The proportion and number of corporations increased somewhat between 1978 and 1982. However, about 90 percent of the corporations were family-held in 1978. The proportion of individual or family operations decreased as the acres of cotton harvested per farm increased.

Trends in Domestic Cotton Use

Domestic cotton use reached an historic high in the United States in 1987 at 12.1 million bales. Domestic cotton use equals mill use plus the cotton in textile imports minus the cotton in textile exports. The previous record domestic use was in 1942 when 11.3 million bales were used. Domestic use reached a post-World War II peak of 10.4 million bales or 25.4 pounds per person in 1966. Competition with manmade fibers and slower real economic growth beginning in the 1970's caused domestic cotton use to decline to 6.5 million bales by 1982 when per capita consumption fell to only 13.5 pounds per person. Since 1982 there has been a steady and rapid growth in consumer demand for cotton. By 1987 per capita consumption had risen to 23.9 pounds.

Foreign textile producers seem to have a basic labor-cost advantage over U.S. textile producers, especially in the apparel sector, and cotton textile imports grew at an average compound rate of about 4.6 percent between 1965 and 1980. The average compound annual rate of growth of textile imports increased to about 16 percent during 1980-87, in part due to the increase in the value of the dollar since 1980 and the strength of the U.S. economy relative to foreign economies in 1983. The raw cotton equivalent of U.S. textile imports totaled a record 4.9 million bales in 1987. But, the growth of imports slowed down in 1988 and totaled about 4.4 million bale-equivalents, representing a 10-percent decrease in volume but a slight increase in value.

Additional imported products increase the supply of cotton textiles available to American consumers at the retail level. In 1987, 53 percent of the fibers in imported textiles were cotton, while cotton accounted for only 29 percent of the fibers used in U.S. mills. Also, apparel prices at the retail level are declining in real terms, and lower prices are encouraging increased domestic use. The consumer price index (CPI) for apparel products (1967=100) rose from 179 in 1980 to 208 in 1986. The overall CPI rose from 270 to 405 over that same period, implying about a 14-percent drop in real retail prices of apparel products.

Mill use of cotton reached 9.6 million bales in 1966 and declined to 5.3 million bales in 1981 before recovering to 7.6 million in 1987. During 1966-83, cotton mill use declined at a compound annual rate of 3.3 percent. The decline in mill use was caused primarily by two factors: the loss of market share to manmade fibers, mainly polyester, and the loss of market share to textile imports.

Cotton's share of mill consumption dropped from 90 percent in 1960 to 59 percent in 1980. From 1966 to 1983, cotton's share of total use in the cotton system (mills and spindles adapted to the use of cotton) declined from 81.5 percent to 60.3 percent. Manmade fiber's strength, uniformity, and ease of handling and care account for much of the decline in cotton's share of mill use. Costs to mills were higher for cotton than for polyester and rayon during most of the 1970's.

If cotton had maintained its 1966 share of cotton-system fiber use at 81.5 percent, the decline in cotton mill use would have been more than 2 million bales less than actually occurred between 1966 and 1980 when cotton's share of total mill consumption reached its lowest point. Since 1980 cotton's share of total mill consumption rose to 67.4 percent in 1987. However, the entire cotton system is becoming smaller. This is partly because manmade fibers have entirely supplanted cotton in some end uses such as tire cord and carpeting, but mostly because the cotton textile trade deficit (the excess of imports over exports of cotton textiles on a raw-fiber equivalent basis) grew from 668,000 bales in 1966 to 1.9 million bales in 1983. During 1966 to 1983, total fiber use in the cotton system declined from the equivalent of 12.1 million bales to 9.6 million bales, implying an additional 2-million-bale loss in cotton mill use.

In recent years consumer preference for cotton has led to both increased mill use of cotton and a greater share of total mill consumption. This was at the same time that textile imports were growing rapidly.

In 1980, the cotton textile trade deficit represented only 8.5 percent of domestic cotton use. That year, imports reached 1.7 million bale-equivalents while cotton textile exports equaled 1.1 million bales, for a trade deficit of 590,000 bales. In 1983, the United States imported 2.3 million bale-equivalents of cotton in the form of textile products, and exported 460,000 bale-equivalents. The resulting deficit of 1.9 million bale-equivalents represented about 25 percent of all the cotton used in the United States in 1983. In 1988 4.4 million bale-equivalents were imported as textiles and 688,000 bale-equivalents were exported.

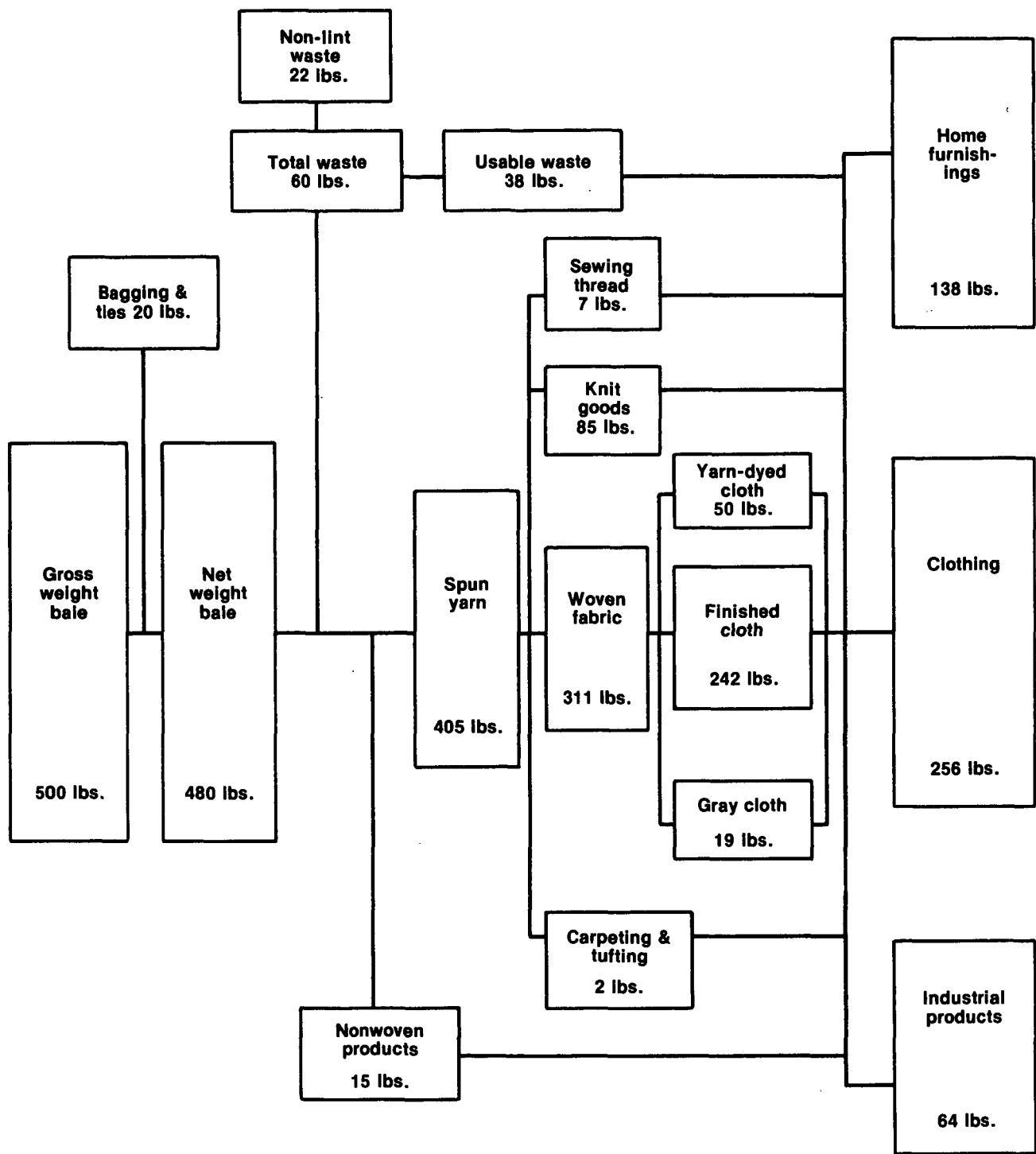
End uses of cotton include apparel, household, and industrial products. On average, clothing accounts for about 256 pounds of total end use of a 480-pound bale of cotton delivered to a textile mill (fig. 2). Home furnishings and industrial products account for 138 pounds and 64 pounds.

Trends in World Cotton Trade

Forces affecting world cotton trade are complex. Since cotton is an input for the production of clothing, it can be traded as raw cotton, yarn, fabric, or finished apparel. The United States is a competitive exporter of raw cotton, but other countries, many of them also cotton producers, are more competitive as exporters of finished products (tables 4 and 5). The demand for U.S. raw

Figure 2

Distribution of an average bale of U.S. cotton



cotton exports depends heavily on: (1) foreign cotton production, (2) U.S. cotton price relative to the cotton prices of competing exporters, (3) the price of cotton relative to other fibers, and (4) the rate of economic growth in importing nations. For example, it has been estimated that a 1-percent increase in real income of foreign importing countries is associated with about a 120,000-bale increase in U.S. cotton exports. If our major competitors increase their production by 1 million bales, U.S. exports might drop by about 600,000 bales in the short run.

World cotton production increased from an average of 54.5 million bales in 1964-68 to an estimated 80.5 million bales in 1984-88, an increase of 48 percent. Cotton trade, however, increased only 32 percent in the same period, from an average of 17.3 to 22.8 million bales. Hence, a larger share of world cotton production is now milled within producing countries.

Even though cotton production and trade have increased worldwide, cotton's share of world fiber production fell from 58 to 50 percent between 1967 and 1987. All natural fibers have lost markets to manmade fibers, especially during the past 20 years. The development of polyester in the 1950's brought intense competition with other cotton, rayon, and acetate and was instrumental in cotton's loss of market share. However, within the apparel and home furnishing markets, cotton and other natural fibers have enjoyed increased popularity during the 1980's. These and other developments mean that world producers in search of export growth will compete for a larger share of a slowly expanding market.

Table 4--World cotton exports and market shares, 1960-87

Year	World exports	U.S. exports	Market shares		
			United States	USSR	Other exporters
	--- Million bales ---		----- Percent -----		
1960	17.1	6.9	40.1	10.2	49.7
1965	16.9	3.0	17.0	13.2	68.9
1970	17.7	3.9	22.0	13.8	64.2
1975	19.1	3.3	7.4	20.5	62.1
1980	19.7	5.9	30.1	20.8	49.1
1981	20.2	6.6	32.6	21.3	46.1
1982	19.4	5.2	26.9	20.1	53.0
1983	19.2	6.8	35.8	18.5	45.7
1984	20.5	6.2	30.2	14.3	55.5
1985	20.5	2.0	9.6	15.5	74.9
1986	24.8	6.7	25.8	12.0	59.4
1987	24.1	6.9	28.6	2.0	59.4

Table 5--U.S. raw cotton exports of selected countries, August-July years 1983-88 ^{1/}

Destination	1983/84		1984/85		1985/86		1986/87		1987/87-	
	Exports	Market share	Exports	Market share	Exports	Market share	Exports	Market share	Exports	Market share
	<u>1,000 bales</u>	<u>Per-cent</u>	<u>1,000 bales</u>	<u>Per-cent</u>	<u>1,000 bales</u>	<u>Per-cent</u>	<u>1,000 bales</u>	<u>Per-cent</u>	<u>1,000 bales</u>	<u>Per-cent</u>
Japan	1,709	51	1,464	48	520	17	1,723	48	1,569	46
Korea	1,269	79	1,257	77	513	31	1,330	72	1,450	74
Taiwan	495	42	513	45	46	3	907	41	424	27
Hong Kong	583	28	125	13	1	0	52	4	88	8
Italy	252	22	301	26	91	8	263	19	406	28
France	154	20	132	17	8	1	114	15	67	9
Germany, Federal Republic of	195	20	195	19	85	9	263	21	376	33
Portugal	69	10	80	12	7	1	76	10	58	7
Indonesia	320	63	258	43	105	15	324	41	287	33
Thailand	244	44	139	25	17	3	239	23	248	16
Canada	227	93	195	87	98	34	70	30	153	73
China	12	5	6	6	0	0	0	0	0	0
Other	1,556		1,550		469		1,324		1,456	
World	6,786	35	6,215	31	1,960	10	6,685	26	6,582	28

^{1/} For each country, market share is the U.S. share of total cotton imports. For the world, market share is the U.S. percentage share of world exports.

Changes in Importing Countries

Eight countries account for about 60 percent of world cotton imports. Japan is by far the most important cotton importer with a 15-percent share of world imports in 1986-87. The Japanese share fell 2-3 percent during the 1970's as other East Asian textile producers--Taiwan, Hong Kong, and South Korea--expanded mill capacity and increased cotton imports. In 1986-87, South Korea purchased 8 percent of world cotton imports while Taiwan and Hong Kong had import market shares of 9 and 5 percent. The share of trade held by China increased from an average of less than 3 percent in 1960-64 to more than 17 percent in 1979 and 1980.

China's imports have tapered off sharply since 1980, however, as Chinese cotton production has expanded. In 1986 and 1987, Chinese cotton imports comprised less than 1 percent of world imports. In 1988, however, Chinese cotton imports were expected to account for about 6 percent of world imports. While China is a major net exporter of raw cotton, its increasing domestic consumption, limited arable land, and intense competition for land among crops, have placed it at a crossroads with respect to production and further highlighted its role in international cotton trade.

The major European cotton importers--France, Italy, and Germany--have declined in importance since the early 1960's as these countries have moved heavily into the use of manmade fibers. Each of these countries currently purchases 3-6 percent of world cotton imports.

Changes in Exporting Countries

The United States is the world's largest cotton exporter with a market share in 1986-87 of 27 percent. The U.S. share has varied substantially since 1960, ranging from 10 to 40 percent of world exports (see table 4). Much of the variation in market share is explained by relative prices for U.S. cotton and cotton from competing exporting countries. Abundant harvests in competing exporting countries cause a reduction in U.S. exports. Also, during the 1982/83 season, when U.S. prices fell to the loan rate, U.S. exports fell from 33 percent to 27 percent of world trade, even though U.S. ending stocks rose to 7.9 million bales.

The United States accounts for a high proportion of total imports of raw cotton by several countries, including Japan, Korea, Taiwan, Hong Kong, Indonesia, Thailand, and Canada (table 5). Japan was the largest single export market for the United States during 1984-87, followed closely by Korea. The United States holds the largest market shares of imports by Canada and Korea. During the 1950's and early 1960's, when U.S. price support rates were high relative to world prices, a payment-in-kind was used to promote exports, but it was discontinued in 1967. Such a program provides an indirect advantage to foreign textile manufacturers which compete with U.S. mills. During fiscal years 1985-87, about 950,000 bales a year were exported under a credit guarantee

program. Although PL 480 exports were important in some earlier years, only about 50,000 bales each year were exported through PL 480 during 1985-87.

The United States imposes an annual import quota on raw cotton totaling 14.5 million pounds (about 30,240 bales) of short-staple cotton having a length of less than 1-1/8 inches, and a quota of 45.7 million pounds (about 95,118 bales) of long-staple cotton having a length of 1-1/8 or more. Raw cotton imports have not approached these quota limits in recent years, having averaged about 2,500 bales in 1986-87.

The United States will likely continue as the world's leading exporter of raw cotton in the near future, though its position has slipped somewhat since the early-1980's. Chief competitors and their 1987-88 export market shares are the Soviet Union (14.4 percent), Pakistan (11.6 percent), and China (7.9 percent). Among these countries, Pakistan has garnered an increasing share of world exports in recent years.

Other cotton exporters with a significant 1987-88 share of the world market include Australia (4.3 percent), Paraguay (3.3 percent), Sudan (2.9 percent), Argentina (1.9 percent), Brazil and Mexico (1.8 percent each), and Egypt (1.5 percent). Among these countries, the role of exports varies considerably with the first three exporting nearly all of their production and the last three exporting an average of only 20-40 percent. Individual variation of exports as a percentage of production is greatest for Argentina, which exported about 20 and 75 percent of its outturn in 1987 and 1988.

World Textile Trade

Much of the growth in world and U.S. cotton trade in the 1960's and 1970's was associated with the development of textile industries in Japan, Taiwan, Hong Kong, and South Korea. These countries, with their low labor costs, gained a competitive advantage on a global basis in the manufacture of labor-intensive textile products. However, economic growth in these countries has increased wage rates. From 1983-87, wage rates in Japan, Taiwan, Hong Kong, and South Korea increased 81, 89, 48, and 54 percent, respectively. A second tier of textile exporters has recently emerged, including China, Brazil, Pakistan, and India. These countries, all raw cotton producers, have begun to compete for textile markets in an effort to increase revenue through sale of value-added textile products. In 1987, U.S. textile workers received an average of \$9.11 per hour, while workers in Taiwan, Hong Kong, and South Korea received \$2.19, \$2.19, and \$1.48 per hour, respectively. While differences do not account for labor productivity differences, variable exchange rates, or differences in purchasing power, they give an indication of the advantage that lower wage countries have over the United States and Western Europe in textile production.

The Multifiber Arrangement (MFA) is a factor influencing textile trade and, by extension, world cotton trade. The MFA, negotiated

under the auspices of the General Agreement on Tariffs and Trade (GATT) in 1974, is a set of complex export restrictions negotiated on a bilateral basis between developed-country textile importers and the major developing-country textile exporters. Import quotas negotiated under the MFA may have slowed the decline of textile and apparel mills in developed countries. In the U.S. textile industry, employment is estimated to decrease 1 percent for each 5 percent rise in the value of textile imports. The value of U.S. imports of textile products is estimated to have increased at about a 16-percent compound annual rate during 1978-86.

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 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, the cotton category coverage is more comprehensive. In 1988, 14 of the 40 agreements covered all cotton imports, compared with 6 of the 20 agreements in 1983. Countries with comprehensive cotton category coverage accounted for 63 percent of cotton imports in 1987. Not all U.S. cotton textile imports in 1988 were charged against import quotas, while 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.

Trends in Prices, Costs, and Returns

Prices, costs, and returns for the cotton sector can be reported in various forms. With government programs, there is not just one price to consider but several prices. 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 analysis of individual farms as well as certain industry analysis. 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 nonirrigated cotton. And returns 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 the most useful for most issues involving the overall condition of the industry and program effects.

Prices

Although U.S. cotton prices vary substantially from year to year, there was no significant upward trend in nominal prices from the mid-1940's through 1972 (table 6). Farm prices more than doubled in the 1970's, reaching a peak of 74.4 cents per pound in 1980. Prices then dropped below 60 cents per pound in 1981 and 1982 and again rose somewhat during the 1983 crop year due to the payment-in-kind program and drought. Prices fell to near 50 cents in 1986 as U.S. cotton became noncompetitive in world markets. The marketing loan provision of the 1985 Food Security Act restored U.S. cotton's competitiveness. Exports and domestic prices both rose.

Prices received by farmers from 1975-87 were above variable cash expenses but under total economic costs (fig. 3). Total economic

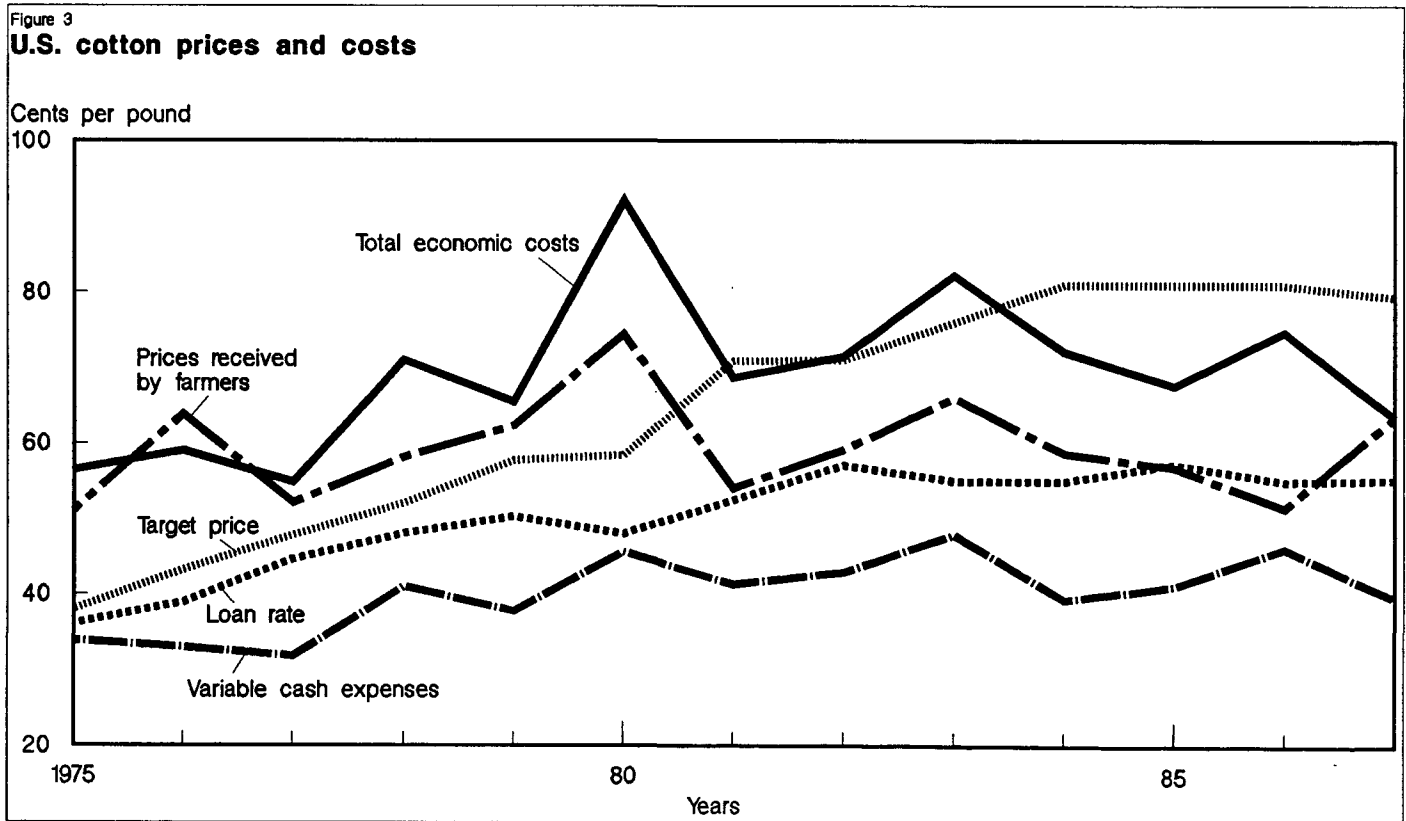
Table 6--Upland cotton farm prices, yields, and revenue, 1929-87

Crop year	<u>Average farm price</u>		Yield	Revenue per harvested acre
	Current dollars	1982 dollars		
	<u>Cents per pound</u>		<u>Pounds</u>	<u>1982 dollars</u>
1929	16.8	115.1	164	188.71
1933	10.2	91.1	213	193.98
1940	9.8	75.4	252	189.97
1945	22.5	143.3	254	364.01
1950	39.9	166.9	269	449.08
1955	33.6	123.5	417	515.12
1960	31.3	101.3	446	451.77
1965	29.2	86.4	527	455.28
1970	22.8	54.3	439	238.31
1971	28.1	63.3	438	277.20
1972	27.2	58.5	480	280.77
1973	44.4	89.7	521	467.32
1974	42.7	79.1	441	348.72
1975	51.1	86.2	453	390.36
1976	63.8	101.1	464	469.15
1977	52.1	77.4	519	401.78
1978	63.8	88.4	419	370.25
1979	62.1	79.0	547	432.17
1980	74.4	86.8	402	348.99
1981	54.0	57.4	542	311.36
1982	59.1	59.1	589	348.10
1983	66.1	63.6	504	320.64
1984	58.7	54.5	600	327.02
1985	56.8	51.2	630	322.67
1986	51.5	45.2	552	249.59
1987	63.7	74.5	706	525.97

cost is the breakeven longrun average price necessary to continue producing a crop. It includes returns to all factors of production including land. During the 1980's the target price was generally high enough to cover total economic costs. The loan rate generally stayed above variable cash expenses and below farm prices and well below total economic costs.

Cotton prices averaged 64 cents in 1987, but U.S. cotton again lost its competitiveness in world markets in 1988. This time it was due to procedures for calculating the adjusted world price (AWP) which reflect the true market differences in transportation costs. U.S. cotton prices in world markets were successfully undercut by competitors, causing U.S. exports to drop. In addition, the marketing loan was not sufficient to induce producers and merchants to sell cotton they were holding in storage because the cotton program allowed owners of cotton to hold stocks for up to 18 months with little or no storage or other holding costs and no downside price risk. The result was tight short-term supplies and rising prices even though stocks were growing and exports were down.

Cotton competes with manmade fibers for a share of the textile market. Through the 1970's, cotton's share of the market had been declining. Polyester, the major manmade fiber, was cheaper than cotton and offered mills a stronger fiber with consistent fiber qualities. When cotton prices fell in the early 1980's, cotton became cheaper than polyester (fig. 4) and the downward trend in the share of the market for cotton bottomed out. At the



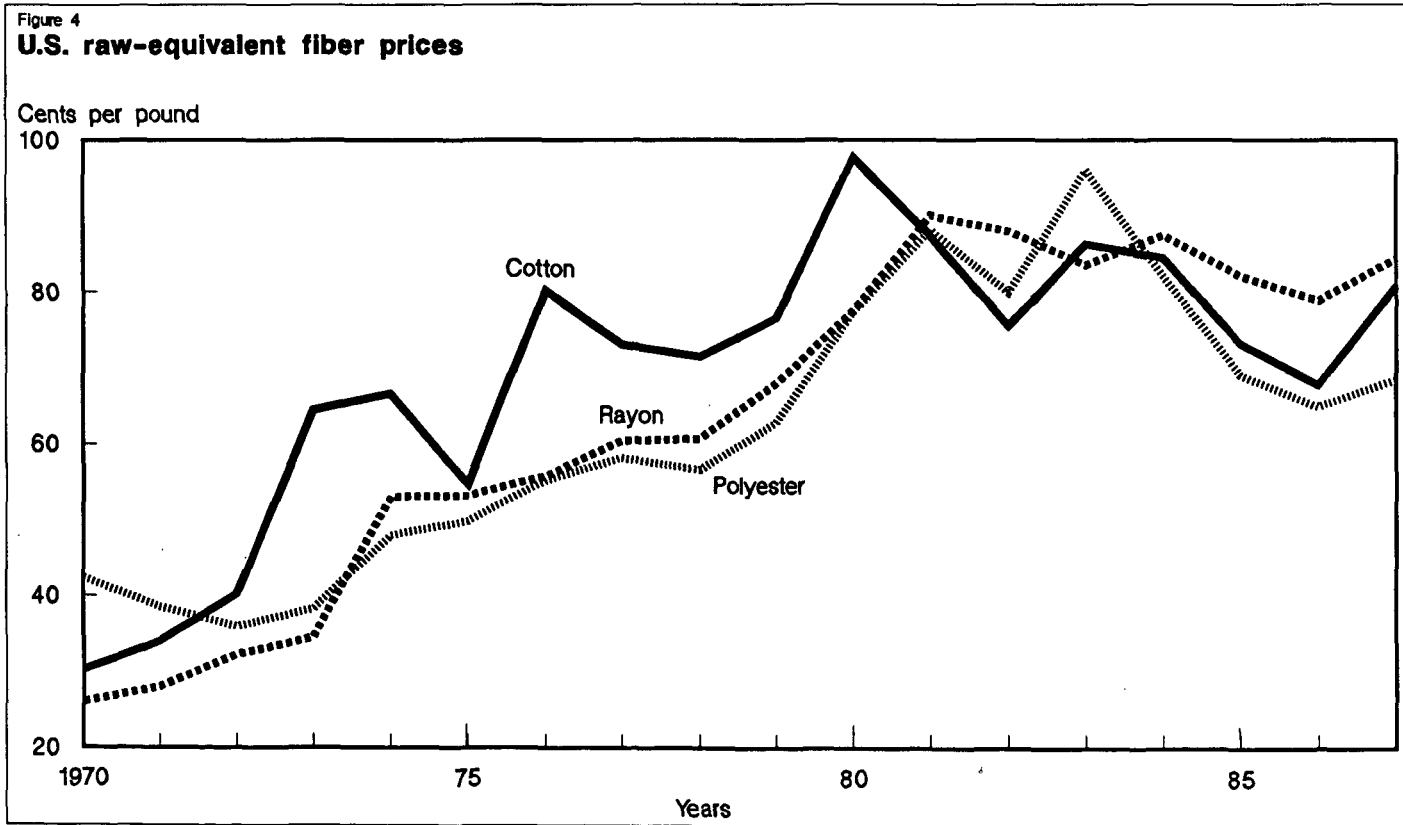
same time consumers began showing a preference for cotton clothing, helping to bring cotton's market share from a low of 29 percent to 34 percent in 1987, the highest level in more than a decade.

Cotton is the only agricultural commodity covered by specific legislation prohibiting price forecasting by the Federal Government. This restriction has existed since 1929.

Costs and Returns

From 1980-86 the farm value of cotton was not enough to cover all production costs (fig. 5). However, when Government payments were included, cotton producers were able to earn a profit after paying all costs, including returns to land, management, and unpaid family labor. Cotton producers had a good year in 1987 because prices increased enough so that all costs could be paid from the farm value of the crop and substantial Government payments added to producers' profits.

Yield changes are a key factor in unit costs of production. Yields in the mid-1960's were triple those of 1929-30. Productivity increases resulted in relatively high real (deflated) revenues per harvested acre from 1950 through 1965. Yields from 1965 to 1980 showed no obvious trend and real revenue per harvested acre generally declined as real prices weakened. Yields finally turned upward during the 1980's but stocks and supplies were high and real prices dropped, causing real revenue



per harvested acre to decline even with higher per acre production (see table 6).

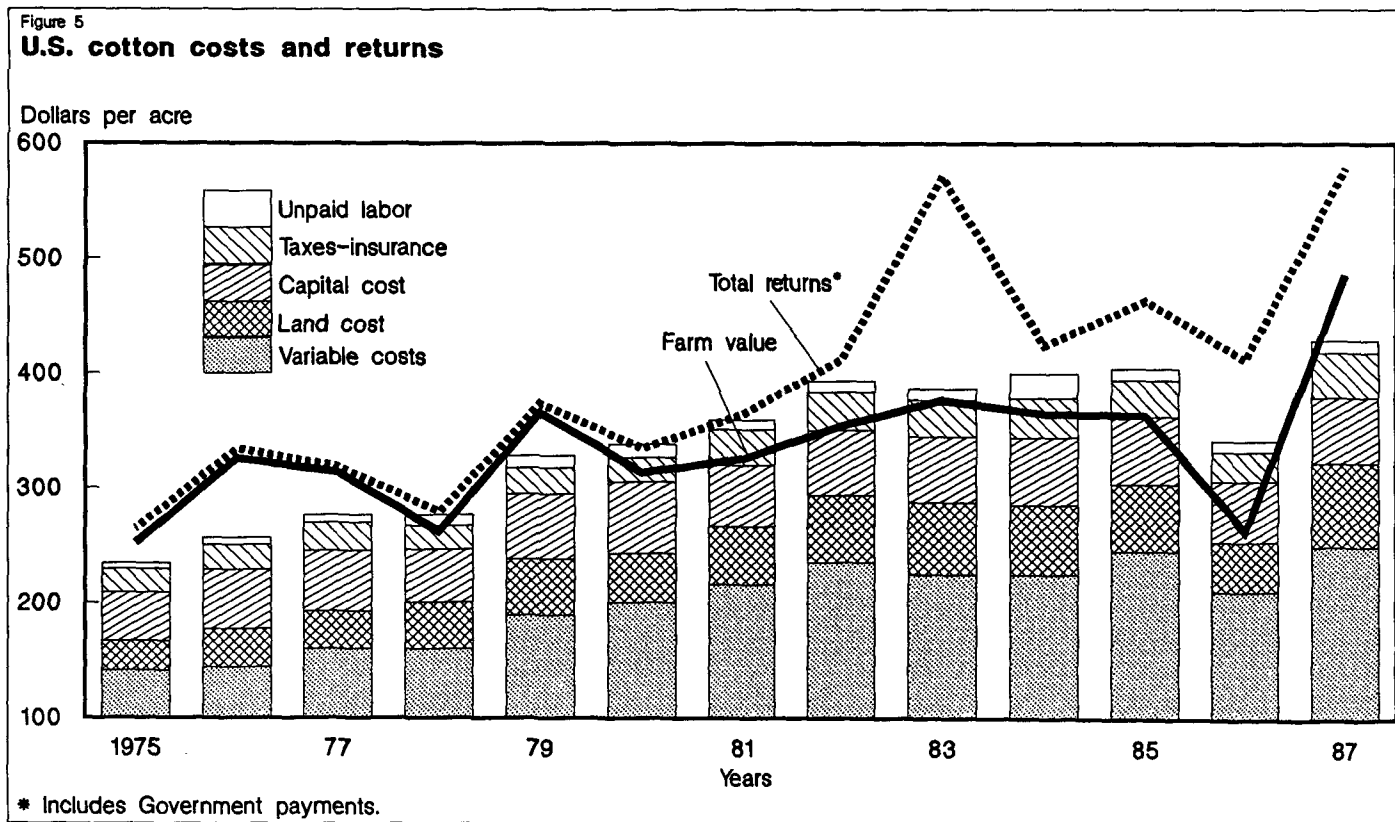
Compared with other types of farms, cotton farms were relatively profitable in 1987 (fig. 6). Cotton farms are defined as farms having at least 50 percent of harvested acreage or cash sales from cotton.

There has been an upward trend in the growth of the cotton sector as a whole (table 7). But total economic costs have also increased so that total income above economic costs shows little or no growth over time. Like most crops, real returns per unit of output show a downward trend. As a result, farm costs of cotton products continue to decline and consumer costs decline from what they would be otherwise.

History of Cotton Programs

Early Programs

The decline in the economic conditions of farmers, especially cotton farmers, after World War I led to public discussion of possible programs to stabilize commodity prices and increase farm income. Farm leaders had been advising farmers to control production on a voluntary basis as a means of stabilizing market prices.



The failure of those efforts to affect the acreage of crops in oversupply and mounting pressure for legislation to cope with a depressed farm economy led to enactment of the Agricultural Marketing Act of 1929. This act created the Federal Farm Board, which made loans to marketing cooperatives for the purchase and storage of surplus commodities, including cotton. This program failed to achieve its objectives of stabilizing prices or increasing farm income. The failure was due in part to the absence of an effective program to control production, but more importantly to declining demand for cotton and other farm products during the depression. This experience led to the enactment of the Agricultural Adjustment Act of 1933, a comprehensive program aimed at controlling production and increasing prices of designated "basic" commodities, including cotton. One of the major goals of the act was to restore farm purchasing power of agricultural commodities to the 1910-14 average level. This concept later became known as "parity" which was translated into parity prices for each of the "basic" commodities. The concept was used to establish minimum levels of price support through the mid-1960's for cotton. Parity prices were based on a rigid historical formula and failed to reflect changing market conditions and technological advances.

Production control was a primary objective of the Agricultural Act of 1933 and subsequent legislation. Farmers could take land out of production in return for benefit payments. In response to very low cotton prices received by farmers in 1932 and an abnormally high carryover, a cotton plow-up campaign in 1933

