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# Cotton and Wool

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# OUTLOOK & SITUATION

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## Summary

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Prospects for a smaller cotton crop and favorable economic signals suggest an improvement in the market fundamentals for cotton. The 1983 crop is forecast at 8.8 million bales, a fourth smaller than last year's output. Both mill use and export prospects are brighter, and disappearance next season could climb to 11.6 million bales, 0.8 million above estimated use in 1982/83. Therefore, stocks on August 1, 1984, could be reduced to 5.3 million bales, 2.7 million below the expected volume on August 1, 1983. However, even with the anticipated reduction, stocks will likely remain above "normal" carryover needs.

Cotton farmers surveyed in late April indicated planting intentions of about 8.1 million acres for 1983, down over one-fourth from last year, and the smallest acreage in over a century. Because farmers normally devote their least productive land to conservation uses, yields should again be relatively high and abandonment low. Partially as a result of the expected production declines, spot market prices averaged 67 cents a pound in mid-May, up from the April average of 65 cents and January's 60 cents.

The seasonally adjusted annual rate of cotton consumption by U.S. mills rose from 5 million bales in December to 5.7 million in March. Based on this upward trend and continued economic growth, domestic mill use is estimated at 5.5 million bales for 1982/83, and is expected to grow to 5.8 million next season.

The U.S. cotton textile trade deficit continued to grow during the first quarter of 1983. Cotton textile imports totaled the equivalent of 561,000 bales while exports

equaled only 117,000. This deficit accounted for 24 percent of domestic cotton consumption from January through March, up from 20 percent during all of 1982 and only about 9 percent during 1980.

Cotton exports ran at a seasonally adjusted annual rate of only 5 million bales through April. However, because of a reduced estimate of the Soviet Union's exportable supply and improvements in the world economy, the pace of U.S. exports is expected to rise through the end of July and reach 5.3 million bales for the entire season. Exports in 1983/84 are projected at 5.8 million bales, reflecting some stock rebuilding abroad and continued large U.S. supplies at competitive prices.

While world cotton production is forecast at 67.7 million bales in 1982/83, estimated consumption of 66.5 million is still less than production, and world ending stocks are expected to hit 27.7 million bales. However, stocks in importing countries will likely decline by a half-million bales. The largest production declines have occurred in the exporting countries, especially the United States and the Soviet Union, while many importing nations have harvested larger crops. For 1983/84, world production is projected to fall to 66.8 million bales, as a smaller U.S. crop may more than offset anticipated gains in foreign crops.

U.S. production of extra-long staple (ELS) cotton in 1983/84 may decline slightly from this season's 99,000 bales and total use may moderately exceed 1982/83's estimated 66,000 bales. Despite these expected developments, ending stocks of ELS are projected to top this season's 101,000 bales, continuing the upward trend of

recent years. A precipitous decline in exports from 52,000 bales in 1979/80 to an estimated 13,000 this season accounts for most of the recent increase in ELS stocks.

Wool prices are expected to strengthen this year as mill use increases to an estimated 120 million pounds, compared with 115 million in 1982, and production declines to about 53 million pounds from 59 million last year. The 1983 weighted average farm price for wool is expected to rise to 70-75 cents a pound, greasy, in 1983, up from 65 cents in 1982.

## Cotton and Wool Situation

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### TEXTILES AND THE ECONOMY

The Nation's economic health improved significantly in the first quarter, marking a clear upward trend. Real gross national product (GNP), rose 2.5 percent (\$9.0 billion) over fourth-quarter 1982, the largest percentage increase since first-quarter 1981. Real GNP decreased 1.1 percent during fourth-quarter 1982. Mainly behind the improved economy was a \$13-billion increase in private domestic investment (13 percent of GNP) resulting mostly from a slower rate of nonfarm business inventory liquidation and residential investment. Personal consumption expenditures (65 percent of GNP) contributed a \$6.1-billion increase, a 2.6-percent gain. By comparison, the fourth-quarter increase was \$10.7 billion. Negative factors were a decrease in real net exports and in Government purchases of goods and services. Almost all the change in Government purchases resulted from a \$7.5-billion decline in farm expenditures by the Commodity Credit Corporation, compared with a \$7.7-billion increase in the fourth quarter.

Other first quarter and more recent data indicated a definite economic recovery. The index of industrial production increased at an annual rate of 9.5 percent. The capacity utilization rate for manufacturing in the first quarter increased for the first time in 2 years, reaching 68.3 percent. The index of leading indicators advanced at an annual rate of 24.2 percent, the highest rate in 4 years. The coincident index, a companion index that measures current activity, rose after six quarters of decline. Consumers spent a greater share of their income during first quarter 1983 than in any other quarter in the last 2 years. Retail sales of nondurable goods, seasonally adjusted, in the first 3 months of 1983 gave a mixed picture. They were 3.3 percent above a year ago but only very slightly above fourth-quarter 1982.

Manufacturers' inventories in March 1983 were the lowest in 2 years, indicating a likely end to inventory liquidation. The consumer price index has risen an average of about 0.2 percent each month in 1983. The April index of industrial production reached its highest level since February 1982, and the percentage increase from March was the largest since August 1975. Personal consumption expenditures in April were 1 percent above

This issue of the *Cotton and Wool Outlook and Situation* report contains a special article, "Analysis of Factors Affecting Cotton Yields." Major factors—temperature, rainfall, acreage planted, and skip-row regulations—explain 69-94 percent of the variability in lint yields in three major producing areas. After considering the PIK-induced acreage drop and other factors, the authors conclude that 1983 cotton yields should be relatively high.

March. Retail sales for April were 1.6 percent above March and 6.5 percent above a year ago, marking the second monthly increase following three consecutive declines.

Production of textile materials improved sharply in the first quarter with a 16.5-percent annual rate of increase, compared with 2-3 percent in 1982. The latest data indicate that March textile materials production was the highest in 1-1/2 years. Capacity utilization in the textile industry in the first quarter was the highest since fourth-quarter 1981. Unemployment, however, while improving over late 1982, remained high. During the first 4 months of 1983, unemployment in textile mills averaged about 10.7 percent and in the apparel industry about 14.7 percent. In the last 4 months of 1982, these unemployment rates averaged 13.9 and 15.2 percent, respectively.

Mill consumption of all fibers was 2.74 billion pounds in the first quarter, the highest since third-quarter 1981, and 7 percent more than fourth-quarter 1982. Cotton enjoyed a 9.2-percent rebound from the fourth-quarter with nearly 0.7 billion pounds used by mills. Noncellulosic fiber use increased 5 percent. Most of the gain occurred in staple fibers, which were used in apparel blends with cotton, cut pile carpets, and nonwoven products. In contrast, first-quarter demand for textile products using filament fibers, such as knit apparel and loop pile carpets, was subdued.

### COTTON SITUATION

#### U.S. Outlook in 1983/84

##### Plantings Likely To Be Lower Than Earlier Expected

The May planting intentions report, based on a late-April survey of growers, changed the U.S. cotton outlook from earlier projections. Growers indicated plantings of 8.125 million acres, compared with 11.3 million a year ago (table 1). The acreage reduction and payment-in-kind (PIK) programs accounted for the drop. Since 1974, the average rate of abandonment in the United

**Table 1 – Cotton: All kinds, U.S. acreage planted by States**

State	1982	Indicated 1983 <sup>1</sup>	1983 as a percentage of 1982
	1,000 acres		Percent
Upland			
Alabama	287	200	70
Arizona	466	300	64
Arkansas	410	300	73
California	1,380	850	62
Georgia	163	140	86
Louisiana	605	400	66
Mississippi	1,000	660	66
Missouri	154	110	71
New Mexico	79	57	72
North Carolina	71	55	77
Oklahoma	480	380	79
South Carolina	97	75	77
Tennessee	260	220	85
Texas	5,800	4,300	74
Other states <sup>2</sup>	17.0	10.2	60
Total	11,269.0	8,057.2	72
American-Pima			
Texas	19.6	21.0	107
New Mexico	9.5	12.0	126
Arizona	41.8	35.0	84
Total	70.9	68.0	96
Total (all cotton)	11,339.9	8,125.2	72

<sup>1</sup>Crop Production report, May 10, 1983. <sup>2</sup>Virginia, Florida, and Nevada.

States has been about 7 percent, but because intended acreage is the lowest in over 100 years, abandonment may be as little as 3-5 percent this year. As shown below, intentions for all regions are less than the sum of participants' maximum plantings plus the base of non-participants, indicating that "wildcat" acreage is not as important as some had thought.

Region	Maximum permitted planting	Nonpar- ticipants' base	Intended plantings
Southeast	423	52	470
Delta	1,691	124	1,690
Southwest	4,635	312	4,701
Far West	1,003	341	1,254
United States	7,763	830	8,125

Nonparticipating cotton farmers, about 15 percent of all those with cotton bases, and farmers with no cotton base can plant any amount they wish. Because cotton prices rose following the PIK signup report, the incentive for these producers to increase their cotton acreage has risen. Consequently, some forecasters put 1983 plantings in excess of 9 million acres. However, those forecasts failed to recognize that cotton prices still do not offset the higher expected returns from competing crops.

Cotton yields have averaged 483 pounds per harvested acre since 1965, and the standard deviation from that mean is about 46 pounds. Between 1965 and 1980, there was no statistically significant trend to cotton yields, although the record yields of 1981 and 1982 could reflect a trend improvement that was offset by 1980's 404 pounds an acre. Because of the large year-to-year variation, yields are hard to predict. Still, certain factors

have been found to be significant in statistical equations that explain yields. These factors include soil moisture prior to planting, spring temperature and rainfall, summer temperature and rainfall, and planted acreage. See the special article in this issue for an assessment of 1983 yield prospects.

In general, preplant soil moisture was adequate throughout the cotton belt this year. Rainfall was excessive in some areas during the spring, especially in the Delta and California, delaying planting activities and increasing the likelihood of disease and pest problems. Planting across the belt was approximately 60 percent complete by May 22, compared with 62 percent in 1982 and 68 percent on average. However, planting is not yet so far behind schedule that better-than-average yields are ruled out. Another weather concern is cool temperatures that have inhibited plant development in some areas of Texas. While some reseeding may be necessary, a good crop is still in prospect.

The other major yield variable that is about determined is planted acreage. Since the least productive acres are retired first, the decrease in acreage caused by this year's cotton program will have a strong positive effect on yields. The record yield of 593 pounds in 1982 is not expected again this year, because the weather last summer and fall was unusually good. Still, an excellent yield is anticipated, although the possible error associated with yield forecasts is quite large.

Given the acreage intentions and expected above-average yields, U.S. cotton production in 1983 is projected at 8.8 million bales, down 3.2 million from 1982. With increased domestic use and exports, ending stocks on July 31, 1984, are expected to total 5.3 million bales—a third below carryin stocks. Although the drop is large, 5.3 million bales is still above most estimates of normal carryover needs. Unless weather remains poor, price gains will be limited next season.

### GNP and Market Share To Determine Cotton Mill Use

Consumption of cotton in U.S. textile mills during 1983/84 is forecast at about 5.8 million bales, up more than 5 percent from 1982/83. The forecast is based on the relationship between GNP and total fiber consumption shown in figure 1 and on the assumption that cotton will maintain a 23 to 24 percent market share through next year. The simple correlation between the percentage change in real GNP and total fiber use by U.S. mills was 0.73 during 1972-1982, and with the strengthening U.S. economy, total fiber consumption could grow to 12 billion pounds in 1983.

Use of cotton in knit fabrics increased from 1.1 million bales in 1977 to 1.5 million in 1981, but fell considerably in 1982 to 1.2 million bales (table 13). It is expected to resume a growth trend again next season.

Use of cotton in denim has trended downward since 1977. Denim is the most important fabric made chiefly of cotton, and in 1977, about 1.1 million bales were used in this fabric, versus only 0.9 million in 1982. While an improvement has already begun and will continue with the recovery, the longer term trend for cotton use in denim is likely slow growth. Corduroy—the other big bottom weight user—has not bounced back and will lose some market share to manmade fiber as a new fabric blend known as ground-pik (75 percent cotton, 25 percent man-made) is adopted. Twills have trended up and likely will continue up during the next several years. Toweling also

### Total Fiber Use Follows GNP

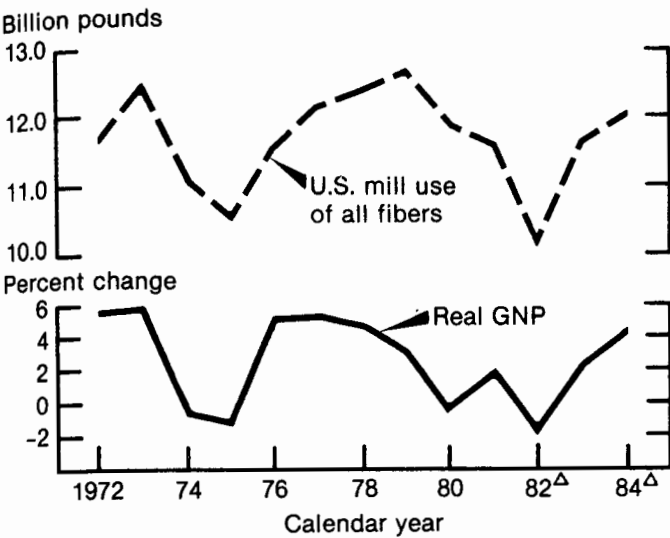


Figure 1

showed improvement in 1982 despite the recession.

Use of cotton in sheeting and print cloth also trended downward since 1977. Cotton use in sheeting alone fell from 0.9 million bales in 1976 to less than 0.4 million in 1982. The decline in print cloth has been less severe but still noticeable.

### Rebound in Exports Projected

Changes in U.S. export availabilities and in foreign supplies have been good indicators of directional changes in U.S. exports over the last decade. The ratios produced by dividing the excess supply (beginning stocks plus production less mill use) in the United States by the foreign excess supply was compared with U.S. exports between 1972/73 and 1981/82. The correlation between the ratio and U.S. exports was 0.90, indicating that the ratio was a good predictor of U.S. exports (figure 2).

Foreign excess supplies of 15.2 million bales are expected in 1983/84, and U.S. excess supplies are projected at 11 million bales, leaving a ratio of 0.7. This ratio corresponds to exports of between 5.5 and 6 million bales, and the official forecast is 5.8 million.

The ratio of ending stocks to use in foreign countries is expected to decline to 0.32 this season. Between 1972/73 and 1981/82, this ratio averaged 0.36. Foreign ending stocks are currently projected to rise in 1983/84 by 0.7 million bales to 20.4 million, but this will leave the foreign stocks-to-use ratio unchanged at 0.32. Should foreign countries choose to rebuild stocks to the historical level relative to use, their stocks would grow to 22.3 million bales, and this would present substantial room for U.S. export growth. The availability of PIK cotton this fall, anticipation of stronger demand, and the prospects for tighter supplies in 1984/85 could cause importers to rebuild stocks. The United States is expected to hold only one-fifth of world stocks on July 31, 1984, compared with 29 percent this season. Because the difference between foreign production and consumption next season is forecast to be only 4.5 million bales, U.S. exports of 5.8 million will require an increase in foreign stocks of about 1.3 million bales.

### U.S. Stocks To Tighten

The stocks-to-use ratio in the United States is expected to tighten to 0.46 in 1983/84 from 0.56 in 1981/82 and 0.72 in 1982/83. Despite this improvement, stock levels will remain above the level at which prices usually become highly sensitive to improving market conditions. Consequently, the CCC loan program will likely be an important marketing option again next season (figure 3).

### Indicated U.S. Exports

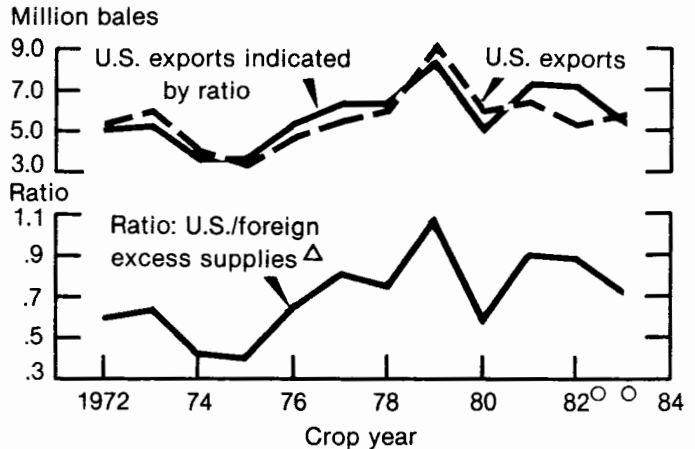


Figure 2  
 △ Excess supplies are carryin stocks plus production minus mill use.  
 ○ U.S. exports are from World Agricultural Supply and Demand  
 Estimates, May 11, 1983.

### Cotton Use/Supply and Farm Price

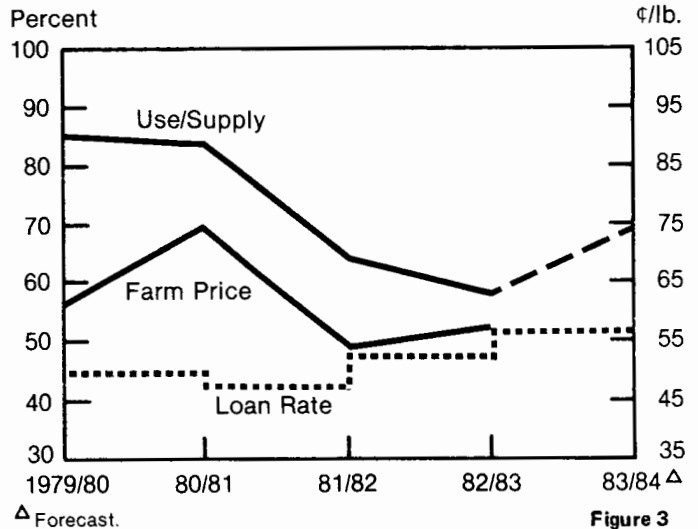


Figure 3

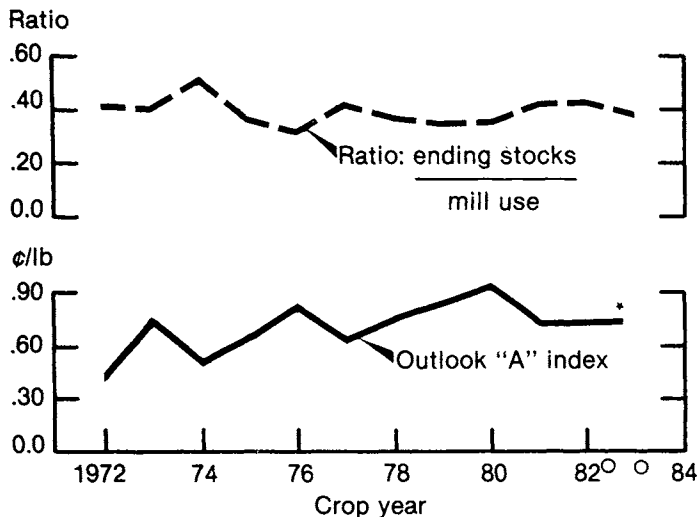
### World Cotton Outlook in 1983/84

#### U.S. Production Down, But Foreign Output To Jump

Largely because of lower U.S. production, next season's cotton outlook is slightly brighter from a foreign producer's standpoint. World production is expected to decline to 66.8 million bales from 67.7 million in 1982/83. With anticipated economic growth, world cotton consumption is forecast to accelerate, and total use for 1983/84 is put at 68.3 million bales, up 1.8 million. Thus, projected 1983/84 ending stocks are 25.7 million bales, down 2 million from this year's expected level. As

a result, the ratio of world ending stocks to use should improve to 0.37 from 0.42 this year. Figure 4 portrays the relationship between world cotton prices, represented by the season average Outlook "A" index, and the ratio of

### World Price Fundamentals



\*Average August 1 thru April 30, not a prediction.  
 O 1982 estimated, 1983 forecast.

Figure 4

world ending stocks to consumption. The simple correlation between the stocks-to-use ratio and the "A" index between 1972/73 and 1982/83 is -0.71, indicating that the ratio does a fair job of explaining world price movements. Since 1972/73, the ratio has been inversely related to the direction of price changes in every year except 1980/81.

Cotton production in foreign countries will likely rise to about 58 million bales in 1983/84 from 55.7 million this season. Large increases are expected in the Soviet Union and Mexico. Production in the Soviet Union may return to normal levels after this year's shortfall, and devaluation of the peso has made production of export crops profitable again in Mexico. Among importers, only India is expected to realize a larger crop, although production in China may remain at 1982's record level. As a consequence, the proportion of world production grown in foreign exporting countries will increase in 1983/84.

### Economic Growth Should Spur Consumption

Economic growth is the main reason for the forecast gain in world use next season. Among exporters, Mexico, Brazil, the United States, Pakistan, and the Soviet Union are expected to have the largest gains in use. Consumption in India, Thailand, and some low-income Asian nations is expected to show the greatest rise among importers. The economic recovery will likely be strongest in the United States and Asia, as reflected in the consumption projections.

### U.S. Situation in 1982/83

#### Spot Prices Remain Relatively Strong Despite Carryover Prospects

As of late May, spot market prices averaged about 5 cents higher than a year earlier, though the ratio of ending stocks to use has worsened from 0.56 to an estimated

0.74 (figure 5). Spot prices for SLM 1-1/16-inch cotton averaged 60.48 cents a pound in 1981/82, but were around 67 cents in late May. This price strength relative to 1981/82 can be largely explained by uncertainty about world production, the response to PIK, improved economic conditions, and by heavy use of Commodity Credit Corporation (CCC) loans. From October 1982 to the beginning of March, outstanding loans grew from about 3.4 million bales to about 7.4 million. As a result, free stocks (defined as total stocks less outstanding loans and CCC-owned stocks) fell from November to March, despite the 1982 harvest. On March 1, free stocks were 5.4 million bales, down from 6.3 million on November 1, and the lowest March 1 stocks since 1977/78. Between November 1 and March 1, spot prices for SLM 1-1/16-inch cotton rose from 58.40 to 64.64 cents per pound, although most of the increase occurred during February.

During March, the number of outstanding loans fell by 1.2 million bales. The outstanding loans on 1982-crop cotton from Arizona and California alone fell by 852,000 bales as growers there sought to avoid pledging their loans to the PIK program. Local market prices exceeded the loan rate plus redemption charges in these areas. And, outstanding 1982 loans in Mississippi fell by 89,000 bales. However, the rate of loan redemption was relatively slow on 1980- and 1981-crop loans in all States as well as on 1982 loans in States other than California, Arizona, and Mississippi. The accumulated carrying costs, including interest and storage, on the 1980 and 1981 crops are now so large that average farm prices would have to rise to between 64 and 67 cents a pound to make redemption profitable. National average farm prices in early May averaged below 60 cents. Loans on the 1982 crop require a farm price of about 61 cents a pound to make redemption profitable for the average producer.

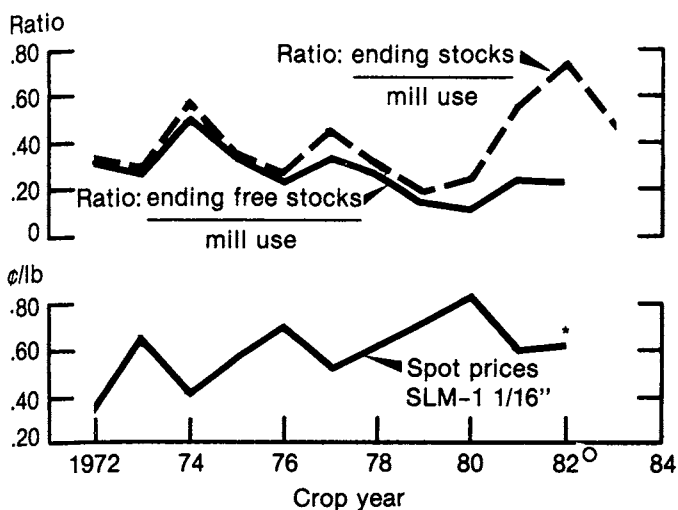
Redemptions through the rest of the marketing year will slow as Arizona and California growers have little left to redeem, and a large proportion of remaining stocks will be needed for PIK. PIK cotton will be disbursed starting as early as July, but during October in most States. Consequently, ending free stocks could be little changed from a year ago. Assuming total ending stocks of 8 million bales and total outstanding loans plus CCC inventory on August 1, 1983, of 5.3 million bales, ending free stocks would be about 2.4 million bales. The ratio of free stocks to use would be 0.22, similar to the situation in 8 of the 10 previous years (figure 5).

The simple correlation between season average spot prices and the ratio of ending free stocks to use between 1972/73 and 1981/82 is -0.80, and only in 1980/81 did the ratio falsely predict the direction of price changes. The rise in spot prices since February is a reflection of the rise in this ratio.

### 1982 Crop Review

The 1982/83 harvest of all types of cotton was approximately 12 million bales, about 1.2 million more than expected use. Harvested acreage was 9.7 million, down about 26 percent from the average of the previous 3 years. The biggest decline occurred in the Southwest, where about 3.1 million fewer acres were harvested than in 1981. Smaller declines occurred in the other regions, and only Georgia, North Carolina, and Louisiana had

## U.S. Price Fundamentals



\*Average August 1 thru April 30, not a prediction.  
 ○ 1982 estimated, 1983 forecast.

Figure 5

Low prices in 1981/82 also discouraged plantings. Prices during first-quarter 1981 averaged 73 cents a pound, but were only 50 cents a pound in first-quarter 1982. The increase in yields in 1982 partially offset the acreage decline. At 593 pounds an acre, the national average yield was about 18 percent higher than the average for the previous 5 years. Yields increased from the 1977-81 average by 43 percent in the Southeast and by 33 percent in the Delta, indicating what is possible with good weather as planted acreage declines. Because of storm damage, yields in the Southwest averaged only 298 pounds an acre in 1982/83, 19 pounds below the 1977-81 average. Yields in the Far West were only 10 percent above the average.

The distribution of 1982 production by grade improved over 1981. With about 95 percent of the 1982 crop ginned, 47 percent has graded strict low middling (41) or higher, compared with 41.5 percent of the 1981 crop. The biggest improvement occurred in Texas where 21.5 percent of the crop graded 41 or higher, compared with 7.2 percent in 1981. Also, 78 percent of the cotton ginned was 1-1/16 inches or longer, compared with only 62 percent of the 1981 crop.

## Recovery Boosts U.S. Mill Use

U.S. cotton mill use is estimated at 5.5 million bales this season, 200,000 bales above last season's 50-year low. Through March, U.S. mills had consumed 3.6 million bales, only 30,000 bales ahead of last year's pace. However, the cumulative total is greatly improved over levels earlier in the year. As late as February, mill use had been running behind a year earlier. In March, the seasonally adjusted daily rate rose 5 percent to 22,126 bales, continuing the upward trend that began in December 1982 (tables 3 and 4).

Table 2—Cotton: Acreage, production, and yield per acre on harvested acreage

Year beginning August 1	Planted		Harvested		Production		Yield	
	1,000 acres	Percent of total	1,000 acres	Percent of total	1,000 bales <sup>1</sup>	Percent of total	Pounds <sup>2</sup>	Pounds <sup>3</sup>
West <sup>4</sup>								
1980	2,302	15.8	2,259	17.1	4,650	41.8	988	972
1981	2,318	16.2	2,276	16.4	5,287	33.8	1,115	
1982 <sup>8</sup>	1,977	17.4	1,955	20.1	4,370	36.3	1,073	
Southwest <sup>5</sup>								
1980	8,588	59.2	7,438	56.3	3,550	31.9	229	317
1981	8,128	56.7	7,858	56.8	6,103	39.0	373	
1982 <sup>8</sup>	6,300	55.6	4,769	49.0	2,961	24.7	298	
Delta <sup>6</sup>								
1980	2,955	20.3	2,846	21.5	2,424	21.8	409	562
1981	3,107	21.7	2,943	21.3	3,394	21.7	554	
1982 <sup>8</sup>	2,429	21.4	2,381	24.5	3,707	30.9	716	
Southeast <sup>7</sup>								
1980	689	4.7	672	5.1	498	4.5	355	524
1981	777	5.4	764	5.5	862	5.5	541	
1982 <sup>8</sup>	634	5.6	623	6.4	972	8.1	749	
U.S.								
1980	14,534	100.0	13,215	100.0	11,122	100.0	404	501
1981	14,330	100.0	13,841	100.0	15,646	100.0	543	
1982 <sup>8</sup>	11,340	100.0	9,728	100.0	12,010	100.0	593	

<sup>1</sup>480-pound bales. <sup>2</sup>Actual. <sup>3</sup>5-year centered average. <sup>4</sup>California, Arizona, New Mexico, and Nevada. <sup>5</sup>Texas and Oklahoma. <sup>6</sup>Missouri, Arkansas, Tennessee, Mississippi, Louisiana, Illinois, and Kentucky. <sup>7</sup>Virginia, N. Carolina, S. Carolina, Georgia, Florida, and Alabama. <sup>8</sup>Crop Reporting Board Report, May 10, 1983.

Several factors influence rates of cotton consumption, including the average retail price for all textiles and the relationship between raw cotton and manmade fiber prices. Consumer spending on apparel, industrial activity, and housing purchases also affect cotton consumption, and these are in turn influenced by interest rates, employment, and personal income. Textile imports and exports are also critical.

The seasonally adjusted consumer price index for apparel and apparel commodities stood at 182.5 during March (1967=100), while the CPI for all items was 282.7. However, during first-quarter 1983, seasonally adjusted apparel prices rose about 3.1 percent, whereas prices for all commodities rose by only 0.4 percent. The first-quarter increase in apparel prices also was sharply

above the price gains in previous quarters. For instance, during fourth-quarter 1982, apparel prices fell 1.5 percent. The price increases of this year probably resulted not from a shift in consumer demand—seasonally adjusted retail sales fell in the first quarter—but from a shift in supply at the retail level, perhaps caused by the expectation of stronger demand.

Despite the decline in apparel retail sales in the first quarter, industrial activity has increased monthly since last November. About a fifth of domestic cotton textile consumption goes for industrial uses. A rise in housing starts is also contributing to the economic recovery. About a fifth of cotton textiles are used in home furnishings. Employment is also improving and will eventually lead to increased consumer spending.

**Table 3—Cotton and manmade fibers: Daily rate of mill consumption on cotton-system spinning spindles, unadjusted and seasonally adjusted**

Month	Upland cotton				Manmade staple								
	1981/82		1982/83 <sup>1</sup>		1981/82				1982/83 <sup>1</sup>				
	Unad-justed	Ad-justed	Unad-justed	Ad-justed	Rayon and acetate		Non-cellulosic <sup>2</sup>		Rayon and acetate		Non-cellulosic <sup>2</sup>		
				Unad-justed	Ad-justed	Unad-justed	Ad-justed	Unad-justed	Ad-justed	Unad-justed	Ad-justed	Unad-justed	Ad-justed
	<i>Bales<sup>3</sup></i>				<i>1,000 pounds</i>								
August	22,147	21,971	20,202	20,042	1,172	1,150	6,448	6,403	779	765	5,417	5,379	
September	21,399	21,836	19,636	20,037	1,132	1,129	6,312	6,395	756	754	5,400	5,471	
October	23,156	22,011	21,576	20,510	1,090	1,007	6,391	6,151	837	774	5,694	5,480	
November	20,763	20,276	20,211	19,737	1,078	1,087	5,737	5,554	882	889	5,451	5,277	
December	16,367	17,618	17,620	18,967	764	852	4,692	5,106	681	759	4,723	5,139	
January	19,406	18,914	20,954	20,423	887	864	5,585	5,591	841	819	5,718	5,724	
February	20,488	18,970	22,425	20,764	843	836	5,865	5,773	855	847	6,183	6,086	
March	20,550	19,741	22,694	21,800	812	801	5,595	5,375	862	850	6,052	5,814	
April	21,391	21,158			852	844	5,608	5,403					
May	20,395	19,744			820	771	5,267	5,031					
June	19,000	18,793			752	736	5,066	4,952					
July	16,419	19,711			651	758	4,536	5,324					

<sup>1</sup>Preliminary. <sup>2</sup>Includes nylon, acrylic and modacrylic, polyester, and other manmade fibers. <sup>3</sup>480-pound net weight bales.

Compiled from reports of the Bureau of the Census.

**Table 4—Upland cotton and manmade staple fibers: Mill consumption on cotton-system spinning spindles**

Year beginning August 1	Cotton	Manmade			Total fibers	Cotton's share of total
		Rayon and acetate	Non-cellulosic	Total		
						<i>Percent</i>
			<i>1,000 pounds</i>			
1981/82	2,503,788	234,321	1,450,365	1,684,686	4,188,474	59.8
1982/83						
August	193,941	15,575	108,335	123,910	317,851	61.0
September	235,629	18,909	135,000	153,909	389,538	60.5
October	207,127	16,747	113,879	130,626	337,753	61.3
November	194,028	17,644	109,023	126,667	320,695	60.5
December	211,440	17,013	118,077	135,090	346,530	61.0
January	201,156	16,823	114,360	131,183	332,339	60.5
February <sup>1</sup>	215,285	17,111	123,653	140,764	356,049	60.5
March <sup>1</sup>	272,327	21,551	151,292	172,843	445,170	61.2

<sup>1</sup>Preliminary.

Compiled from reports of the Bureau of the Census.



Assuming real GNP growth of more than 2 percent for all of 1983, the relationship described in figure 1 indicates total fiber use will be about 11.6 billion pounds, 1.5 billion above 1982. To reach that estimate, total fiber use during each of the last three quarters will have to average nearly 3 billion pounds, 0.3 billion more than in the first quarter. That is approximately the average rate of use during the first three quarters of 1981/82.

Cotton's share of total fiber use increased slightly from 23.5 percent in 1981 to 24.5 percent in 1982 (table 16). The share increased further to 25.2 percent during first-quarter 1983. On the cotton spinning system alone, upland cotton's share averaged 59.8 percent during 1981/82 but has averaged almost 61 percent between August and March this season.

Two factors account for cotton's increased market share. The first is that high interest rates and the recession have discouraged consumer spending on durable goods, such as automobiles, which use more manmade fibers than cotton. As the recovery proceeds, demand for durable goods will strengthen, and cotton's share of the total fiber market could decline.

A second factor is the relationship between cotton and manmade fiber prices. Manmade prices have enjoyed a strong advantage over cotton in recent years. This is especially true when waste in the milling process is accounted for to obtain raw fiber equivalent prices, because cotton waste averages about 10 percent but polyester waste is only about 4 percent. However, during 1982, on a raw fiber equivalent basis, cotton prices at Group B mill points averaged 4.4 cents a pound less than polyester, and this probably encouraged the use of cotton relative to other fibers. The price relationship has switched back again to favor polyester during the last several months as cotton prices have strengthened while polyester prices have continued down. However, man-made prices are expected to rise with the economic recovery, and the difference could again narrow.

The rise in cotton prices could combine with increased consumer spending on durable goods to reduce cotton's

share of total fiber use in 1983. A market share between 23 and 24 percent of total fiber use seems possible. If total fiber use reaches 11.6 billion pounds in 1983, a slight drop in market share would imply total cotton mill use of 5.7 million bales in 1983 and 5.5 million for the 1982/83 marketing year.

Inventories of cotton in U.S. mills stood at 830,000 bales at the end of March, the lowest level for this date in over a decade. Mill stocks usually build during the second and third quarters of the marketing year. This year has been no exception, but the increase through March was less than normal.

Furthermore, the ratio of mill stocks at the end of March to mill consumption of cotton during March was only 1.4. Since 1972, this ratio averaged 2.1, and had never been less than 1.6. This is a cause for optimism concerning future demand for cotton. As the recovery proceeds and sales increase, mills will need to rebuild cotton stocks to insure that they can fill increasing orders. The rebuilding of mill stocks alone could account for an additional 200,000 to 300,000 bales of farm sales.

Due largely to the strength of the dollar, the textile and apparel trade deficit for cotton continues to grow and affect the U.S. cotton industry. Between 1972 and 1980, the difference between domestic cotton consumption and U.S. mill consumption of cotton (the net cotton textile trade deficit) averaged 0.56 million bales per year and never exceeded 1.02 million bales. However, the cotton trade deficit climbed to 1.24 million bales in 1981 and to 1.34 million in 1982. This occurred at a time when domestic mill use continued to fall. The deficit had accounted for 7.7 percent of domestic cotton consumption in 1972, and by 1980, the trade deficit still accounted for only 8.5 percent. But by 1982, net imports equaled almost 21 percent of all cotton textiles consumed in the United States. During the first quarter of 1983, 444,000 more bales of cotton textiles were imported than exported, accounting for 24 percent of domestic cotton consumption.

**U.S. Cotton Prices**

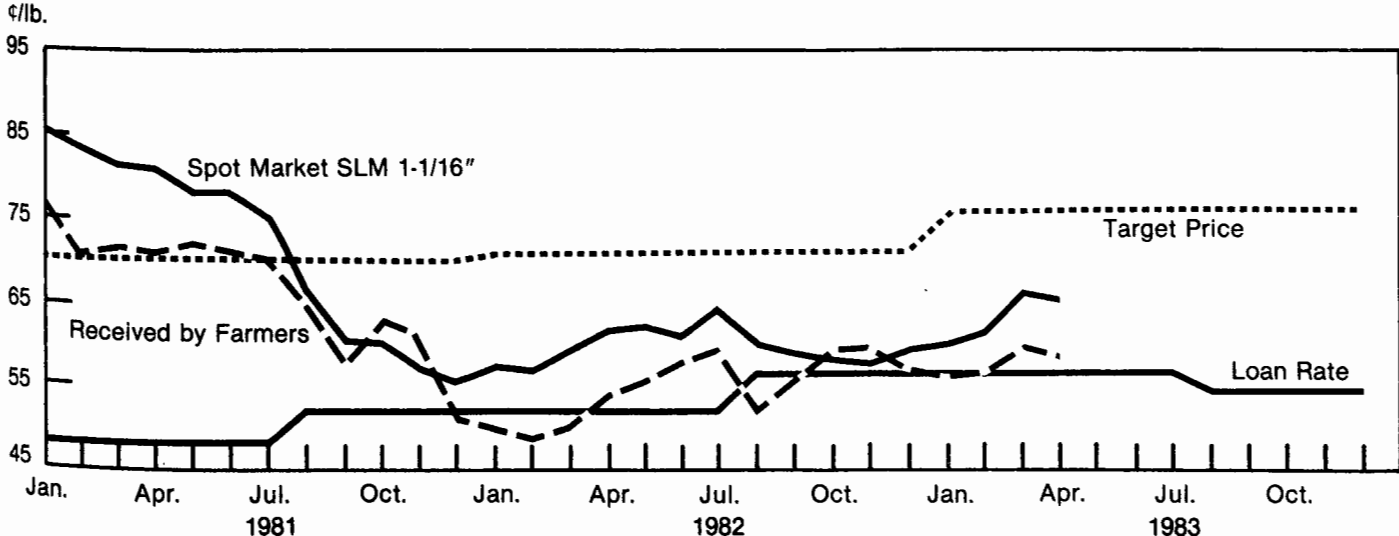


Figure 6

Neg. ERS 2597-83(3)

## Export Pace Has Quickened, But Season's Total Will Remain Low

Exports are estimated at 5.3 million bales for the 1982/83 season, a big drop from last season's 6.6 million. Through April 28th, export shipments for the marketing year totaled about 3.7 million bales, and an additional 1.7 million in outstanding sales were reported. However, not all outstanding sales for this year will actually be shipped prior to August 1, as some sales will be cancelled or rolled over to next year. At the end of April a year ago, outstanding sales stood at about 1.8 million bales, but only about 80 percent were eventually recorded as exports. Applying the same proportion to current outstanding sales yields an export estimate of 5.1 million bales. The current forecast is above that because stronger economic growth overseas is still expected to generate slightly more business than trends to date suggest.

The Soviet Union's March cancellation of about 127,000 bales of previously reported sales was a disappointment to U.S. exporters. The Soviet Union shifted another 65,000 bales to Eastern European destinations, and out of the 407,000 bales originally purchased, only 215,000 are still destined for the Soviet Union.

Japan, South Korea, China, Taiwan, Hong Kong, Indonesia, Thailand, and Canada accounted for 84 percent of all U.S. cotton exports in 1981/82. As of April 28, exports to these eight countries amounted to about 2.8 million bales, and if present trends continue, they will import only about 75 percent of total U.S. exports this season. This is primarily because Chinese imports from the United States have fallen from 848,000 bales during 1981/82 to 19,000 so far this year. The near term prospects for additional sales to China are zero, as that country's import needs are limited following this season's successful harvest.

Despite lower exports this season, a few countries, including Spain, Bangladesh, Thailand, Morocco, and Canada, along with the Soviet Union and Eastern Europe, are importing U.S. cotton at a faster rate than last year. In general, U.S. cotton markets are becoming slightly more diversified than in the past, and this trend should continue even though the Soviet Union will probably increase its net exports following the next harvest. Diversification will occur as textile and apparel industries migrate from the relatively labor-scarce countries in Asia, such as Japan, Taiwan, and South Korea, and relocate in lower labor cost countries such as Thailand and Indonesia. Economic development in other parts of Asia, Africa, and South America will also cause diversification of export markets as countries seek to establish their own textile industries.

However, this does not necessarily mean that U.S. exports will grow, since many countries are also striving to increase cotton production. A continued shift in cotton production away from the United States would tend to reduce the gap between foreign use and foreign supply, thus reducing the U.S. export potential.

Prices for Memphis territory cotton, c.i.f. Northern Europe, have been above the "A" index by an average of 2.04 cents a pound this crop year. This is not an unusual amount and cannot explain the decline in cotton exports. For instance, in 1980/81 U.S. exports were 5.9 million bales and U.S. prices averaged almost 7 cents more than the index. Major factors in the export decline are a rise in the foreign supply/consumption gap from 14.5 to 14.9 million bales this season and lower imports in the Far

East where the United States has a high market share.

The strength of the U.S. dollar has also affected exports. Even though nominal U.S. interest rates declined during 1982, inflation declined at an even faster rate, causing real interest rates to rise, and this attracted large amounts of foreign capital. The result has been a continuing increase in the value of the dollar relative to other currencies. The index of trade-weighted dollar exchange rates for cotton (1971=100) climbed from 144.1 in July 1982 to 150.7 in March 1983. This means that U.S. cotton prices increased by about 4.6 percent in terms of our customers' currencies since the start of this crop year. This is in addition to the domestic price increase seen in terms of U.S. cents per pound.

The cumulative effect of increased production in importing countries, high prices, and slack demand caused by the recession can be evaluated by taking a closer look at the level of exports implied by the ratio of U.S.-to-foreign excess supply. This season, the divergence between exports indicated by the ratio and actual exports is nearly twice as large as in any previous season (figure 2). The size of the error, 1.7 million bales, could be an indication of the effect that the strong dollar and weak demand have had on U.S. exports.

## World Situation in 1982/83

### World Stocks Up, But Prices Strengthen

World cotton production is estimated at 67.7 million bales this season. With world consumption estimated at 66.5 million bales, ending stocks will rise about a million bales, reaching 27.7 million by August 1 (table 5).

For 1981/82, the Outlook "A" index was about 74 cents a pound, and the ending stocks/use ratio was 0.41. This season, the projected ratio has worsened slightly to 0.42, but since November the "A" index has risen almost 10 cents a pound to nearly 80 cents (table 6). Rising world prices, despite slightly growing stocks, are likely related to lower production in foreign exporting countries, Soviet imports, anticipation of an effective PIK program, and large U.S. stocks isolated from the market under loan and needed for PIK.

### World Production Falls

In addition to the decline in the United States, this season's largest production decreases occurred in the Soviet Union and Mexico. Soviet production in 1982/83 is currently pegged at 12 million bales, down 1.3 million from a year ago despite a slight increase in plantings. The decline coupled with the extremely low quality of the weather-damaged harvest may force the Soviets to import over a half-million bales of cotton, including over 200,000 bales from the United States.

The Soviet Union harvests cotton from September through December, and ginning continues until the following July. The size of the Soviet crop is still uncertain because of the expectation that this year's ginning ratio will be less than normal. A storm passed through the main cotton production regions last October when approximately two-thirds of the crop remained unharvested. Some damage resulted, and 9.3 million metric tons of seed cotton were reportedly delivered to gins, down about 4 percent from 1981/82. The average gin-

**Table 5—Cotton: Supply and use; U.S., major importers, major exporters, and world**

Year beginning August 1	United States	World less United States				World <sup>3</sup>
		Major importers <sup>1</sup>	Major exporters <sup>2</sup>	Other	Total	
<i>Million 480-pound bales</i>						
1981/82						
Supply						
Beginning stocks	2.7	9.3	4.2	6.3	19.8	22.5
Production	15.6	14.5	24.3	16.4	55.2	70.9
Imports	(4)	16.9	.2	2.6	19.6	19.7
Use						
Mill use	5.3	31.0	15.2 <sup>4</sup>	14.3	60.5	65.7
Exports	6.6	.4	9.2	4.2	13.8	20.4
Ending stocks	6.6	9.3	4.1	6.8	20.2	26.8
1982/83						
Supply						
Beginning stocks	6.6	9.3	4.1	6.8	20.2	26.8
Production	12.0	17.2	22.5	16.1	55.7	67.7
Imports	(4)	14.6	.6	2.7	17.9	18.0
Use						
Mill use	5.5	31.4	15.1	14.5	61.0	66.5
Exports	5.3	.5	7.4	4.9	12.8	18.1
Ending stocks	8.0	9.3	4.4	6.1	19.7	27.7

<sup>1</sup>Includes Western Europe, Eastern Europe, Japan, PRC, Korea, Taiwan, and Hong Kong. <sup>2</sup>Includes the USSR, Pakistan, Egypt, Sudan, Turkey, Central America, and Mexico. <sup>3</sup>Total trade of individual countries, including intra-regional trade. World imports and exports may not balance due to cotton in transit and reporting discrepancies in some countries. <sup>4</sup>Less than 50,000 bales.

Totals may not add and stocks may not balance due to rounding, a small quantity of cotton destroyed, and differences unaccounted.

ning ratio between 1978 and 1981 was 29.7 percent. Applying this ratio to the quantity of seed cotton delivered to gins yields a production estimate of approximately 12.6 million bales. However, the Soviets may have suffered additional losses due to spoilage of some seed cotton in exposed stacks at the gins. Consequently, this year's ginning ratio is lower than average, and USDA's production estimate assumes a ginning ratio of 28 percent.

Mexican cotton production has declined this year as acreage fell by 46 percent from the 1981/82 area to about 470,000 acres. Consequently, production decreased by about 460,000 bales to 840,000, even though average yields rose to 860 pounds per acre from 790 pounds the year before. Low world prices in 1981/82 and a greatly overvalued peso prompted the shift out of cotton. At that time, Mexico's exchange rate was about 25 pesos to 1 U.S. dollar. It currently stands around 150 to 1, and this is expected to help boost Mexican cotton acreage in 1983.

Other exporting countries, such as Australia and Argentina, and several importing countries including Greece, Spain, and India also suffered production declines this season. Production in exporting nations is expected to be about 5 million bales under 1981/82, and this, combined with uncertainty about actual Soviet production and its importing intentions, has strongly contributed to the recent strength of cotton prices.

However, production declines in foreign exporting nations have been offset by an increase in China, causing this season's estimated foreign production to rise 0.5 million bales to 55.7 million. Chinese production, at 16.5 million bales, has increased by 2.9 million in 1982/83 because of increased acreage and improved yields. The Chinese are striving to increase agricultural production, and have, since the late 1970's, encouraged production by

reducing the scope of state planning in their farm sector, and by allowing farmers to directly benefit from increased output. Chinese farmers have changed the planting patterns previously mandated, and acreage devoted to cash crops, such as cotton, has increased. Furthermore, yields have also risen largely because better quality land is being devoted to cotton, weather has been good, and management has been more intense.

**Table 6—Index of prices of selected cotton growths and qualities, and price per pound of U.S. M-1-3/32" c.i.f. Northern Europe**

Month	1982		1983	
	Index <sup>1</sup>	U.S. M 1-3/32"	Index <sup>1</sup>	U.S. M 1-3/32"
<i>Cents</i>				
January	69.98	72.75	71.88	74.25
February	69.98	72.50	74.32	75.50
March	70.44	74.69	78.89	81.35
April	71.52	77.40	80.23	80.75
May	76.69	78.88		
June	75.64	75.38		
July	78.47	80.60		
August	76.40	77.13		
September	72.75	74.10		
October	70.21	73.38		
November	69.04	72.00		
December	69.67	73.25		
Average	72.57	75.17		

<sup>1</sup>Outlook A" index of Liverpool Cotton Services. Average of the 5 lowest priced of 10 selected growths.

Cotton Outlook, Liverpool Cotton Services.

Chinese cotton acreage rose by 26 percent since 1979 to about 14 million acres, and yields gained nearly 30 percent to 560 pounds per acre. However, some of the increased cotton acreage has come at the expense of grain area, and arable land in China is scarce. Acreage devoted to cotton may decline somewhat in the near future, but yields are expected to continue to rise, although at a slower pace than in recent years.

### **World Use To Rise Slightly**

World cotton consumption is expected to improve slightly this year to 66.5 million bales. The average rate of use in 1980/81 and 1981/82 was 65.8 million bales. While many countries have experienced changing rates of consumption, the increase in China over the last several years is the most important trend worldwide.

Cotton consumption in China has trended up since the end of World War II when total use was approximately 3.1 million bales. Consumption reached 15.7 million bales in 1981/82, and is expected to total 16.5 million this season. World consumption is expected to rise above last season's level by 800,000 bales this year, meaning that world use, excluding China, has remained about the same. Despite the increased use, production gains have lowered China's imports from 4 million bales in 1979—a fifth of world trade when the new incentive policies were implemented—to an estimated 500,000 bales this season.

China's increased use of raw cotton has come largely from increased domestic demand. Cotton fabric exports, especially exports of apparel, have also grown. Hong Kong, Japan, and the United States are the largest buyers of Chinese textiles, although many goods shipped to Hong Kong are cut, sewn, and finished for re-export to other destinations. China has also expanded its consumption of manmade fibers, and intends to continue decreasing cotton's share in textile products, currently at least 70 percent, over the next decade. Therefore, while acreage limitations may place a ceiling on Chinese cotton production, increased use of manmade fibers may enable the Chinese to avoid becoming heavily dependent again on raw cotton imports.

Consumption in Pakistan also trended upward over the last 2 years, and is expected to reach 2.3 million bales this season, 300,000 above 1981/82. Duty-free imports of textile machinery are helping to boost Pakistan's use of cotton as that country tries to make its export industries more efficient.

Consumption in several other countries has trended downward in the past 2 years. Use in Brazil is expected to fall from 2.7 million bales in 1980 to 2.6 million this year. The decline in Hong Kong is particularly steep, demonstrating the effects of the world recession and the continuing drop in textile production capacity there. In 1979/80, Hong Kong consumed 1.1 million bales, nearly twice this season's estimated 600,000 bales. Similarly, Mexican use, which grew to 760,000 bales by 1980/81, is expected to fall to 500,000 this season. Consumption in Portugal, Spain, and Thailand is also declining.

### **World Stocks Shift Toward Exporting Countries**

Of the 27.7 million bales estimated for world carryover stocks this season, the United States will have about 8 million, or 29 percent. China might have about 4.4 million bales, the USSR may hold about 2.4 million, and Brazil will have about 1.9 million. This means these four

countries will hold about 60 percent of world stocks. A year earlier, about 25 percent of world ending stocks were U.S.-held, and the four countries together held 58 percent.

For the importing countries, stocks as a percent of use have fallen from 28 percent in 1981/82 to an estimated 26 percent this year. However, for the exporting countries, stocks have grown from 63 to 67 percent of use. This indicates that importers may expect supplies to be plentiful and prices cheap this fall as U.S. PIK cotton becomes available and as the new harvest begins. The data also suggest that exports in 1983/84 could benefit if importing nations move to replenish their inventories of raw cotton as stronger economic growth stimulates consumption worldwide.

## **ELS Outlook in 1983/84**

### **Despite Acreage Cuts, Stocks Expected To Build Again**

The May planting intentions report indicated that American-Pima area would be 68,000 acres in 1983, down by less than 3,000 from 1982. Intentions in Arizona were 35,000 acres, compared with 1982 plantings of 41,800. The reduction in the national allotment from 120,200 acres to 80,131 explains the Arizona drop. However, in New Mexico and Texas, where the allotment was not restrictive, acreage intentions are 12,000 and 21,000, respectively. These figures represent increases of 26 and 7 percent over 1982.

With lower acreage but relatively high yields expected in 1983, production is expected to decline slightly from 1982's 99,000 bales. Because of the large supply, imports also are expected to fall.

Domestic demand for extra-long staple (ELS) cotton is expected to increase moderately as consumption of all fibers increases, and as new products, such as towels and sheets using ELS are developed. Exports are projected to increase slightly for the same reason, although shipments will likely remain far below exports during the past 5 years.

Because production is expected to be above disappearance again in 1983/84, ending stocks may rise sharply above this year's estimated 101,000 bales. Use of the loan program is expected to remain heavy, and the ELS loan rate for 1983/84 has been lowered to 96.25 cents a pound.

## **ELS Situation in 1982/83**

### **Mill Use Improving, But Stocks Will Still Be Excessive**

Ending stocks of ELS cotton are now expected to hit 101,000 bales this season. The estimate is 10,000 bales below earlier estimates, but still leaves expected ending stocks for this season 55 percent larger than carryin stocks.

Harvested acreage totaled 70,500 in 1982, and yields averaged 672 pounds. The resulting production of 98,700 bales was 19,000 more than last year. Through the end of March, imports totaled about 6,800 bales and are expected to reach about 8,000 bales for the season—equal to the 1981/82 total.

U.S. mill use has improved, and through the end of March, 32,900 bales had been consumed. When seasonal factors are considered, the average daily rate of use during March was 241 bales, sharply above the 197-bale average during the previous 3 months. Extrapolation of the March rate through the end of July puts total ELS use for 1982/83 at about 53,000 bales.

Exports are projected to reach 13,000 bales this season with most of the sales going to the European Community. Since 1979/80, ELS exports have fallen from 52,000 bales, and this has been the largest single cause of the buildup in carryover stocks. Exports have fallen for several reasons. Egypt and Sudan have had good crops, so competition has been strong. Sudan also produced a better quality crop the last 2 years and reduced its prices in an effort to increase its market share. Global demand for all fibers has decreased this year, but the biggest problem is that prices for American-Pima, supported by the loan rate, have remained above ELS prices from other sources.

Of the 101,000 bales expected in carryover stocks on August 1, approximately 45,000 will likely be owned by the CCC, and an additional 35,000 will be under loan. Ending free stocks will be about 21,000 bales, up from a reported 11,000 at the end of 1981/82. However, the 1981/82 ELS data show 15,000 bales unaccounted for, and stocks could have been larger than those reported.

With an ending stocks-to-use ratio of 1.54 projected for this season, the loan rate of 99.89 cents a pound has served as a price floor under ELS. The average farm price from August through April 1 was \$1.01 per pound.

## MANMADE FIBER REVIEW

### Manmade Fiber Recovery Continues

Manmade fiber production (including glass) in first-quarter 1983 was 2.06 billion pounds, 2.9 percent more than the fourth quarter and 1.7 percent above a year earlier (table 23). First-quarter staple production was 0.98 billion pounds, up 2.4 percent from fourth-quarter 1982 and 2 percent above a year earlier. Filament production was 1.08 billion pounds, 3.3 percent above the fourth quarter and 1.5 percent above first-quarter 1982.

Manmade fiber production capacity in the first quarter was 3.01 billion pounds, 0.3 percent greater than the fourth quarter, but 1 percent less than a year earlier. Staple capacity was 1.33 billion pounds, the same as the previous quarter but 2.6 percent less than a year ago. Filament capacity was 1.68 billion pounds, slightly more than the fourth quarter and first-quarter 1982. Manmade fiber plants operated at an average rate of 68 percent of capacity in the first quarter—staple plants at 74 percent, and filament plants at 64 percent. To obtain a desired rate of return on investment, fiber producers need to operate at 85 to 90 percent of capacity.

Total shipments (domestic plus exports) of nonglass manmade fibers in first-quarter 1983 were 1.84 billion pounds, 4.5 percent above the fourth quarter and 2.5 percent more than a year earlier. Noncellulosic fibers accounted for 1.7 billion pounds or 92 percent, and cellulosic fibers, 0.14 billion pounds or 8 percent.

Domestic shipments of noncellulosic fibers totaled 1.57 billion pounds in the first quarter, 5.2 percent above the previous quarter and 8.7 percent more than a year earlier. Cellulosic fiber shipments were 0.12 billion pounds,

11 percent above the fourth quarter and 1 percent above a year earlier.

Exports of manmade fibers, particularly polyester staple, remained weak. Exports began to drop in early 1982 because of reduced sales to the Far East. Overseas shipments were 0.14 billion pounds in the first quarter, 7 percent less than the fourth quarter and 38 percent below a year earlier.

### Woven and Carpet Uses Up, Knits Down

Consumption data for the three major manmade fiber markets are shown in table 7. The largest market, woven textiles, consumed 504 million pounds in fourth-quarter 1982, almost 6 percent more than the third quarter but 9 percent less than a year earlier. Fiber use in woven textile products in 1982 totaled 1.95 billion pounds, 18.5 percent less than in 1981. Polyester fibers dominated this market with a 66-percent share. Polyester staple made up 77 percent of the manmade staple fibers used in weaving, while polyester filament accounted for a half of the manmade filament fibers.

Carpet use of manmade fibers was 409 million pounds in the fourth quarter, down 7 percent from the third quarter but 23 percent above a year earlier. The carpet industry consumed 1.62 billion pounds of manmade fibers in 1982, 6 percent below 1981. At 71 percent, nylon was the most important manmade fiber in this market. Nylon staple accounted for 76 percent of the manmade staple fibers used in carpets, while nylon filament made up 67 percent of manmade filament fibers.

Preliminary first quarter data indicate that domestic shipments of nylon fiber to the carpet industry increased 9 percent from the fourth quarter. Nylon staple shipments for cut pile carpets grew 15 percent, while nylon filament shipments for loop pile carpets were up 3 percent.

Knitted textile products remained a depressed market for manmade fibers. About 315 million pounds of manmade fibers were used in knits in the fourth quarter, 1 percent less than the third quarter and 3 percent below a year earlier. In 1982, about 1.29 billion pounds of manmade fibers were used by the knitting industry, 16 percent less than in 1981. Almost all of this decline occurred in filament knit fibers, which are used to make doubleknit and tricot apparel.

Prices of chemicals used to make manmade fibers remained rather steady in the first quarter. The supply and demand for virgin xylene, a precursor for polyester fibers, was in balance with the spot price at \$1.20 per gallon. Another polyester fiber precursor, ethylene glycol, experienced a rather flat demand early in 1983. In April, the market softened and prices declined to 23-1/2 cents per pound from 25 cents in December. Suppliers expect the demand to increase in June as antifreeze manufacturers place orders for the coming season.

Caprolactam, one of the major raw materials for nylon, has been selling at around 85 to 86 cents per pound (flake, f.o.b. shipping point, truck load bags) since the first of the year. In January, propylene, a starting chemical for both polypropylene and acrylic fibers, experienced weak demand and sold for 2 to 2.5 cents off list prices of 18.5 cents for the chemical grade and 20 cents for the polymer grade. By mid-April these prices had not changed much. The chemical grade moved at about 15.5 cents per pound, while the polymer grade was about 19 cents.

**Table 7.—Major manmade fiber markets<sup>1</sup>**

Fiber type	1981				1982				1983
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
<i>Million pounds</i>									
Woven products									
Total	580.7	646.0	614.6	553.8	480.5	491.0	476.8	503.9	N.A.
Polyester	380.3	440.8	410.2	358.8	318.1	322.1	318.6	337.3	N.A.
Rayon	56.5	58.2	57.6	52.4	38.2	34.4	35.1	37.8	N.A.
Olefin	58.5	59.2	57.5	55.2	49.3	53.6	48.8	49.0	N.A.
Nylon	43.5	43.2	44.0	44.9	41.3	43.5	39.8	44.2	N.A.
Acetate	24.3	29.9	31.8	27.2	23.2	24.0	21.9	22.6	N.A.
Acrylic	17.6	14.7	13.5	15.3	10.4	13.4	12.6	13.0	N.A.
Knit products									
Total	402.2	427.7	384.1	325.6	318.7	332.6	318.8	315.4	N.A.
Polyester	201.0	203.0	189.5	160.1	151.4	151.6	150.7	150.5	N.A.
Nylon	82.8	85.3	76.7	73.6	64.6	61.3	63.0	64.2	N.A.
Acrylic	87.2	96.8	90.5	72.7	79.1	95.6	85.1	83.3	N.A.
Acetate	28.5	39.3	24.8	16.9	20.6	21.2	17.1	14.4	N.A.
Rayon	2.7	3.3	2.6	2.3	3.0	2.9	2.9	3.0	N.A.
Carpets									
Total	487.0	507.5	399.6	333.5	359.4	412.9	439.2	408.9	N.A.
Nylon	369.7	379.6	282.9	218.8	248.7	291.5	319.8	293.9	320.3
Olefin	90.3	90.3	87.3	84.4	86.1	89.2	91.7	84.5	N.A.
Polyester	27.0	37.6	29.2	30.2	24.6	—	32.0	27.6	30.5
Acrylic	—	—	—	—	—	—	—	—	N.A.
Rayon	—	—	0.2	0.1	—	0.2	0.1	—	N.A.

<sup>1</sup>Filament plus staple.

N.A. = Not available.

Compiled from *Textile Organon*.

## WOOL SITUATION

### U.S. Situation

#### New Year Starts Strong

Raw wool mill consumption in first-quarter 1983 was 34.2 million pounds, clean, 30 percent more than fourth-quarter 1982, but 1 percent below a year earlier (table 8). Raw wool used in apparel totaled 31.3 million pounds, 29 percent above the previous quarter, but 2 percent less than first-quarter 1982. Use of wool in the woolen system of 15.5 million pounds, clean, was up 35 percent from the fourth quarter. The worsted system used 15.8 million pounds, clean, an increase of 24 percent. Demand continued to be stronger for the finer grades. In the worsted system, 67 percent of the raw wool was 60's and finer, compared with 63 percent in 1982. In the woolen system, 53 percent was 60's and finer, up from 50 percent. Raw wool used in carpets amounted to 2.9 million pounds, clean, 39 percent more than the fourth quarter and 14 percent above a year earlier. Improved consumer demand in 1983 is expected to boost mill use to about 120 million pounds (table 9). Also reflecting stronger consumer demand, the raw wool content of imported textile products rose to 26.4 million pounds, 10 percent above the fourth quarter and 21 percent more than a year earlier (table 24).

Imports of wool in first-quarter 1983 were 16.2 million pounds, clean, 58 percent above the fourth quarter but 22 percent below a year earlier (table 10). Duty-free imports were 5.6 million pounds, 47 percent above the previous quarter. Most of the duty-free imports came

from New Zealand (74 percent), the United Kingdom (14 percent), and Argentina (10 percent). Dutiable raw wool imports totaled 10.5 million pounds, 64 percent above the previous quarter. Almost all the dutiable wool came from four countries: Australia (69 percent), the Republic of South Africa (13 percent), Uruguay (7 percent), and Argentina (4 percent). The finer grades of raw wool continue to dominate the dutiable raw wools, accounting for 82 percent.

Last fall the National Wool Growers Association petitioned the Office of International Trade Administration (O.I.T.A.), Department of Commerce, alleging that certain benefits were being provided to exporters of Argentine wool. The Office of Investigations, O.I.T.A., verified that dutiable raw wool shipped from southern ports of

**Table 8.—U.S. mill consumption of raw wool, scoured basis**

Year	Apparel wool	Carpet wool	Total
<i>1,000 pounds</i>			
1978	102,246	13,009	115,255
1979	106,533	10,513	117,046
1980	113,423	10,020	123,443
1981	127,752	10,896	138,648
1982 <sup>1</sup>	105,005	9,825	114,830
Jan.-Mar.			
1982	31,920	2,576	34,496
1983	31,269	2,938	34,207

<sup>1</sup>Preliminary.

Compiled from reports of the Bureau of the Census.

**Table 9.—Wool supply and disappearance, clean content**

Item	1981	1982	1983 <sup>1</sup>	1984 <sup>1</sup>
<i>Million pounds</i>				
Stocks, Jan. 1	50.6	44.5	46.0	43.9
Production	58.6	56.2	53.1	53.9
Imports	74.3	61.4	55.3	60.0
Diff. unacc.	—	—	10.0	10.0
Total supply	183.5	162.2	164.4	167.8
Mill use	138.6	114.8	120.0	123.0
Exports	0.3	1.4	0.5	0.7
Total use	138.9	116.2	120.5	123.7
Stocks, Dec. 31	44.6	46.0	43.9	44.1

<sup>1</sup>Estimated.

Compiled from reports of the Bureau of the Census.

**Table 10.—U.S. imports of dutiable and duty-free raw wool for consumption, clean content**

Year	Dutiable	Duty-free	Total
<i>1,000 pounds</i>			
1978	27,000	23,404	50,404
1979	20,283	22,047	42,330
1980	30,491	25,992	56,483
1981	48,106	26,146	74,252
1982	39,988	21,433	61,421
Jan.-Mar.			
1982	15,356	5,515	20,871
1983	10,549	5,639	16,188

Compiled from reports of the Bureau of the Census.

Argentina was being subsidized by the Argentine government. Therefore, American importers of dutiable raw wool shipped from those ports were ordered to pay 4.65 percent ad valorem after April 4, 1983. A review will be conducted within 12 months to determine future action.

U.S. raw wool exports in first-quarter 1983 totaled 252,000 pounds, clean, and went to three countries: the United Kingdom (67 percent), Canada (27 percent), and Italy (6 percent). The raw wool content of exported textile products was 2.2 million pounds, 10 percent less than the fourth quarter and 26 percent below a year earlier (table 25).

Since mid-March, the wool market has been moderately active at mostly steady prices. Prices for the finer grades were 20 percent below last year, while the medium grades were about 10 percent less—64's were \$1.92 a pound, 60's were \$1.38, and 56's and 54's averaged \$1.18. The only type of fleece wool experiencing significant demand was 54's, which sold for about \$1.13 in March and April. The average farm price in March was 58.4 cents a pound, but it rose to 67.4 cents in April as the spring clip became available (table 11). These January-April farm prices were the lowest since 1976.

The price of the finer grades of imported wool increased on average about 4 cents a pound from the first to the last week of April, when trading resumed after the 3-week Easter recess. Grade 70's were quoted at \$2.75, 64's at \$2.51, and 56's at \$1.96.

U.S. production of raw wool in 1982 was 105 million pounds, 4.3 percent below 1981. The weighted average price was 68.4 cents per pound, compared with 94.4 cents the year before. The value of the 1982 production was \$71.8 million, 31 percent below 1981. About 13.1 million

**Table 11.—Average U.S. farm prices per pound for shorn wool, grease basis**

Month	1980	1981	1982	1983 <sup>1</sup>
<i>Cents</i>				
January	82.1	84.6	73.1	53.2
February	86.8	88.3	72.9	57.7
March	93.5	91.8	63.6	58.4
April	92.2	101.0	83.6	67.4
May	86.6	99.8	76.5	
June	86.5	101.0	68.0	
July	85.8	94.4	77.0	
August	85.5	84.8	64.2	
September	84.7	84.3	56.5	
October	89.4	87.3	70.7	
November	92.1	91.1	54.7	
December	90.9	84.2	55.5	
Weighted season average	88.1	94.5	68.4	

<sup>1</sup>Preliminary.

sheep were shorn in 1982, 2.5 percent fewer than the year before. The average weight per fleece was 7.99 pounds in 1982 and 8.14 pounds in 1981.

## World Overview

### Moderate Wool Demand

The Australian wool market has been moderately strong since the beginning of the year. The market indicator (a weighted-average index of 11 wool categories) rose from a seasonal low of 426 in December to 432 in January and then to 437 in February. In early March, the Australian dollar was devalued 10 percent, and the Australian Wool Corporation (AWC) announced a 7.5-percent increase in the market indicator floor price to 454 cents per kilogram, clean. Some price weakness occurred in mid-March, but the market strengthened in late April after the Easter recess. AWC stocks peaked in late January at 1.16 million bales. They have since declined every week and by the end of April were 1.01 million bales, a decline of 13 percent. The principal buyers of Australian wool this year were the Japanese, the EC, and Eastern Europe.

The New Zealand wool market has been quite strong this year. Its market indicator reached a 1982/83 low of 234 in January, but moved up to 241 in February because of firmer demand. This rise occurred with the New Zealand Wool Board having to take only 4 percent of wool offered at auction. The market peaked at 288 in mid-March, due to a strong market and a 6-percent currency devaluation. Lower demand in late March and after the Easter recess caused the market indicator to fall to 270 in late April. The chief buyers of New Zealand wool were Eastern and Western Europe, China, and the Middle East.

The South African wool market had a strong tone in early February. The market indicator reached a peak of 535 before sliding to 517 at month's end. Prices in March fell substantially, due largely to the devaluation of the Australian dollar. The market indicator fell to a low of 492, but recovered to 499. During April, moderate demand kept the market indicator at the 499-501 level. The most important buyers of South African wool have been the Federal Republic of Germany, the United Kingdom, Italy, France, and Japan.

The Argentine wool-selling season has almost ended. In February, prices were higher for the finer types in short supply. The market remained firm in March as trade interest was evident for the falling volume of merino and crossbred wools.

## MOHAIR SITUATION

This spring's mohair market proved the most favorable in many years for U.S. angora goat owners. The year began with stocks of slightly less than 1 million pounds. The spring clip was an estimated 4.3 million pounds. It has been almost completely sold, and stocks as of May 1 were about 600,000 to 700,000 pounds, the lowest in at least 5 years. Poor grazing conditions from prolonged drought resulted in a finer clip and a lower yield. This higher quality hair is much desired by the trade for its good combing performance and higher scouring yield. Adult hair prices doubled, from \$1.80 a pound in February to \$3.50-\$3.80 in late March. Young goat rose from \$3 to \$4 while kid was in the \$6.50-\$7.00 range. This strong demand is expected to carry through the fall clip, which may be about 5 million pounds.

U.S. exports in the first quarter were 1.77 million pounds, 69 percent more than the average of the previous 5 years. The value was \$6.49 million. Four countries

took 85 percent: the United Kingdom (63 percent), Italy (10), and Switzerland and Spain (6 each).

Mohair production in 1982 was 9.8 million pounds, greasy, 1 percent less than the previous year. The number of goats clipped was 1.33 million, up 2.3 percent. The average clip per goat in 1982 was 7.37 pounds, down from 7.62 in 1981, and the average price per pound last year was \$2.55, almost a dollar less than in 1981. The value of the 1982 clip was almost \$25 million, 28 percent below the previous year.

In South Africa, the year began with stocks of about 1.5 million pounds, which together with the spring clip of about 7 million pounds are almost sold out. Current stocks are estimated at about 100,000 pounds. Strong demand will probably take all of the fall clip, which is expected to be about 7.3 million pounds. It might have been larger, but the prolonged drought reduced the kid crop to the lowest in 10 years. The United Kingdom, Japan, and Germany have been the principal customers of South African mohair. South African prices in mid-April were reported to be: adult, \$3.50 to \$3.80 a pound; young goat, \$4.00; and kid, \$6.50. The new Turkish mohair clip of about 12 million pounds is just now available. The Russians are reported to have purchased most of last year's clip. Their principal use is believed to be hand knitting yarns.

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# ANALYSIS OF FACTORS AFFECTING COTTON YIELDS

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**ABSTRACT:** The most important factors contributing to the variability in cotton yields in the Mississippi Delta, Texas High Plains, and California are temperature, rainfall, acreage planted, and skip-row regulations. The four factors explain 69 to 94 percent of the variability in lint yields in these three major producing areas. With this spring's smaller acreage and generally abundant moisture, 1983 cotton yields should be relatively high.

**KEYWORDS:** Cotton yields, precipitation, temperature, acreage planted

Crop productivity in the United States continues to trend upward, but in recent years the rate of increase appears to have diminished and the variability in yields from year to year has been greater than usual. In an earlier article (1), trend yields were estimated for the principal crops in the 14 major cotton producing States. Cotton yields in most States leveled off during 1965-80, while yields of soybeans, corn, winter wheat, and sorghum either leveled off or increased at a diminished rate in the majority of these States.

This article analyzes the impacts of selected variables—chiefly acreage planted, temperature, and precipitation—on cotton yields in three major cotton producing areas of the United States, based on statistical analysis of data from the 1955-80 crop years (2). The potential impacts of these variables on 1983 yields are then explored.

In spite of important advances in model development, data availability, and computer techniques in recent years, crop yield modeling is still in a stage of early development, especially for cotton. Definitive specification of the variables affecting yields and quantification of the functional relationships among those variables have yet to be achieved. One promising approach is development of physiological or crop-growth models, which can be used to explain and predict crop yield (3). These models simulate the growth and fruiting of the crop in response to major environmental, technological, and management factors included in the model.

Models in this article use ordinary least-squares regression to estimate regional cotton yields as a function of preplant soil moisture, spring temperature and rainfall, summer temperature and rainfall, fall temperature, acreage planted, and skip-row rules. The regions evaluated are the Delta area of Mississippi, the Texas High Plains, and California, where most of the acreage is in the San Joaquin Valley.

## FACTORS AFFECTING COTTON YIELDS

The variability in cotton plant growth and fruiting is caused by many factors, including variety, temperature, moisture, nutrients, sunlight, and cultural methods (4). Total land used in cotton production and Government programs are also important factors.

The minimum soil temperature required for germination and early seedling growth of upland cotton varieties averages about 60 degrees F and the maximum about 102

degrees. The optimum soil temperature for seedling growth is about 93 degrees (4). Beyond the seedling stage, air temperatures are the grower's main concern. Air temperatures below 60 degrees do not promote plant growth, while a sustained period when daily maximum temperatures exceed 100 degrees is reportedly unfavorable for plant growth. Within limits, higher daily average temperatures result in earlier maturity and higher yields. On the other hand, extreme summer heat can seriously reduce plant growth and fruiting. Plant responses to temperature are interdependent with moisture supplies, as water scarcity is one of the most critical factors affecting plant growth. Shortages often cause poor germination and seedling growth and, at later stages, shedding of squares and young bolls. Too much water prevents good soil aeration and may kill plants or result in shallow root systems. Too much moisture when bolls are maturing often results in boll rot, which reduces yield. Use of water by the plant is usually low early in the season and reaches a maximum in late July or early August when peak blossoming occurs (5).

The weather variables in the yield equations differ somewhat by region. Selection of variables was based partly on known plant physiology and production practices and partly on testing of alternative specifications for each region. Since a more comprehensive measure of weather is not available, rainfall and temperature variables were selected as the relevant weather factors affecting changes in yield. Other relevant but omitted factors may include solar radiation and light intensity. Weather data selected for the statistical analysis represented the critical time periods of crop growth—germination and seedling growth, fruiting, and harvesting.

It is generally recognized that as the acreage planted to a crop increases, the addition of less productive land has a tendency to depress crop yields. Since there is no readily available aggregative measure of productivity for land used in cotton production, the acreage planted is often used as a proxy. For example, one study (6) estimated that a 1-million-acre increase in harvested cotton area in the Delta States of Arkansas, Louisiana, Mississippi, Missouri, and Tennessee would cause per acre yield to decline 34 pounds. They concluded that greater cotton acreage in the Delta usually means more acreage planted in mixed or heavy soils that are less suited for cotton.

Previous research has indicated that changes in Federal regulations relating to skip-rowing of cotton

have affected average cotton yields, especially during the early 1960's when the rules were relaxed. During the allotment years of 1954-61, all acreage in fields planted to skip-rowed cotton was counted as cotton acreage, including the rows not planted. During 1962-65, these rules were relaxed, and only the planted rows were counted as acreage planted. Acreage penalties were reimposed in 1966-67. Since 1968, only land actually planted to cotton has been counted as cotton land in determining compliance with program provisions. USDA has reliable data on skip-rowing on a State basis for 1961-73, but estimates were not made for smaller geographic areas or for other years.

## REGIONAL RESULTS

### Mississippi Delta

Planted acreage, weather, and skip-row policy explained about 82 percent of the variability in cotton yields in this region (table 12). The F statistic indicates that the predictive power of the equations is significantly different from zero at a 99.9-percent level of confidence. With only a few exceptions, most of the variables had the expected sign and were significantly different from zero.

The results show that a 100,000-acre increase in planted acreage would reduce yields by about 40 pounds per acre. During a period when skip-row plantings are discouraged, yields could be expected to be about 98

pounds per acre less than under more relaxed rules. Excess rainfall during May and June would be expected to depress yields in Mississippi by about 37 pounds per acre for every inch of rain in excess of normal. During the summer months, rainfall in excess of normal can be expected to improve yield prospects as long as rainfall is not 4 inches above normal (figure 7). Cotton yields may be reduced by 29 pounds per acre for every 1 degree

### Effect of Summer Precipitation on Cotton Yields in the Delta Region of Mississippi

Incremental effect on cotton yield (lb)

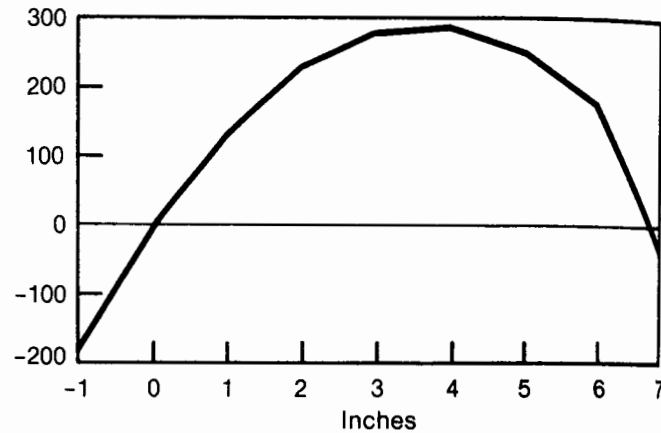


Figure 7

Table 12—Estimated cotton yield equations for selected regions, 1955-80<sup>1</sup>

Region	Explanatory variables											R <sup>2</sup> F
	Constant	PA <sub>i</sub>	SM <sub>i</sub>	RFSP <sub>i</sub>	RFSM <sub>i</sub>	RFSM <sup>2</sup> <sub>i</sub>	RFDE <sub>i</sub>	TEMSM <sub>i</sub>	TEMFL <sub>i</sub>	SKRW <sub>i</sub>	DUM <sub>i</sub>	
Mississippi Delta	1914.72 (2.23)	-39.82 (-4.01)		-37.03 (-4.63)	157.17 (2.07)	-21.31 (-2.29)		-29.00 (-2.82)	22.94 (3.23)	-98.21 (-3.21)		0.82 11.98
Texas High Plains Irrigated	-2072.27 (-5.06)	-22.37 (-4.67)	89.96 (3.85)	-25.78 (-2.67)	26.10 (2.88)			11.61 (2.61)	29.42 (5.29)	-52.10 (-1.80)	-123.42 (-3.55)	.82 9.63
Texas High Plains Nonirrigated	1772.71 (5.79)	-7.83 (-5.43)	81.45 (6.24)	-18.75 (-3.37)	52.82 (8.82)			-56.41 (-12.89)	37.53 (10.02)	-60.35 (-4.12)	-74.36 (-3.76)	.94 30.76
California	1157.04 (1.58)	-17.49 (-2.23)					-18.27 (-2.66)	-21.79 (-2.55)	32.08 (3.42)	-63.40 (-1.62)	-286.47 (-3.07)	.69 7.15

<sup>1</sup>Dependent variable is yield per harvested acre in the *i*th region (pounds). Figures in parenthesis are *t* ratios. Variable definitions and their measurement units are:

PA<sub>i</sub> = Acreage of cotton planted in the *i*th region (100,000 acres).

SM<sub>i</sub> = Soil moisture proxy, deviation from normal (February and March)/2 rainfall for the *i*th resource situation in the Texas High Plains (inches).

RFSP<sub>i</sub> = Spring rainfall deviation from long run (1955-80) normal in the *i*th regions (inches).

Spring is defined as follows: For Mississippi, (May and June)/2; Texas High Plains, May.

RFSM<sub>i</sub> = Summer rainfall deviation from normal in the *i*th region (inches). Summer is defined as follows: For Mississippi, (July and August)/2; irrigated High Plains in Texas, June; non-irrigated High Plains in Texas, August.

RFSM<sup>2</sup><sub>i</sub> = Summer rainfall deviation from normal, squared  $(X-\bar{X})^2$ , to account for excess rainfall in Mississippi (inches).

RFDE<sub>i</sub> = December rainfall deviation from normal in California (inches).

TEMSM<sub>i</sub> = Spring-summer temperature deviation from normal in the *i*th region (degrees).

Spring-summer is defined as follows: For Mississippi, July; irrigated High Plains in Texas, May; non-irrigated High Plains in Texas, (May, June, and July)/3; California, August.

TEMFL<sub>i</sub> = Fall temperature deviation from normal in the *i*th region (degrees). Fall is defined as follows: For Mississippi, (October and November)/2; irrigated and non-irrigated High Plains in Texas, September; California, (October, November, and December)/3.

SKRW<sub>i</sub> = A 0,1 variable to account for different skip row policy rules: penalties were imposed between 1955-61 and 1966-67, while no penalties were assessed in other years (1 in penalty years, 0 otherwise).

DUM<sub>i</sub> = Dummy variables defined as follows: For Mississippi, the variable accounts for the early 1974 frost. (1 in 1974, 0 otherwise). For the irrigated and non-irrigated High Plains in Texas, the variable accounts for subnormal temperatures between 1969-71. For California, the 0,1 variable accounts for unusually poor weather and severe insect infestation in 1978.

above normal in July, while temperatures above normal in the fall would improve yields by 23 pounds per acre for every 1 degree above normal.

## Texas High Plains

In addition to planted acreage, soil moisture, weather, and skip-row variables, it was also useful to include a variable to account for the subnormal temperatures experienced in the High Plains between 1969 and 1971. These variables explained from 82 to 94 percent of the variability in cotton yields in the two resource situations (table 12). The F statistics confirm the explanatory power of the equation. Most of the variables that were specified in the theoretical model had the expected sign, and the coefficients for these variables were significantly different from zero.

Empirical results indicate that warmer-than-usual temperatures in May had a favorable influence on yields of irrigated cotton, probably a result of favorable impacts that warm temperatures have on seedling growth and early maturity. Producers of nonirrigated cotton in the High Plains experienced lower yields as a result of above-average temperatures during the summer months. On the other hand, above-average temperatures during the summer months did not reduce yields of irrigated cotton. These results imply that irrigation reduces the adversity of high summer temperatures in the Texas High Plains. The implication, however, is not conclusive, because the results in the next section show that above-average temperatures will reduce cotton yields in California where the crop is entirely irrigated.

For both the irrigated and nonirrigated cotton crops, summer rainfall in excess of normal had a beneficial effect on yields, and above-normal summer rainfall did not appear to be a significant problem in this region. On the other hand, yields in the High Plains were reduced by excess rainfall in May.

Skip-row cultural practices are widely used in the High Plains to conserve soil moisture. Therefore, it is not surprising that the skip-row variable indicates a significant decrease in yields when incentives for skip-row planting are reduced. When skip-row rules are tightened, as in 1954-61 and 1966-67, yields can be expected to decrease by 52 pounds per acre on High Plains irrigated cotton and 60 pounds per acre on the High Plains nonirrigated acreage.

## California

Planted acreage, weather, and skip-row policy account for 69 percent of the variability in California cotton yields (table 12). Among the regions evaluated, California is the only one where rainfall during the summer months was not important, because summer rainfall in the San Joaquin Valley is very scarce, making production entirely dependent on irrigation. The data show that above-normal temperatures during the summer months will reduce yields, while above-normal temperatures in the fall months will favor cotton yields. Rainfall in December appears to be especially detrimental to yields, as an early rainy season or winter fog can preclude a satisfactory harvest such as second-pickings and cleanings. The skip-row variable indicates that yields will be approximately 63 pounds per acre higher under more liberal rules.

## IMPLICATIONS OF RESULTS

The variables included in this analysis explain a high proportion of the variability in lint yields during 1955-80 and tend to support the selection of the variables and their hypothesized signs. The analysis, however, was constrained by lack of complete time-series information on other variables, such as fertilizer, herbicide and insecticide use, acreage skip-rowed, planting patterns, and other cultural practices. An especially interesting and controversial question relates to the historic yield impacts of herbicide use. Herbicide use data are available for major regions (groups of States) for selected years, but data for States or smaller geographic areas are limited. The impact of herbicides on average U.S. yields is not well understood.

The yield model was partially validated by comparing predicted and actual yields over time. Figure 8 indicates that the model tracked actual yields quite well in Mississippi, with the exception of 1974, 1975, and 1977. The model has limited value for making early season predictions. The earliest information commonly available for a given year includes preseason weather conditions and an estimate of planting intentions. Growing-season weather conditions and pest infestations cannot be easily predicted. Another confounding factor is that the cotton plant is quite resilient and can overcome some adverse environmental conditions. Given these limitations, it is difficult to predict 1983 cotton yields with a reasonable degree of certainty. However, the model can be used to indicate general directions.

Early spring rainfall in 1983 was excessive in much of the cotton belt, especially in California, and the mid-South (7). These areas also experienced cooler-than-average temperatures through May 14. Cotton producers in the 14 major States had planted 60 percent of their expected acreage by May 22, compared with 62 percent in 1982 and an average of 68 percent. Relatively favorable moisture conditions prevailed in Texas, but the Texas Plains producers were reported to be waiting for warmer soil temperatures before planting. Even so, most of the planting was expected to take place within critical calendar limits, with exceptions of some flooded areas and heavy soils that drain slowly following saturation.

Growers indicated intentions to plant 8.1 million acres this season, down from 11.3 million planted in 1982 and 14.3 million in 1981. Assuming an abandonment of 3-5 percent, harvested area in 1983 would total about 7.8 million acres, compared with 9.7 million in 1982.

In an attempt to match statistical analysis with observations of early season factors affecting the 1983 crop, a diverse mixture of indications was obtained. Statistical analysis indicated that May and June precipitation levels in the humid areas are more critical than rainfall in earlier months. In the Texas High Plains region, however, above-average preseason (February and March) rainfall had a favorable effect on yields. If above-average rainfall is experienced through May and June of 1983, yield prospects could be reduced in the Delta and Texas High Plains regions. Above-average rainfall during the summer months, however, has historically favored higher yields in the Delta and High Plains regions. Lower-than-average summer temperatures and higher-than-average fall temperatures favor cotton in most areas.

On balance, the above-average preplanting rainfall received in most areas in 1983 has resulted in favorable-to-excessive soil moisture conditions for early planting.

## Cotton Yields In The Mississippi Delta

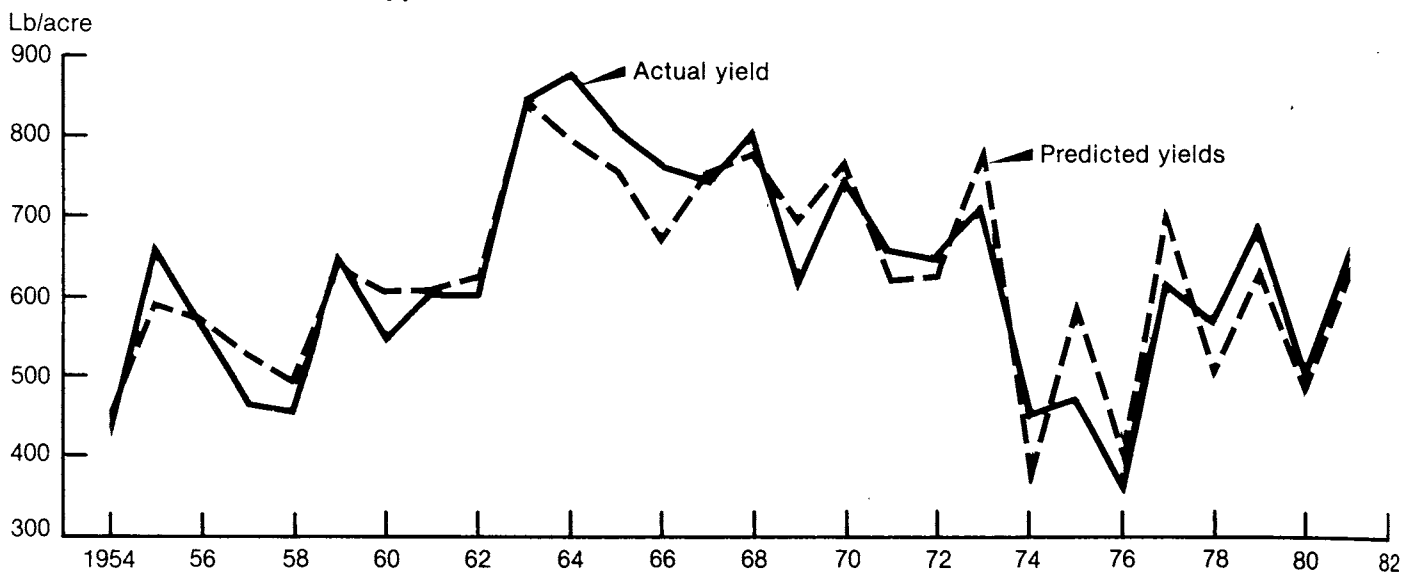


Figure 8

If drying conditions are favorable and if plantings are not delayed much beyond May 20 (depending on area), the net yield effect would likely be positive. Statistical analysis in the 3 major regions indicated that departure from normal spring temperatures has not been a critical factor. On the other hand, if above-average rainfall and cool temperatures persist during May and June, as some forecasts indicate, a yield-reducing effect could result.

It is generally accepted that as the acreage planted diminishes, the more productive land is used, especially when acreage of competing crops is also reduced. The statistical analysis indicated that cotton yields increased as acreage dropped in the major regions, with the most significant impacts in the Delta region. Evans and Bell (6) found that acres harvested had no significant effect on yield in the western irrigated areas but had a significant effect in the Southeast, Delta, and Southwest regions. Schroeder and Headley (8) concluded that a million-acre reduction in acreage planted in the Delta region (La., Miss., Ark.) would increase average yields by approximately 64-80 pounds of lint per acre. This article estimated that in the Delta area of Mississippi, a 100,000-acre drop would increase average yields by 40 pounds per acre (table 12). Similar results were obtained for Louisiana, but planted acreage had no significant effect on yields in Arkansas. A 100,000-acre drop in California plantings would increase yields by an estimated 17 pounds of lint per acre, while yield responses in the Texas High Plains ranged from 8 to 22 pounds per acre. Given favorable weather, planted acreage would be the most important variable affecting yields in 1983.

All factors considered, cotton yields should be relatively high in 1983.

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**Table 13.—Estimated mill consumption of raw cotton  
by major type of textile product**

Item	1981			1982 <sup>1</sup>				
	3 Q	4 Q	Year	1 Q	2 Q	3 Q	4 Q	Year
	1,000 bales <sup>2</sup>							
Wholly or chiefly cotton								
Duck	34	33	127	33	29	30	30	122
Sheeting & allied coarse	121	119	494	104	88	72	82	346
Print cloth	70	84	296	69	67	62	68	266
Denim	255	227	969	223	209	225	252	909
Toweling	133	138	560	160	170	148	184	662
Blanketing	21	17	87	17	20	19	27	83
Fine cotton	11	10	39	26	30	27	30	113
Corduroy	68	61	275	68	69	55	51	243
Miscellaneous	15	9	53	46	51	38	52	187
Total	728	698	2,900	746	733	676	776	2,931
Polyester/cotton fabrics								
Batiste	12	11	48	11	10	10	8	39
Bed sheeting	105	95	408	82	72	64	62	280
Broadcloth	16	14	53	14	13	12	12	51
Twills	49	46	201	57	61	51	53	222
Oxfords	10	10	40	4	4	5	4	17
Poplins	29	27	103	23	21	19	19	82
Sateens	2	2	11	2	3	2	2	9
Yarn dyed fabric	23	22	97	17	16	17	16	66
Print cloth	46	44	176	47	37	34	38	156
Other	50	43	213	25	23	19	18	85
Total	332	306	1,310	282	260	233	232	1,007
Other textile products								
Knit fabric	340	328	1,483	314	312	287	293	1,206
Narrow	18	17	73	14	14	10	10	48
Thread	23	20	95	20	20	16	17	73
Rope	13	12	55	12	12	8	8	40
Total	394	380	1,709	360	358	321	328	1,367
Grand Total	1,454	1,384	5,919	1,388	1,351	1,230	1,336	5,305
Actual mill consumption	1,412	1,327	5,657	1,300	1,325	1,252	1,306	5,183
Residual	+42	+57	+262	+88	+26	-22	+30	+122

<sup>1</sup>1982 figures revised. <sup>2</sup>480-pounds, net weight.

Based on data from Bureau of the Census reports and National Cotton Council.

**Table 14—Cotton: Supply and disappearance, by type, United States**

Year beginning August 1	Supply				Disappearance			Difference unaccounted <sup>4</sup>	Ending stocks July 31
	Beginning stocks August 1 <sup>1</sup>	Production <sup>2</sup>	Imports	Total	Mill consumption <sup>3</sup>	Exports	Total		
1,000 480-pound net weight bales <sup>5</sup>									
All kinds									
1980	3,000	11,122	28	14,150	5,891	5,926	11,817	335	2,668
1981	2,668	15,646	26	18,340	5,264	6,567	11,831	123	6,632
1982 <sup>7</sup>	6,632	<sup>8</sup> 12,010	23	18,665	5,503	5,313	10,816	152	8,001
Upland									
1980	2,962	11,018	27	14,007	5,828	5,893	11,721	328	2,614
1981	2,614	15,566	18	18,198	5,216	6,555	11,771	140	6,567
1982 <sup>7</sup>	6,567	<sup>8</sup> 11,911	15	18,493	5,450	5,300	10,750	157	7,900
Extra-long staple <sup>6</sup>									
1980	38	104	1	143	63	33	96	7	54
1981	54	80	8	142	48	12	60	-17	65
1982 <sup>7</sup>	65	<sup>8</sup> 99	8	172	53	13	66	-5	101

<sup>1</sup>Compiled from Bureau of the Census data and adjusted to an August 1 480-pound net weight basis. Excludes preseason ginnings. <sup>2</sup>Includes preseason ginnings. <sup>3</sup>Adjusted to August 1-July 31 marketing year. <sup>4</sup>Difference between ending stocks based on Census data and preceding season's supply less disappearance. For upland cotton, this difference primarily reflects an increase of an estimated 1 percent in average bale weights due to moisture absorption once cotton is ginned and begins to flow through marketing channels. Additional moisture is absorbed by cotton moving in export channels. For ELS cotton, this difference reflects, in part, reporting discrepancies for stocks, mill consumption, and exports. <sup>5</sup>Factors used to convert running bales to equivalent 480-pound net weight bales for carryover and consumption of domestic cotton are based on the relationship between 480 pounds and the gin weight of a running bale, raised by 1 percent (moisture factor). <sup>6</sup>Includes American-Pima, Sea Island, and foreign grown ELS cotton. <sup>7</sup>Preliminary and estimated. <sup>8</sup>Crop Reporting Board report of May 10, 1983.

**Table 15—Cotton: Supply and disappearance of all kinds; by months, United States<sup>1</sup>**

Date	Supply					Disappearance					Ending stocks <sup>5</sup>
	Beginning stocks <sup>2</sup>			Total	Ginnings <sup>3</sup>	Imports	Total	Mill consumption <sup>4</sup>	Exports	Total	
	At mills	In public storage <sup>6</sup>	Other <sup>7</sup>								
1,000 480-pound net weight bales											
1982/83											
August	865	5,495	272	6,632	472	2	7,106	448	360	808	6,298
September	788	5,259	251	6,298	1,122	2	7,422	435	370	805	6,617
October	700	5,521	396	6,617	3,919	1	10,537	455	308	763	9,774
November	639	7,919	1,216	9,774	3,668	3	13,445	448	399	847	12,598
December	663	10,644	1,291	12,598	1,825	0	14,423	404	395	799	13,624
January	731	11,619	1,274	13,624	750	1	14,375	444	462	906	13,469
February	819	11,640	1,010	13,469	254	0	13,723	454	386	840	12,883
March <sup>8</sup>	813	10,666	1,404	12,883		1	12,884	528	513	1,041	11,843
April <sup>8</sup>	830	10,195	818	11,843							
Season	865	5,495	272	6,632	12,010						

<sup>1</sup>Compiled from Bureau of the Census data and adjusted to a 480-pound net weight basis. <sup>2</sup>August stocks adjusted to an August 1 basis and exclude preseason ginnings. <sup>3</sup>August data include preseason ginnings. <sup>4</sup>Adjusted to a calendar month. <sup>5</sup>Supply less disappearance. End of season stocks adjusted by Bureau of the Census data. Differences primarily reflect varying bale weights. <sup>6</sup>Adjusted to 480-pound bales by use of monthly conversion factors for mill stocks. <sup>7</sup>Primarily cotton on farms and in transit. Estimated by subtracting public storage and mill stocks from total stocks. <sup>8</sup>Preliminary.

Table 16--U.S. consumption of fibers: Total and per capita

Year beginning Jan. 1	Population July 1 1/	Cotton			Wool			Rayon and acetate			Non-cellulosic manmade fibers			Manmade fiber waste			Flax and silk			All fibers		
		Total	% of fibers	Per capita	Total	% of fibers	Per capita	Total	% of fibers	Per capita	Total	% of fibers	Per capita	Total	% of fibers	Per capita	Total	% of fibers	Per capita	Total	Per capita <sup>2/</sup>	
		Mil.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Per-cent	Lb.	Mil. lb.	Lb.
Mill 3/																						
1976	218.0	3,413.9	29.4	15.7	121.7	1.1	0.6	854.8	7.4	3.9	6,974.6	60.2	32.0	223.1	1.9	1.0	6.4	0.1	5/	11,594.5	53.2	
1977	220.2	3,169.9	26.1	14.4	108.0	.9	.5	861.7	7.1	3.9	7,771.2	63.9	35.3	254.6	2.1	1.2	4.1	5/	5/	12,169.5	55.3	
1978	222.6	3,040.6	24.5	13.7	115.3	.9	.5	870.6	7.0	3.9	8,146.8	65.8	36.6	210.3	1.7	.9	5.8	5/	5/	12,389.4	55.7	
1979	225.1	3,077.2	24.3	13.7	117.0	.9	.5	822.6	6.5	3.7	8,493.0	67.2	37.7	130.4	1.0	.6	6.2	.1	5/	12,646.5	56.2	
1980	227.7	3,036.4	25.5	13.3	123.4	1.0	.5	733.0	6.2	3.2	7,944.1	66.6	34.9	83.0	.7	.4	3.4	5/	5/	11,923.4	52.4	
1981	229.8	2,715.5	23.5	11.8	138.6	1.2	.6	701.3	6.1	3.1	7,871.3	68.1	34.3	129.8	1.1	.6	5.5	.1	5/	11,562.0	50.3	
1982 6/	232.1	2,487.9	24.5	10.7	114.8	1.1	.5	515.5	5.1	2.2	6,882.1	67.9	29.7	132.8	1.3	.6	10.4	.1	5/	10,143.5	43.7	
Domestic 4/																						
1976	218.0	3,709.3	30.7	17.0	205.2	1.7	1.0	868.5	7.2	4.0	7,311.4	60.5	33.5	--	--	--	--	--	--	--	12,094.4	55.5
1977	220.2	3,469.8	27.3	15.8	211.5	1.7	1.0	884.4	6.9	4.0	8,167.2	64.1	37.1	--	--	--	--	--	--	--	12,732.9	57.8
1978	222.6	3,528.7	26.8	15.9	235.1	1.8	1.0	898.4	6.8	4.0	8,528.6	64.7	38.3	--	--	--	--	--	--	--	13,190.9	59.3
1979	225.1	3,343.8	25.9	14.9	214.1	1.7	1.0	824.4	6.4	3.7	8,548.4	66.1	38.0	--	--	--	--	--	--	--	12,930.7	57.4
1980	227.7	3,319.1	27.5	14.6	212.7	1.8	.9	720.8	6.0	3.2	7,803.3	64.7	34.3	--	--	--	--	--	--	--	12,055.9	53.0
1981	229.8	3,310.1	27.0	14.4	239.9	2.0	1.0	724.8	5.9	3.1	7,989.3	65.1	34.8	--	--	--	--	--	--	--	12,264.1	53.4
1982 6/	232.1	3,131.7	28.1	13.5	215.1	1.9	.9	542.5	4.9	2.3	7,247.3	65.1	31.2	--	--	--	--	--	--	--	11,136.7	48.0

1/ Including Armed Forces overseas, Alaska and Hawaii. 2/ Total consumption divided by population. 3/ "Mill" consumption of cotton is the net weight of running bales. Wool data include apparel and carpet wool scoured basis. Rayon and acetate data and non-cellulosic manmade fiber data (including glass) are producers' shipments plus imports for consumption. Manmade fibers waste data are producers' waste consumed by mills (excluding glass). Flax and silk data are imports for consumption. 4/ "Domestic" consumption refers to mill consumption adjusted for raw fiber equivalent of net U.S. trade in textile manufactures. Rayon and acetate data and non-cellulosic manmade fiber data includes fiber waste. "All fibers" data exclude flax and silk. 5/ Less than 0.05 pound. 6/ Preliminary.

Manmade fibers, Textile Organon, a publication of the Textile Economics Bureau, Inc.; all other, Bureau of the Census reports.

**Table 17—Fiber prices: Landed Group B mill points, cotton prices, and manmade staple fiber prices at f.o.b. producing plants, actual and estimated raw fiber equivalent**

Year beginning January 1	Cotton <sup>1</sup>		Rayon <sup>2</sup>		Polyester <sup>3</sup>	
	Actual	Raw fiber equivalent <sup>4</sup>	Actual	Raw fiber equivalent <sup>4</sup>	Actual	Raw fiber equivalent <sup>4</sup>
	<i>Cents per pound</i>					
1982	68	76	85	88	77	80
1982						
October	66	74	82	85	75	78
November	65	73	82	85	73	76
December	68	75	80	83	73	76
1983						
January	69	76	78	81	72	75
February	69	77	78	81	72	75
March	75	83	76	79	71	74
April	75	83	77	80	71	74

<sup>1</sup>SLM-1-1/16" at Group B Mill points, net weight. <sup>2</sup>1.5 and 3.0 denier, regular rayon staple. <sup>3</sup>Reported average market price for 1.5 denier polyester staple for cotton blending. <sup>4</sup>Actual prices converted to estimated raw fiber equivalent as follows; cotton, divided by 0.90, rayon and polyester, divided by 0.96.

Agricultural Marketing Service and Trade reports.

**Table 18—Cotton: Strict low middling, spot prices in designated U.S. markets, loan rates, and prices received by farmers for upland cotton**

Year beginning August 1	Average spot market prices per pound (net weight) <sup>1</sup>						Price per pound received by farmers for upland cotton (net weight) <sup>2</sup>
	15/16 inch	1 inch	1-1/32 inches	1-1/16 inches	1-3/32 inches	1-1/8 inches	
	<i>Cents</i>						
1981/82	49.92	54.13	58.28	60.48	60.89	62.07	<sup>3</sup> 54.00
1982/83							
August	50.86	54.82	58.21	60.38	60.76	61.71	52.80
September	49.81	53.89	56.71	58.98	59.36	60.10	55.50
October	49.12	53.14	56.35	58.58	58.97	59.62	59.80
November	48.87	52.80	55.98	58.20	58.57	59.09	59.90
December	50.14	54.04	57.40	59.65	60.02	60.90	57.30
January	50.07	54.08	57.88	60.16	60.53	61.56	56.00
February	50.85	54.81	59.42	61.72	62.09	63.43	56.40
March	53.81	57.93	63.74	66.05	66.43	67.95	59.90
April				65.34			58.80
May							
June							
July							
Average							<sup>3</sup> 57.60
Loan rate	48.73	52.68	55.73	57.73	58.13	58.38	<sup>4</sup> 57.08

<sup>1</sup>Spot market loan rates and prices are for cotton with micronaire readings of 3.5 through 4.9. <sup>2</sup>Excludes domestic allotment payments, price <sup>sup</sup>port and diversion payments. <sup>3</sup>Weighted average. <sup>4</sup>SLM 1-1/16" average location.

Agricultural Stabilization and Conservation Service, Agricultural Marketing Service, and Statistical Reporting Service.



**Table 19—Raw cotton equivalent of U.S. imports for consumption of cotton manufactures**

Year and month	Yarn, thread, and woven fabric					Primarily manufactured products					
	Yarn	Sewing thread, crochet, knitting yarn	Woven fabric		Total		Pile fabrics and mfrs. <sup>2</sup>	Table damask and mfrs.	Bed clothes and towels <sup>3</sup>	Gloves hosiery, and hdkf.	
			100 percent cotton	Blends <sup>1</sup>	Weight	Bales					
			1,000 pounds		1,000 bales <sup>8</sup>						1,000 pounds
1981	23,048	1,035	296,607	47,179	367,869	766.4	6,484	475	56,460	23,113	
1982	27,264	1,244	218,619	41,518	288,645	601.3	6,342	481	64,060	22,652	
1982											
January	2,171	119	25,028	4,604	31,922	66.5	478	35	4,878	1,832	
February	953	91	21,331	4,075	26,450	55.1	357	15	4,404	1,832	
March	1,990	136	16,937	3,669	22,732	47.4	311	43	5,580	1,772	
April	1,476	128	16,747	3,450	21,801	45.4	434	21	4,608	1,662	
May	3,281	169	19,257	3,266	25,973	54.1	664	53	7,096	2,218	
June	2,901	168	16,344	3,550	22,963	47.8	716	17	6,374	2,266	
July	2,384	62	14,604	2,834	19,884	41.4	498	10	4,108	1,347	
August	2,800	75	16,834	3,677	23,386	48.7	803	41	6,204	2,355	
September	2,670	68	17,479	3,434	23,651	49.3	528	17	5,298	2,096	
October	1,691	56	16,370	3,212	21,329	44.4	382	26	4,894	2,287	
November	2,645	85	19,960	3,032	25,722	53.6	524	107	5,614	1,794	
December	2,302	87	17,728	2,715	22,832	47.6	647	96	5,002	1,191	
1983											
January	3,670	60	23,065	5,435	32,230	67.2	672	48	6,788	2,711	
February	1,720	119	20,733	4,066	26,638	55.5	436	16	5,862	1,893	
March	2,716	91	20,626	3,777	27,210	56.7	563	33	6,928	1,788	
Primarily manufactured products							Total				
	Other wearing apparel <sup>4</sup>	Lace fabric and articles <sup>5</sup>	Household and clothing articles <sup>6</sup>	Misc.-products <sup>7</sup>	Floor covering	Total		Weight	Bales	Weight	Bales
						Weight	Bales				
						1,000 pounds					
1981	480,864	4,730	10,483	8,861	2,561	594,031	1,237.6	961,900	2,004.0		
1982	487,867	4,046	10,628	<sup>9</sup> 10,053	2,408	<sup>9</sup> 608,537	1,267.8	<sup>9</sup> 897,182	1,869.2		
1982											
January	34,052	265	940	918	155	43,553	90.7	75,475	157.2		
February	35,369	362	800	769	228	44,136	92.0	70,586	147.1		
March	32,739	327	1,031	801	114	42,718	89.0	65,450	136.4		
April	26,761	328	664	638	194	35,310	73.6	57,111	119.0		
May	39,442	382	1,018	636	223	51,732	107.8	77,705	161.9		
June	51,590	442	879	1,027	208	63,519	132.3	86,482	180.2		
July	46,021	270	860	636	242	53,992	112.5	73,876	153.9		
August	60,537	315	969	854	258	72,336	150.7	95,722	199.4		
September	46,366	364	802	1,088	193	56,752	118.2	80,403	167.5		
October	39,251	317	882	931	134	49,104	102.3	70,433	146.7		
November	42,206	338	1,048	937	246	52,814	110.0	78,536	163.6		
December	33,533	336	735	818	213	42,571	88.7	65,403	136.3		
1983											
January	49,331	368	944	<sup>9</sup> 1,017	1,160	<sup>9</sup> 63,039	131.3	<sup>9</sup> 95,269	198.5		
February	47,043	353	917	<sup>9</sup> 936	947	<sup>9</sup> 58,403	121.7	<sup>9</sup> 85,041	177.2		
March	48,694	446	949	<sup>9</sup> 1,123	1,225	<sup>9</sup> 61,746	128.6	<sup>9</sup> 88,956	185.3		

<sup>1</sup>Includes tapestry and upholstery fabrics, tire cord fabrics, and cloths in chief value cotton containing other fibers. <sup>2</sup>Includes velvets and velveteens, corduroys, plushes and chenilles, and manufactures of pile fabrics. <sup>3</sup>Includes blankets, quilts, bedspreads, sheets and pillow cases. <sup>4</sup>Includes knit and woven underwear and outerwear (collars and cuffs, shirts, coats, vests, robes, pajamas, and ornamented wearing apparel). <sup>5</sup>Includes nets and nettings, veils and veillings, edging, embroideries, etc., and lace window curtains. <sup>6</sup>Includes braids (except hat braids) tubing, labels, lacing, wicking, loom harness, table and bureau covers, polishing and dust cloths, fabric with fast edges, cords, and tassels, garters, suspenders and braces, corsets and brassieres etc. <sup>7</sup>Includes belts and belting, fish nets and netting, and coated, filled or waterproof fabrics. <sup>8</sup>480-pound net weight bales. <sup>9</sup>Does not include quantities in the TSUSA 706 luggage categories. The raw fiber equivalent quantities for May-December 1982 was 6,609 thousand pounds. For January-March 1983 these quantities are 1,271, 1,824, and 1,433 thousand pounds, respectively.

Compiled from reports of the Bureau of the Census.

**Table 20—Raw cotton equivalent of U.S. exports of domestic cotton manufactures**

Year and month	Yarn, thread, twine, and woven fabric						Manufactured products				
	Yarn	Sewing thread, crochet, darning and embroidery cotton	Twine and cordage	Woven fabric		Total		House, furnishings			
				Standard constructions and tire cord <sup>1</sup>	Other <sup>2</sup>	Weight	Bales	Knit fabrics	Blankets, spreads, pillow cases, and sheets	Towels	Other <sup>3</sup>
1,000 pounds				1,000 bales <sup>6</sup>		1,000 pounds					
1981	21,800	15,199	1,073	75,401	52,346	165,817	345.5	6,632	20,789	8,886	2,413
1982	17,981	11,277	822	71,570	13,186	114,838	239.3	4,720	14,092	6,222	3,241
1982											
January	1,347	1,087	39	5,078	1,170	8,722	18.2	451	1,012	338	124
February	1,713	741	79	5,375	1,001	8,909	18.6	388	932	456	192
March	1,343	1,137	64	6,027	1,214	9,785	20.4	463	1,271	351	205
April	1,357	1,322	65	5,887	1,273	9,904	20.6	402	1,432	947	154
May	2,178	860	62	7,250	1,326	11,677	24.3	479	1,148	430	153
June	1,981	734	106	7,250	1,854	11,925	24.8	574	1,268	674	297
July	829	1,374	58	7,803	831	10,895	22.7	395	1,115	588	432
August	994	1,409	95	4,056	975	7,529	15.7	360	1,051	373	370
September	1,293	885	46	5,609	1,024	8,857	18.5	419	1,148	578	494
October	1,952	813	85	5,977	1,098	9,924	20.7	330	1,360	553	266
November	1,562	484	81	5,995	723	8,845	18.4	213	1,155	637	216
December	1,432	431	42	5,263	697	7,866	16.4	246	1,200	297	338
1983											
January	1,796	1,314	55	5,589	878	9,633	20.1	106	881	537	168
February	1,720	506	36	4,101	891	7,254	15.1	148	1,028	310	143
March	2,727	656	116	4,441	779	8,718	18.2	203	1,194	446	190

	Manufactured products				Total		Total	
	Wearing apparel		Other household & clothing articles <sup>6</sup>	Industrial products <sup>7</sup>	Weight	Bales	Weight	Bales
	Knit <sup>4</sup>	Other <sup>5</sup>						
1,000 pounds				1,000 bales <sup>6</sup>		1,000 pounds		
1981	60,333	62,603	22,319	17,505	201,480	419.8	765.2	
1982	34,713	45,321	15,918	14,277	138,506	288.6	527.8	
1982								
January	2,792	3,467	1,701	1,011	10,896	22.7	40.9	
February	4,061	4,929	1,317	1,314	13,589	28.3	46.9	
March	3,311	5,142	1,544	1,204	13,492	28.1	48.5	
April	3,347	4,831	1,512	1,163	13,788	28.7	49.4	
May	3,108	4,386	1,617	1,449	12,770	26.6	50.9	
June	3,050	4,189	1,830	1,345	13,225	27.6	52.4	
July	2,305	3,265	1,025	1,307	10,432	21.7	44.4	
August	2,099	3,232	1,195	1,075	9,756	20.3	36.0	
September	2,713	3,746	1,215	1,311	11,625	24.2	42.7	
October	2,766	3,179	1,147	1,285	10,887	22.7	43.4	
November	2,633	1,950	943	841	8,587	17.9	36.3	
December	2,528	3,005	872	972	9,459	19.7	36.1	
1983								
January	2,830	2,792	2,046	879	10,240	21.3	41.4	
February	2,556	3,198	1,719	753	9,857	20.5	35.7	
March	2,991	3,460	897	968	10,349	21.6	39.7	

<sup>1</sup>Includes fabrics, tire cord and cloth for export to the Philippines to be embroidered and otherwise manufactured and returned to the United States. <sup>2</sup>Includes tapestry and upholstery fabrics, table damask, pile fabrics and remnants. <sup>3</sup>Includes curtains and draperies, house furnishings not elsewhere specified. <sup>4</sup>Includes gloves and mitts of woven fabric. <sup>5</sup>Includes underwear and outerwear of woven fabric, handkerchiefs, and wearing apparel containing mixed fibers (corsets, brassieres, and girdles, garters, armbands and suspenders, neckties and cravats). <sup>6</sup>Includes canvas articles and manufactures, braids and narrow fabrics, elastic webbing, waterproof garments, and laces and lace articles. <sup>7</sup>Includes rubberized fabrics, bags, and industrial belt and belting. <sup>8</sup>480-pound net weight bales.

Compiled from reports of the Bureau of the Census.

**Table 21 — Manmade fiber equivalent of U.S. imports for consumption of manmade fiber manufactures**

Year and month	Tops, yarn, thread, and woven fabric							Primarily manufactured products	
	Silver tops and roving	Yarns thrown or plied <sup>1</sup>	Yarns spun	Sewing thread and hand-work yarns	Rayon Tire fabric including cord fabrics	Woven fabric	Total	Wearing apparel	
								Knit <sup>2</sup>	Not knit
1,000 pounds									
1981	3,736	4,793	23,479	2,854	277	95,382	130,521	184,704	252,162
1982	2,724	6,642	26,470	2,324	1,087	93,335	132,582	193,087	292,224
1982									
January	448	622	1,877	169	28	7,740	10,884	12,464	24,013
February	320	143	1,408	208	65	6,583	8,727	11,222	22,724
March	207	434	1,648	191	29	6,818	9,327	10,548	21,744
April	118	326	2,114	231	2	6,788	9,579	8,565	16,823
May	82	477	2,774	196	0	8,739	12,268	15,317	25,132
June	138	520	2,438	239	1	9,143	12,479	21,755	31,280
July	348	330	2,050	115	80	6,581	9,504	17,801	25,780
August	192	611	2,847	176	135	10,438	14,399	26,414	34,499
September	423	618	2,566	147	106	9,087	12,947	21,522	26,856
October	68	515	2,337	231	84	7,413	10,648	20,041	20,546
November	209	1,080	2,280	241	280	7,693	11,783	16,642	21,174
December	171	966	2,131	180	277	6,312	10,037	10,796	21,653
1983									
January	363	871	2,725	234	169	8,841	13,203	17,107	28,010
February	336	828	2,169	274	169	7,148	10,924	15,867	23,703
March	688	1,198	2,925	263	251	9,122	14,447	15,030	23,074
Primarily manufactured products									
	Handkerchiefs	Laces and lace articles <sup>3</sup>	Narrow fabrics <sup>4</sup>	Knit fabric	Other manufactures <sup>5</sup>	Total	Total manufactured imports		
1,000 pounds									
1981	192	4,497	8,703	2,149	56,148	508,555	639,076		
1982	1,162	4,782	10,089	2,284	<sup>6</sup> 61,749	<sup>6</sup> 565,377	<sup>6</sup> 697,959		
1982									
January	81	343	761	220	4,418	42,300	53,184		
February	108	277	821	141	4,052	39,345	48,072		
March	82	295	847	243	4,650	38,409	47,736		
April	65	213	943	187	3,767	30,563	40,142		
May	90	452	1,158	161	5,303	47,613	59,881		
June	128	529	1,060	214	6,595	61,561	74,040		
July	145	384	774	159	5,586	50,629	60,133		
August	138	536	931	242	5,732	68,492	82,891		
September	106	561	801	236	5,749	55,831	68,778		
October	87	465	606	101	5,353	47,199	57,847		
November	55	368	865	242	5,070	44,416	56,199		
December	77	359	522	138	5,474	39,019	49,056		
1983									
January	89	372	1,343	183	<sup>6</sup> 5,679	<sup>6</sup> 52,783	<sup>6</sup> 65,986		
February	94	423	1,239	145	<sup>6</sup> 6,234	<sup>6</sup> 47,705	<sup>6</sup> 58,629		
March	86	407	1,069	127	<sup>6</sup> 7,077	<sup>6</sup> 46,870	<sup>6</sup> 61,317		

<sup>1</sup>Not included in these data are quantities of imported textured non-cellulosic yarn not over 20 turns per inch. <sup>2</sup>Includes gloves, hosiery, underwear, outerwear, and hats. <sup>3</sup>Includes veils and veillings, nets and nettings, lace window curtains, edging, insertings, flouncings, allover, etc., embroideries, and ornamented wearing apparel. <sup>4</sup>Includes braids (except hat braids), fabrics with fast edges not over 12 inches wide, garters, suspenders, braces, tubing, cords, tassels, gill nets, webs, seines, and other nets for fishing. <sup>5</sup>Not elsewhere classified. <sup>6</sup>Does not include quantities in the TSUSA 706 luggage categories. The raw fiber equivalent quantity for May-December 1982 was 109,137 thousand pounds. For January-March 1983 these quantities are 12,905, 12,561 and 14,461 thousand pounds, respectively.

Compiled from reports of the Bureau of the Census.

**Table 22—Manmade fiber equivalent of U.S. exports of domestic manmade fiber manufactures**

Year and month	Tops, yarn, thread, and woven fabric					Primarily manufactured products				
	Sliver tops, and roving <sup>1</sup>	Yarns spun	Sewing thread and handwork	Tire cord and tire cord fabric	Woven fabric <sup>2</sup>	Total	Hosiery	Underwear and night-wear	Outer wear	
	<i>1,000 pounds</i>									
1981	11,046	45,693	5,522	48,155	208,478	318,894	4,896	16,970	98,783	
1982	6,730	28,169	5,270	27,854	132,569	200,589	3,813	12,884	58,537	
1982										
January	811	2,111	433	3,126	9,117	16,197	293	985	5,405	
February	995	2,936	367	2,703	10,130	17,132	342	1,134	6,476	
March	712	2,554	561	2,794	11,484	18,104	305	1,090	5,486	
April	336	2,153	483	2,108	10,588	15,669	245	1,156	5,809	
May	375	2,427	446	3,059	12,110	18,417	328	1,208	5,433	
June	506	3,561	706	2,522	13,359	20,654	447	1,192	5,496	
July	957	1,882	311	2,311	10,664	16,125	464	971	4,544	
August	334	2,728	343	1,976	9,317	14,698	359	987	4,097	
September	571	1,939	372	1,890	11,292	16,063	313	1,199	4,969	
October	397	1,859	550	2,051	12,029	16,886	276	1,172	4,500	
November	503	1,928	381	1,438	11,529	15,778	240	934	2,301	
December	233	2,091	317	1,876	10,350	14,866	201	856	4,021	
1983										
January	336	2,333	462	1,081	9,245	13,457	241	915	4,566	
February	430	2,450	293	1,509	8,697	13,380	257	928	4,238	
March	373	2,384	546	1,848	10,397	15,548	217	983	5,222	
	Primarily manufactured products									
	House furnishings	Knit or crocheted	Narrow fabrics <sup>3</sup>	Other manufactures <sup>4</sup>	Total	Total manufactured exports				
	<i>1,000 pounds</i>									
1981	84,189	21,673	26,210	66,116	318,839	637,733				
1982	65,904	15,645	26,614	54,566	237,960	438,551				
1982										
January	4,537	1,142	2,816	3,527	18,705	34,902				
February	6,039	978	1,737	4,513	21,219	38,351				
March	6,706	1,474	1,803	4,749	21,613	39,717				
April	4,673	1,023	2,623	4,761	20,290	35,959				
May	7,905	1,307	2,083	5,325	23,589	42,007				
June	7,202	1,193	2,755	5,273	23,557	44,211				
July	4,397	1,219	1,989	4,218	17,802	33,927				
August	4,218	1,395	2,945	4,434	18,436	33,134				
September	5,511	1,600	1,743	4,460	19,795	35,858				
October	4,526	1,903	2,614	4,992	19,982	36,868				
November	6,043	1,373	1,764	4,109	16,763	32,542				
December	4,147	1,038	1,742	4,205	16,209	31,075				
1983										
January	5,125	938	1,792	4,508	18,086	31,543				
February	4,954	995	1,428	4,611	17,409	30,790				
March	5,631	1,536	1,930	5,647	21,167	36,715				

<sup>1</sup>Includes products made from waste. <sup>2</sup>Includes pile and tufted fabric such as corduroy. <sup>3</sup>Includes ribbons, trimmings, and braids (except hat braids). <sup>4</sup>Not elsewhere classified.

Compiled from reports of the Bureau of the Census.

**Table 23.—Manmade fiber production and capacity, quarterly, 1981-84<sup>4</sup>**

Fiber	1981		1982				1983					Projected 1984 capacity	Average annual change 1982-84
	Year	1Q	2Q	3Q	4Q	Year	1Q	2Q	3Q	4Q	Year		
	<i>Million pounds</i>											<i>Percent</i>	
Grand total <sup>1, 2</sup> all fibers													
Cap	12,042	3,033	3,027	3,009	2,996	12,065	3,005	3,020	3,030	3,047	12,102	12,357	1.2
Prod	9,819	2,022	1,967	1,955	2,000	7,944	2,057						
Percent	82	67	65	65	67	66	68						
Total staple <sup>2</sup>													
Cap	5,347	1,362	1,360	1,341	1,325	5,388	1,326	1,330	1,331	1,334	5,321	5,464	0.7
Prod	4,657	962	918	921	958	3,759	981						
Percent	87	71	68	69	72	70	74						
Total filament <sup>1, 2</sup>													
Cap	6,895	1,671	1,667	1,668	1,671	6,677	1,679	1,690	1,699	1,713	6,781	6,893	1.6
Prod	5,162	1,060	1,049	1,034	1,042	4,185	1,076						
Percent	77	63	63	62	62	63	64						
Polyester total													
Cap	4,616	1,132	1,105	1,091	1,076	4,404	1,078	1,081	1,082	1,082	4,323	4,389	-0.2
Prod	4,176	871	778	727	793	3,169	815						
Percent	90	77	70	67	74	72	76						
Staple													
Cap	2,767	707	704	690	675	2,776	677	680	680	680	2,717	2,778	0
Prod	2,607	539	460	447	509	1,955	492						
Percent	94	76	65	65	75	70	73						
Filament													
Cap	1,849	425	401	401	401	1,628	401	401	402	402	1,606	1,611	-0.5
Prod	1,569	332	318	280	284	1,214	323						
Percent	85	78	79	70	71	75	81						
Nylon total													
Cap	2,946	740	739	731	723	2,933	726	729	733	736	2,924	3,008	1.3
Prod	2,333	441	478	503	506	1,928	510						
Percent	79	60	65	69	70	66	70						
Staple													
Cap	989	249	247	246	245	987	245	244	246	247	982	1,045	2.9
Prod	752	141	169	191	185	686	198						
Percent	76	57	68	78	76	70	81						
Filament													
Cap	1,957	491	492	485	478	1,946	481	485	487	489	1,942	1,963	0.4
Prod	1,581	300	309	312	321	1,242	312						
Percent	81	61	63	64	67	64	65						
Olefin total													
Cap	1,192	315	317	322	327	1,281	331	334	337	340	1,342	1,397	4.4
Prod	785	190	178	180	175	723	167						
Percent	66	60	56	56	54	56	50						
Staple													
Cap	239	68	69	68	70	273	68	68	68	68	282	285	2.2
Prod	142	36	31	37	34	138	38						
Percent	59	53	45	54	49	51	56						
Filament													
Cap	953	247	248	254	259	1,008	263	266	269	272	1,070	1,112	5.0
Prod	643	154	147	143	141	585	129						
Percent	67	62	59	56	54	58	49						
Acrylic staple													
Cap	833	210	211	209	208	838	208	209	209	210	836	842	0.2
Prod	691	150	171	158	145	624	160						
Percent	83	71	81	76	70	74	77						
Non-cellulosic non-glass total <sup>1</sup>													
Cap	9,610	2,403	2,380	2,360	2,342	9,485	2,350	2,361	2,368	2,376	9,455	9,666	1.0
Prod	8,007	1,656	1,609	1,572	1,624	6,461	1,656						
Percent	83	69	68	67	69	68	70						
Staple													
Cap	4,828	1,234	1,231	1,213	1,196	4,874	1,198	1,201	1,203	1,205	4,807	4,950	0.7
Prod	4,192	866	831	833	873	3,403	888						
Percent	87	70	68	69	73	70	74						
Filament <sup>1</sup>													
Cap	4,782	1,169	1,149	1,147	1,146	4,611	1,152	1,160	1,165	1,171	4,648	4,716	1.1
Prod	3,815	790	778	739	751	3,058	768						
Percent	80	68	68	64	66	66	67						
Rayon staple													
Cap	512	127	128	127	128	510	127	128	127	128	510	510	0
Prod	461	96	87	88	84	355	93						
Percent	90	76	68	69	66	70	73						
Acetate filament													
Cap	330	81	80	79	80	320	79	80	79	80	318	318	-0.3
Prod	257	53	53	46	43	195	50						
Percent	78	65	66	58	54	61	63						
Glass filament													
Cap	1,525	407	424	427	429	1,687	432	434	440	446	1,752	1,796	3.2
Prod	1,041	208	210	241	240	899	<sup>3</sup> 250						
Percent	68	51	50	56	56	53	58						

<sup>1</sup>Includes spandex capacity and production not shown. <sup>2</sup>Includes rayon filament and acetate staple capacity and production not shown. <sup>3</sup>Estimated.

Compiled from *Textile Organon*.

**Table 24—Raw wool content of United States imports for consumption of wool manufactures<sup>1</sup>**

Year and month	Noils	Wastes <sup>6</sup>	Tops and advanced wool	Yarns	Woven fabrics <sup>2</sup>	Wool blankets <sup>3</sup>
<i>1,000 pounds</i>						
1981	12,299	8,233	326	4,720	27,783	400
1982	7,174	4,569	466	7,239	25,633	315
1982						
January	808	574	69	555	1,628	12
February	480	382	25	634	1,843	13
March	1,064	543	103	715	2,643	10
April	702	389	25	680	2,629	21
May	429	445	83	951	3,419	25
June	591	562	111	593	3,487	14
July	424	303	1	650	2,368	9
August	527	317	14	776	2,814	21
September	388	215	5	459	1,763	34
October	625	315	10	380	1,174	86
November	503	309	12	479	959	34
December	633	215	8	367	906	36
1983						
January	467	399	5	413	2,023	47
February	657	349	12	616	1,829	25
March	908	489	73	574	2,532	23
<b>Wearing apparel</b>						
	Knit	Other than knit <sup>4</sup>		Other manufactures <sup>5</sup>	Carpets and rugs	Total
<i>1,000 pounds</i>						
1981	22,789	18,098		902	18,076	113,626
1982	25,649	20,714		839	19,642	112,240
1982						
January	775	816		74	1,632	6,943
February	1,011	769		66	1,267	6,490
March	829	732		92	1,595	8,326
April	1,065	937		99	1,368	7,915
May	1,569	1,009		64	1,764	9,758
June	2,768	2,006		76	1,692	11,900
July	3,192	2,345		68	1,543	10,903
August	4,644	4,020		53	1,912	15,098
September	3,482	3,237		64	1,352	10,999
October	2,974	2,247		62	1,799	9,672
November	2,285	1,682		70	1,756	8,089
December	1,055	914		51	1,962	6,147
1983						
January	1,435	1,363		119	2,357	8,628
February	740	1,027		80	2,657	7,992
March	1,027	1,163		75	2,923	9,787

<sup>1</sup>Includes manufactures of mohair, alpaca, and other wool-like specialty hair. <sup>2</sup>Includes pile fabric and manufactures, tapestry and upholstery goods press and billard cloths. <sup>3</sup>Includes carriage and automobile robes, steamer rugs, etc. <sup>4</sup>Includes laces, lace articles, veils and veillings, nets and nettings, when reported in pounds. <sup>5</sup>Includes knit fabrics in the piece and miscellaneous manufactures not elsewhere specified. <sup>6</sup>Not including rags.

Compiled from reports of the Bureau of the Census.

**Table 25—Raw wool content of United States exports of domestic wool manufactures<sup>1</sup>**

Year and month	Noils & wastes <sup>2</sup>	Tops and advanced wool	Yarns	Woven fabrics	Wool <sup>2</sup> blankets	Wearing apparel knit
<i>1,000 pounds</i>						
1981	537	2,641	994	1,652	88	2,031
1982	1,069	4,283	663	1,297	47	1,762
<b>1982</b>						
January	6	119	123	87	8	547
February	91	200	90	162	2	122
March	117	380	40	128	3	125
April	95	291	74	106	5	128
May	76	435	56	101	3	142
June	103	560	141	108	7	138
July	36	357	34	102	5	74
August	67	359	22	181	2	114
September	35	501	46	88	4	173
October	161	342	28	56	3	101
November	96	317	3	75	3	28
December	186	422	6	103	2	70
<b>1983</b>						
January	47	211	16	55	3	110
February	31	262	38	38	2	154
March	231	333	21	108	2	151
	Wearing apparel other than knit	Felts	Other manufactures <sup>3</sup>	Carpets and rugs	Knit fabrics	Total
<i>1,000 pounds</i>						
1981	1,945	294	1,729	201	211	12,332
1982	1,131	235	1,173	180	107	11,945
<b>1982</b>						
January	71	15	176	26	4	1,185
February	81	27	91	5	15	887
March	70	21	76	15	22	995
April	83	9	76	22	3	892
May	91	16	88	18	7	1,032
June	262	15	173	12	29	1,549
July	70	2	109	6	3	798
August	113	44	95	15	3	1,013
September	104	16	92	7	6	1,072
October	65	1	80	7	7	852
November	33	31	47	37	7	675
December	88	38	70	10	1	995
<b>1983</b>						
January	59	7	69	21	36	635
February	38	12	44	4	2	625
March	39	27	72	16	6	1,004

<sup>1</sup>Includes manufactures of mohair, alpaca, and other wool-like speciality hair. <sup>2</sup>Not including rags. <sup>3</sup>Census Bureau's Schedule B classification designated manufactures, n.e.c.

Compiled from reports of the Bureau of the Census.



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