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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

THE PROSPECTS FOR EXTRA LONG STAPLE COTTON

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The Prospects for Extra Long Staple Cotton

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Summary and Conclusions

1. The present surplus of extra long staple cotton is likely to continue at least until 1965. Basic to this conclusion is the anticipated substantial increase in the Sudan's production of extra long staple cotton.
2. Although world production of extra long staple cotton represents only about 5% of total cotton output, it is of significance to the economies of Egypt, the Sudan, and Peru. Output of extra long staple cotton rose steadily from the 1953/54 crop year to the 1956/57 season at a compound rate of over 11%. Production in 1965 is estimated at slightly over 1.6 million bales with the only substantial increase in output expected to take place in the Sudan, assuming that the Sudan will continue to emphasize extra long staple cotton rather than shift to upland varieties. Production in Egypt is expected to decline from present levels while increased output in Peru and the United States will be smaller than in recent years.
3. Estimates of consumption of extra long staple cotton center around three possible growth rates. A rate of 1.7% represents the estimated growth rate for consumption of cotton as a whole for those countries, mostly high income countries, which represent over three-fourths of world consumption of extra long staple cotton. There is reason to believe that in these countries consumption of extra long staple cotton will rise faster than consumption of cotton as a whole, perhaps at a rate of 2.9%, which is the estimated growth rate for aggregate fiber consumption in the same group of countries. This is believed to be a more realistic level for extra long staple cotton than 1.7%. However, a growth rate of double the lower limit would be necessary if consumption is to be in equilibrium with production in 1965. While this might be attainable under highly optimistic circumstances, involving continued increases in exports of extra long staple cotton to the Soviet Bloc and relative stability in prices of the extra long staples in the future, on balance it is unlikely to occur unless the price of extra long staple cotton were to fall substantially.
4. In forecasting the price of extra long staple cotton in 1965 two assumptions are made with regard to Sudanese cotton production. Under the first assumption the Sudan would utilize all of the increased irrigated acreage to grow extra long staple cotton. Under the second assumption, the Sudan would utilize only a part -- perhaps 50% -- of the increased acreage for extra long staple cotton. On balance it is our judgement that, although in the medium term the Sudan might utilize all of its increased irrigated acreage for extra long staple cotton, the substantially lower price level which would result from such a development -- perhaps to 38 cents per pound -- will lead to a partial shift to the medium staples, bringing with it a recovery in price. Under such circumstances a reasonable price forecast for the mid-1960's would place the price of extra long staple cotton at around 45 cents per pound for Egyptian Karnak (c.i.f. Liverpool), with Sudanese Sakel perhaps 10% lower.

THE PROSPECTS FOR EXTRA LONG STAPLE COTTON

The purpose of this paper is to analyze recent developments and future prospects for extra long staple cotton. Although extra long staples (generally defined as having a staple length of over 1 3/8 inches) represent only 5 per cent of total cotton production in the free world, they are of significance to the economies of the three largest producers of this type of cotton - Egypt, the Sudan and Peru.^{1/} Together with the United States, the fourth major producer, these countries account for 98% of total world output of extra long staple cotton.^{2/}

There is a degree of interchangeability in use between extra long staple cotton and upland types when price incentives for such substitution prevail, but extra long staple cotton is also used for different purposes than upland cotton. The fineness and high tensile strength of extra long staple cotton make it desirable for sewing thread, fine quality fabrics such as poplins for fine quality shirts and dress goods, lace and typewriter ribbon. There is also a significant degree of interchangeability in so far as production of the two types is concerned. Upland cotton can be grown on the same land as the extra long staples, and, if adequate water is available, the reverse is also true.

1. Recent Developments

a. Production

Post-World War II production of extra long staple cotton has been characterized by marked fluctuations although there was a steady rise in production in the three seasons following the 1953/54 crop year (Table 1). Due to an abnormally small crop in the Sudan as a result of disease and insect damage, world output during the 1957/58 crop year is estimated at 1,335,000 bales ^{2/}, about 50,000 bales less than during the previous season. Growth between the 1953/54 and 1956/57 crop years was at a compound rate of over 11%.

^{1/} During 1954/55 - 1956/57, Egypt accounted for 48% of the world's output of extra long staple cotton; the Sudan 38%; Peru 8%; and the United States 4%.

^{2/} Egyptian extra long staple consists mostly of a variety known as Karnak and to a lesser extent, but growing in importance, Menoufi. Sudanese extra long staple cotton consists mostly of the Sakel variety and to a lesser extent, the Lambert variety. Most of the Peruvian extra long staple cotton is the Pima variety, but there is also some Karnak production. In the United States extra long staple cotton is referred to as American-Egyptian cotton; the variety currently planted is technically known as Pima S-1.

^{3/} All references to bales in this paper are to bales of 478 pounds net weight.

Table 1: Production of Extra Long Staple Cotton, 1947/48-1957/58

(in 1,000 bales of 478 pounds net weight)

<u>Crop Year</u> ^{a/}	<u>Egypt</u>	<u>Sudan</u>	<u>Peru</u>	<u>United States</u>	<u>Others</u>	<u>Total</u>
1947/48	302	223	25	1	4	555
1948/49	513	269	28	3	8	821
1949/50	750	284	73	4	9	1,120
1950/51	593	405	37	62	20	1,117
1951/52	647	195	28	46	24	940
1952/53	925	345	55	94	15	1,434
1953/54	507	365	46	65	22	1,005
1954/55	531	340	79	41	27	1,018
1955/56	552	390	77	42	39	1,100
1956/57	614	585	107	50	30	1,386
1957/58 ^{b/}	808	320	90	83	34 ^{c/}	1,335

a/ Beginning August 1.

b/ Preliminary.

c/ Two-thirds in Aden; balance in British West Indies and Italian Somaliland.

Source: International Cotton Advisory Committee

These fluctuations find their origin in a number of circumstances. Extra long staple cotton production has responded to international developments. Thus increased demand during the Korean conflict, particularly for stockpiling operations and for military items, resulted in the price of Egyptian Karnak cotton reaching a peak of \$1.15 per pound and of Peruvian Pima a peak of \$1.06 per pound, both c.i.f. Liverpool, in March 1951.^{1/} Cotton production in Egypt and Peru increased 56% and 49% respectively between the 1950/51 and 1952/53 seasons.

Similarly in the United States a purchase program was instituted under which the Government bought all extra long staple cotton tendered to it for as much as \$1.10 per pound. Production rose by 51% between the 1950/51 and 1952/53 seasons.

When the increased demand of the Korean conflict disappeared, the United States and Egypt instituted acreage controls. The United States discontinued its purchase program. Between the 1952/53 and the 1955/56 seasons, extra long staple cotton production in these two countries declined by 55% and 40% respectively.

Extra long staple cotton production has also responded to more recent events. Increased exports of Egyptian extra long staple cotton to the Soviet Bloc and then the Suez crisis, resulted in the United States-produced variety, normally higher priced than other growths, becoming fully competitive both domestically and in world markets, as prices for the Karnak, Sakel and Pima varieties rose significantly. This situation led to the liquidation of virtually the entire inventory of Commodity Credit Corporation stocks of extra long staple cotton and the United States became an exporter of this type of cotton in substantial quantities for the first time since World War I.^{2/} With a significant reduction in stocks, acreage restrictions on the 1957 crop of extra long staple cotton were relaxed and 1957 output in the United States is the third highest since 1920.

Production in the Sudan and Peru has not been subject to Government restrictions. As a result there has been almost a steady increase in extra long staple output in these countries until the present (1957/58) crop year. Production in both countries will be below the peak levels reached during the 1956/57 season but in the case of Peru still higher than in any previous year.

^{1/} Karnak averaged 89 cents per pound c.i.f. Liverpool during the 1950/51 season and 90 cents per pound during the 1951/52 season. Pima averaged 55 cents per pound during the 1950/51 season and 91 cents per pound during the 1951/52 season.

^{2/} United States exports of extra long staple cotton have not been put on a subsidized basis as has been the case with upland cotton exports.

Increased production in the Sudan and Peru has been the result of increased acreage and, to a lesser extent, of higher yields (Table 2). Acreage devoted to extra long staple cotton in the Sudan increased by 35% between 1950/51-1951/52 and 1955/56-1956/57; in Peru the increase was 100%. Yields in the Sudan increased by 21% in the same period and in Peru by 41%. A reduction in both yields and acreage accounted for the decline in production of extra long staple cotton in Peru and the Sudan in 1957/58.

Table 2: Acreage and Yields of Extra Long Staple Cotton
1950/51-1957/58

(in 1,000 acres; yields in pounds per acre)

<u>Crop Year</u> ^{a/}	<u>Egypt</u>		<u>Sudan</u>	<u>Peru</u> ^{c/}	<u>United States</u>	<u>Others</u>	<u>Total</u>
	Karnak	Menoufi	Sakel	Pima/ Karnak	American- Egyptian	c/	
<u>Acreage</u>							
1950/51	709	60	392	60	103	38	1,362
1951/52	747	147	357	50	64	77	1,442
1952/53	969	32	415	75	107	44	1,642
1953/54	493	17	452	85	92	42	1,181
1954/55	581	37	415	85	34	61	1,213
1955/56	816	55	414	100	41	70	1,496
1956/57	631	166	597	120	44	72	1,627
1957/58 ^{b/}	630	327	515	112	82	74 ^{d/}	1,740
<u>Yields</u>							
1950/51	368	385	494	295	298	221	392
1951/52	349	324	261	268	354	133	312
1952/53	439	515	397	350	425	140	417
1953/54	470	609	386	259	340	255	407
1954/55	401	568	392	444	589	210	401
1955/56	287	535	450	368	500	232	351
1956/57	335	495	469	426	583	199	407
1957/58 ^{b/}	317	570	297	386	482	221 ^{d/}	366

a/ Beginning August 1.

b/ Preliminary

c/ Estimated.

d/ See Footnote 2/, Table 1.

Source: International Cotton Advisory Committee

b. Stocks

Aggregate carryover stocks of extra long staple cotton in producing countries on August 1, 1957 were the highest since 1953. Together with increased output during the present crop year, aggregate supply in producing countries of 2 million bales will be the highest on record, an 11% increase over the previous season.

Not included in these figures, but an important factor in the extra long staple cotton situation, is the planned disposal by the United States Government of its stockpile of extra long staple cotton accumulated during the Korean conflict.^{1/} A total of 269,000 bales was in the stockpile; 50,000 bales of this total were released for sale in July 1957 by Act of Congress. If Congress approves, the balance will be sold over a five-year period, retroactive to August 1, 1957, with the 50,000 bales already released included in the first year's disposals. The disposal plan specifies that sales for export will not be made at a lower price than for domestic use and that the minimum price at which the stockpile will be sold will be 110% of the support price.^{2/}

Only the Sudan of the four major producers had an unusual increase in stocks at the beginning of the present marketing season. Stocks in the Sudan on August 1, 1957, were $2\frac{1}{2}$ times the level of the previous year and more than twice the average level of the period 1953-56. Egypt's stocks were 140% of the previous year's level, but only 64% of the average level of 1953-56. Stocks in Peru and the United States, excluding the stockpile, were substantially below previous levels.

c. Consumption

The long-term trend in consumption of extra long staple cotton would, of course, not move independently of consumption of all fibers or of cotton as a whole. Nevertheless in the shorter term, despite incomplete consumption data, it would appear that consumption of extra long staple cotton does not necessarily follow the consumption trends for cotton as a whole. For example, free world consumption of all growths rose by 3% between 1954/55 and 1955/56; consumption of extra long staples rose by 9%. Between 1955/56 and 1956/57 free world consumption of all growths rose by about 4%; consumption of extra long staples declined by 11%.

This variation is due essentially to the sensitivity of extra long staple cotton consumption to price fluctuations, which have traditionally

1/ This is in the strategic stockpile and should not be confused with CCC stocks.

2/ For the 50,000 bales released in July 1957, sales are made at a minimum price of 105% of the support price.

been significant. This is shown in Table 3, using data on Egyptian extra long staples.

Table 3: Index of Prices of Egyptian Extra Long Staple Cotton, Liverpool, 1906-09 to 1935-37 and 1950/51 to 1956/57 a/

	<u>Sakels^{b/}</u> (1935-37 = 100)
Average 1906-09	102
" 1910-14	116
" 1915-19	298
" 1920-24	217
1919 <u>c/</u>	496
Average 1925-29	183
" 1930-34	77
1931 <u>d/</u>	55
Average 1935-37	100
	<u>Karnak^{e/}</u> (1953/54 = 100)
1950/51	210
1951/52	191
December 1951 <u>c/</u>	235
1952/53	100
1953/54	100
November 1953 <u>d/</u>	93
1954/55	109
1955/56	118
1956/57	132

a/ Seasons beginning August 1.

b/ Sakels Fully Good Fair; Egyptian production of Sakels virtually ceased after 1941 and was replaced by Karnak.

c/ High.

d/ Low.

e/ Karnak Fully Good.

Source: Liverpool Cotton Association price data and International Cotton Advisory Committee.

Although the price elasticity of demand for cotton as a whole is said to be relatively low, limited available data indicate that the

opposite may be the case for the extra long staples. For example, consumption of Egyptian extra long staple cotton in the United States has been markedly affected by price changes when prices were above 55 cents per pound (Karnak Fully Good, c.i.f. Liverpool). A 52% drop in price between 1951/52 and 1952/53 was accompanied by a 69% increase in consumption; an 8.5% increase in price between 1954/55 and 1955/56 was accompanied by an 18% reduction in consumption; an 11.5% increase in price the following season was accompanied by a 61% reduction in consumption; and a 24% drop in price during the first four months of the current season was accompanied by a 27% increase in consumption.^{1/}

As the price of the extra long staples rises, substitution by synthetics and by the longer staples of the upland varieties occurs. In this process extra long staple cotton has already lost out to synthetics in varying degrees in such uses as thread, lace and gloves. Indeed the wide fluctuation in extra long staple cotton prices in itself adversely affects its consumption prospects in view of the significantly greater price stability for synthetics, both the cellulose and the newer non-cellulose. This is of importance to textile mills which find that processing costs rise whenever changes are made in the composition of fibers consumed at the mill. Table 4 shows the relative fluctuations in prices using United Kingdom data.

Table 4: Index of Prices in the United Kingdom for Karnak Cotton, Rayon Viscose Staple, and Rayon Acetate Staple, 1951/52 to 1956/57

(1951/52 = 100)

<u>Season beginning</u> <u>August 1</u>	<u>Karnak</u>	<u>Viscose</u> <u>Staple</u>	<u>Acetate</u> <u>Staple</u>
1951/52	100	100	100
1952/53	61	103	82
1953/54	57	92	82
1954/55	63	92	80
1955/56	66	92	80
1956/57			
August	80	92	80
September	80	92	80
October	83	92	80
November	85	92	80
December	85	92	80
January	85	92	80
February	85	92	80
March	84	92	80

Source: Based on International Cotton Advisory Committee data

^{1/} A similar situation apparently prevails with regard to Indian consumption of Egyptian extra long staple cotton. Based on the same price series as used above, it appears that the 52% drop in prices between 1951/52 and 1952/53 was accompanied by a 29% increase in consumption; the 8.5% increase in price between 1954/55 and 1955/56 was accompanied by a 26% reduction in consumption; and the 11.5% increase in price the following season was accompanied by a 38% reduction in consumption.

Similarly, extra long staple cotton is vulnerable to competition from the longer staples of the upland varieties. The staple length of some upland cotton may reach $1\frac{1}{2}$ inches and over. In the U.S. annual production of upland cotton $1\frac{1}{8}$ inches in staple length and over is roughly 500,000 bales, about 4% of total U.S. output. During the Suez crisis when Egyptian and Sudanese extra long staples were high priced and in short supply in certain markets, cotton mills in the U.K., which had been using these cottons, switched in part to the longer staples of U.S.-produced upland cotton.^{1/} The extra long staples primarily displaced were Sudanese Lamberts which normally have a staple length of $1\frac{1}{4}$ - $1\frac{3}{8}$ inches.^{2/} In September and October 1957, Sudanese Lamberts were selling in Western Europe at 48 cents per pound; U.S.-produced upland varieties of comparable grade with a staple length of $1\frac{1}{8}$ - $1\frac{1}{4}$ inches were selling in Western Europe at 37-42 cents per pound. The latter prices reflected the U.S. subsidy on exports of upland cotton.

In absolute terms, consumption of extra long staple cotton by free world countries is estimated at 883,000 bales in 1954/55; 968,000 bales in 1955/56; and 857,000 bales in 1956/57.^{3/}

Data on consumption in the Soviet Bloc are not available, but statistics on exports of extra long staple cotton to the Soviet Bloc show a growing volume of trade, increasing by 129% between the average of 1950/51-1952/53 and 1954/55-1956/57. Combined data on consumption in the free world and exports to the Soviet Bloc, shown in Table 5, give the order of magnitude of world consumption of extra long staple cotton.^{4/}

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- ^{1/} They also switched to the U.S.-produced American-Egyptian cotton, 21,000 bales of which were exported to the U.K. during the 1956/57 marketing year.
 - ^{2/} Sudanese Lamberts are considered to be an extra long staple variety although some Lambert output may be between $1\frac{1}{4}$ and $1\frac{3}{8}$ inches.
 - ^{3/} Data on the consumption of the extra long staples prior to 1954/55 are not available. However, exports of such cotton totalled 986,000 bales in 1952/53 and 1,159,000 bales in 1953/54. Of these totals, 152,000 bales went to the Soviet Bloc in 1952/53 and 105,000 bales were exported in 1953/54.
 - ^{4/} Re-exports of extra long staple cotton by the Soviet Bloc to Western Europe have been reported, but not in quantities which would appreciably change the totals of Table 5.

Table 5: Consumption of Extra Long Staple Cotton in the Free World and Exports to the Soviet Bloc, 1954/55 to 1956/57

(in 1,000 bales of 478 pounds net weight)

	<u>1954/55</u>	<u>1955/56</u>	<u>1956/57</u>
<u>Free World Consumption</u>			
Western Europe	551	583	534
Asia	203	235	178
United States	110	120	110
Others	<u>19</u>	<u>30</u>	<u>35</u>
Total	883	968	857
<u>Exports to Soviet Bloc</u>	<u>148</u>	<u>258</u>	<u>275</u>
Grand Total	<u>1,031</u>	<u>1,226</u>	<u>1,132</u>

Source: International Cotton Advisory Committee data.

It is of interest to note that Egypt is the only producer of extra long staple cotton to have exported to the Soviet Bloc in recent years, except for minor exports by the Sudan.^{1/} Egypt's dependence on the Soviet Bloc as a market for its extra long staple cotton has increased substantially in recent years. During the 1954/55 season exports to the Bloc represented 24% of Egypt's total exports of the extra long staples; during 1955/56 it increased to 40%; and during 1956/57 it increased further to 51%.

^{1/} Sudan exported 12,000 bales to the Soviet Bloc in 1954/55; 14,700 bales in 1955/56; and 14,000 bales in 1956/57. These exports represented no more than 5% of Sudanese extra long staple cotton exports.

2. Short-term Prospects

The burdensome world surplus of extra long staple cotton now in existence can be expected to affect the prospects for this type of cotton.

At the end of the current marketing year on July 31, 1958, it is estimated that the carryover of extra long staples in producing countries will have reached about 1.0 million bales. Approximately 100,000 bales of this total represent extra long staple cotton from the U.S. stockpile which will be available for sale under current disposal plans during the 1958/59 season.

A total carryover of 1.0 million bales in producing countries would be the highest stock level on record, 40% higher than the previous year, about twice the average carryover in the period 1950-57, and about 83% of the estimated level of world consumption for the 1957/58 season (1,100,000 bales).

The effects of this surplus on the price of the extra long staples were apparent even before the beginning of the current marketing year. The price of Egyptian Karnak fell almost steadily from January 1957 to March 1958, reaching the lowest price for this variety almost since the end of World War II.^{1/} Likewise the price of Sudanese Sakel fell during 1957 and early 1958 reaching by March 1958 the lowest level since August 1954.^{2/} The price of Peruvian Pima also fell, reaching a low point in March 1958, the lowest since January 1954.^{3/}

Although the magnitude of the 1957/58 world surplus of extra long staple cotton might indicate a further decline in price, any further substantial decline is not realistic for two reasons.

First, Egypt is not likely to let the price of extra long staples decline precipitously. The recent decline in the price of Egyptian Karnak has already made that variety fully competitive in the world market. Stringent acreage restrictions could be imposed on the next crop. Shifts to medium staples would be emphasized. Substantial stocks could be held by the Egyptian Cotton Commission to assist the growers. Increased sales to the Soviet Bloc might be possible.

^{1/} Fully good, c.i.f. Liverpool: January 1957 - 81.98 cents; December 1957 - 51.95 cents; March 1958 - 45.38 cents.

^{2/} G58, c.i.f. Liverpool: January 1957 - 76.93 cents; December 1957 - 48.21 cents; March 1958 - 45.17 cents.

^{3/} No. 1, 1 9/16", c.i.f. Liverpool: January 1957 - 68.75 cents; December 1957 - 54.34 cents; March 1958 - 45.73 cents.

Secondly, as the price of the extra long staples falls, consumption and stocks in consuming countries can be expected to rise. This development may be intensified towards the end of the current marketing season and during the 1958/59 season. Because of the current shortage of good quality upland cotton, the price of such cotton has risen. As the price of the extra long staples declines, and the price of the better qualities of upland cotton increases, it is quite reasonable to anticipate some substitution of the extra long staples for longer staple upland cotton. This may already be in process. The price for Good Middling 1 5/32" cotton c.i.f. Liverpool, an upland variety, had risen to 40.60 cents per pound in the latter part of December 1957. Sudanese Lamberts, an extra long staple variety, were selling at the same time for 40.43 cents.

3. Prospects for 1965

a. Production Prospects

In the long-term the increase in the production of extra long staple cotton can be expected to be proportionately greater than for cotton as a whole. This is due in most part to a substantial increase in the Sudan, which, by 1965, can be expected to become the world's largest producer of extra long staple cotton. Growth in Peru and the United States can be expected to be lower than in recent years. On the other hand, extra long staple cotton output in Egypt can be expected to decline substantially from present levels and show only a negligible increase over average levels in the period 1953/54-1955/56.

No one of the three major producers of extra long staple cotton appears to have any advantage in production costs over the other two major competitors. Production costs in Peru were estimated to be 19 cents per pound for Pima cotton on newly irrigated lands.^{1/} The recent Bank mission to the Sudan was given a figure of 20 cents per pound as a rough average of costs of production of extra long staple cotton. It is believed that Egyptian costs are of the same order of magnitude. Such cost figures, when related to prices at which the cotton is sold in world markets, explain the profitable nature of extra long staple cotton production. This relationship also explains the incentive to expand production, subject only to limitations due to the availability of irrigated land, the need for crop rotation, and the usually greater return from the production of medium staple, rather than extra long staple, varieties.

Egypt

Cotton acreage in Egypt is limited by the availability of water and by the need to increase food production on available land as population increases. Any increased acreage for cotton might be devoted in most part to the medium staple varieties, the yields of which are higher than for the extra long staples. The premium paid for extra long staple cotton has not in recent years been large enough to offset the advantage to the grower of the higher yields of the medium staples.^{2/} Only the construction of the High Aswan Dam could increase acreage by more than a negligible amount; this is not assumed for the next decade.

It is assumed that Egypt will continue to export substantial quantities of extra long staple cotton to the Soviet Bloc, from perhaps one-third

1/ IBRD Report on Quiroz-Piura Irrigation Project (Second Stage), March 25, 1955.

2/ The Egyptians are developing the Menoufi extra long staple variety because it is higher yielding than Karnak. The difference in yields is shown in Table 2. If Menoufi should replace Karnak as the dominant extra long staple variety in Egypt, there might be an incentive to produce more rather than less extra long staple cotton. However, the wider market for medium staples might be an offsetting factor.

to one-half of Egyptian production, about the same as in recent years.

The Sudan^{1/}

A substantial increase in the production of extra long staple cotton is envisaged in the Sudan. Upon completion of the Managil project, expected by 1964/65, an estimated additional 270,000 acres of land would be gravity irrigated and available for extra long staple cotton cultivation. An estimated additional 145,000 acres of land would also be available for this type of cotton by 1965 for cultivation through pump irrigation. Using an average yield of 450 pounds to the acre for production through gravity and pump irrigation^{2/} and assuming that production through flood irrigation will remain constant at about 20,000 bales, the average level during the period 1953/54-1955/56, estimated Sudanese production in 1965 of extra long staple cotton would be approximately 800,000 bales. This compares with an average of 365,000 bales in the period 1953/54-1955/56 and 585,000 bales during 1956/57.

Apparently the Sudanese Government is giving no consideration to the possibility of future restrictions on the production of cotton as has been done in Egypt and the United States. On the contrary, substantial additional acreage devoted to cotton is envisaged beyond 1965 if the Roseires dam project is undertaken.

It is possible, however, that the Sudan will shift its emphasis from extra long staples to upland varieties.^{3/} This shift could result from a number of factors. First, if demand for Sudanese extra long staple cotton should not keep pace with increasing production, there would be an incentive to shift to upland varieties. Secondly, an incentive might be provided when it is recognized that, as in the case of Egypt and the United States - countries producing both extra long staple and medium staple varieties on irrigated land - there could be a greater return to the farmer through the production of higher yielding medium staple varieties than through the extra long staples. Thirdly, Sudan's labor shortage for cotton might become even more acute with increasing output. Upland varieties lend themselves to mechanization to a greater extent than do the extra long staples. Finally, until the Roseires dam is completed, the amount of water available for the completed Managil development might limit the period of

1/ Information used in this section comes primarily from the recent IBRD and ICA missions to the Sudan.

2/ 93% of total production of extra long staple cotton in the Sudan was through gravity and pump irrigation during the period 1953/54-1955/56. Average yields during this period were 480 pounds for gravity irrigation and 460 pounds for pump irrigation. Using these yields for the acreage expected to be available by 1965 would mean total production of 843,000 bales. A 10% reduction in these yields would mean total production of 763,000 bales. Both figures include 20,000 bales through flood irrigation.

3/ For alternative assumptions regarding Sudanese production of extra long staple cotton see part 3, c., below.

irrigation for extra long staples and cause a shift to upland varieties which need less water.

Peru

Substantial increases in Peruvian extra long staple cotton output have occurred in recent years with increased acreage resulting from the development of irrigation facilities in the Piura and Chira valleys. New irrigation developments become more costly as water is brought from longer distances.

The only new irrigation project which is expected to affect the production of extra long staple cotton in Peru by 1965 is the second stage of the Quiroz-Piura project. The plans for the project anticipated that approximately 50,000 acres would be devoted to extra long staple cotton production when the project is completed in 1959 and that yields would be approximately 365 pounds to the acre.^{1/} On this basis, the increase in Peruvian extra long staple cotton production would amount to 40,000 bales. This would represent an increase of almost 45% over the 1957/58 season and compares with a 100% increase over the last 4 years.

United States

Extra long staple cotton production in the United States is conditioned to a considerable extent by production of upland cotton. When upland cotton is subject to stringent acreage restrictions, extra long staple cotton becomes attractive to growers in the West. However, yields for extra long staple cotton are considerably lower than for upland cotton^{2/} in the areas where both are grown, and when acreage restrictions on upland cotton are relaxed, the latter becomes more attractive.

Similarly, as upland cotton continues to move to the higher-yielding areas of the West, production prospects for extra long staples become relatively less favorable.

The growers of extra long staple cotton in the United States do not envisage any significant increase in output over the long term from the level reached in the 1957 crop year. They feel that, except in unusual circumstances, as occurred during the Suez crisis, they will not be able to compete in world markets with the other producers. Therefore, their

1/ IBRD Report on Quiroz-Piura Irrigation Project (Second Stage), March 25, 1955. Yields of 365 pounds would be slightly lower than average yields of the last five years. See Table 2, above.

2/ Yields for extra long staple cotton in Arizona, the major producing state, in 1956 averaged 699 pounds to the acre; in 1957 this had declined to 592 pounds. Yields for all cotton in Arizona in 1956 averaged 1,108 pounds; in 1957, 1,097 pounds. Extra long staple cotton yields in New Mexico averaged 422 pounds in 1956 and 349 pounds in 1957. Yields for all cotton in New Mexico averaged 797 pounds in 1956; in 1957, 629 pounds.

market is essentially limited to the United States. Even in selling in their domestic market, the United States growers face competition from foreign extra long staples, 95,000 bales of which can be imported under the annual quota. This is only 15,000 bales less than United States consumption during the 1956/57 marketing year.

The United States growers feel that their long-term ability to produce and sell 85,000-100,000 bales of extra long staple cotton depends upon a growing market in the United States. In order for demand to grow and for substitution of synthetic fibers to be inhibited, the producers feel that there must be stable prices at a reasonable level. For this reason, the growers of extra long staple cotton are supporting a reduction in price supports from the present fixed level of 75% of parity to 60%.

These growers are also quite unique in their desire to have acreage restrictions continued, although relaxed as much as the law would permit. The reason for this position is that the continuation of acreage restrictions limits production of extra long staple cotton to the existing growers, who number only about 4,200. Their desire to restrict output to the existing producers also tends to keep production to about current levels.

U.S. Government policy with regard to exports of upland cotton might have an indirect effect on other countries' marketings of extra long staple cotton. As pointed out on pages 7 and 8 above, substitution of extra long staples by U.S. upland cotton has occurred. Such substitution would undoubtedly not have occurred if the upland cotton were not exported on a subsidized basis and if the price of the extra long staple cotton had not been so high. For the future, however, it is not expected that the U.S. will do more than maintain its current policy of being competitive in the world market for upland cotton in order to maintain a "fair share" of world trade. It is not expected that the U.S. will engage in full scale price competition at the expense of other countries' marketings of upland cotton.

U.S.-grown extra long staple cotton does not exercise the same influence on world prices as does U.S. upland cotton because the U.S. is a minor producer and exporter of extra long staple cotton. The relatively small quantities of extra long staple cotton exported by the U.S. are not subsidized. The only significant direct impact which the U.S. could have on the world market for extra long staple cotton would occur if the strategic stockpile of 269,000 bales were to be made available for sale all at one time. This possibility, as pointed out on page 5 above, is not, however, envisaged by the stockpile disposal plan now before Congress.

In Summary

The foregoing analysis would indicate that production of extra long staple cotton in 1965 could total slightly more than 1,600,000 bales, distributed as follows, in thousand bales, as compared with 1957/58 and the average of 1953/54-1955/56:

	<u>1965</u>	<u>1957/58</u>	<u>Average 1953/54-1955/56</u>
Egypt	550	808	530
Sudan	800	320	365
Peru	130	90	67
United States	100	83	49
Others	<u>35</u>	<u>34</u>	<u>29</u>
Total	<u>1,615</u>	<u>1,335</u>	<u>1,040</u>

A level of 1,615,000 bales would represent a 21% increase over 1957/58 levels and a 55% increase over average output in the period 1953/54-1955/56. The latter represents a compound rate of growth of 4.5%.

It should be noted that production of 1,615,000 bales assumes that the Sudan will not shift its emphasis from extra long staples to upland varieties and that Egypt will not increase its output of extra long staples significantly over 1953/54-1955/56 levels at the expense of medium staples or of food crops. The possibility of the Sudan using only part of its increased acreage from the Managil project for extra long staple cotton is discussed in part 3, c., below as one of two alternative assumptions.

b. Demand Prospects

In the projection of fiber and cotton consumption in the IBRD paper, Prospects for Cotton, Report No. EC-62a, May 1958, it is concluded that "world cotton consumption in the next decade or so may increase at a compound rate of about 2.3% per year . . ." This conclusion was based upon an analysis for the U.S., Canada, Western Europe, and various countries of Asia and Latin America of population growth, per capita incomes, the displacement of cotton by substitute fibers, and aggregate fiber consumption.

Based on this methodology, an analysis of the demand prospects limited to those countries which are the major consumers of extra long staple cotton (U.S., Western Europe, Japan and India, representing in the aggregate 77% of world consumption) would show a lower limit in growth rate of 1.7% and a higher limit of 2.9%.^{1/} This is due to the

^{1/} This conclusion is based on Table XXI of Prospects for Cotton. Using data in this table, cotton consumption in the United States, Western Europe, Japan, and India are weighted by consumption of extra long staple cotton to get the lower limit. The aggregate percentage increase in all fiber consumption in these countries is used as the higher limit. The increase in over-all cotton consumption, weighted by consumption of extra long staple cotton, is estimated at 12.8% between 1955 and 1962. The increase in fiber consumption in the same period is estimated at 22.3%.

heavy concentration of extra long staple cotton consumption in the United States and Western Europe (59% of world consumption) which have the lowest estimated increases in consumption of cotton as a whole or of fiber consumption.

There is reason to believe, however, that the use of consumption estimates of cotton as a whole, even though limited to those countries which are the major consumers of extra long staple cotton, tends to understate consumption prospects for the extra long staples. In the United States and the countries of Western Europe, countries with relatively high per capita incomes, the trend is towards the consumption of better quality cloth. Therefore, it is reasonable to assume that in Western Europe, where a 1% increase in expenditure is associated with an 0.7% increase in the quantity of fiber consumption, there will be an increase in the share of the total which goods manufactured from the extra long staples will command.

Other evidence exists in the case of the United States, the only country for which data on consumption of extra long staple cotton are available over a long period. Consumption of extra long staple cotton in the United States has increased at a faster rate than has cotton as a whole. Between 1935-39 and 1952-56, consumption of the extra long staples increased 37.5% while consumption of all cotton increased by 27.5%. The growth rate over this 17-year period was 1.9% for extra long staples and slightly over 1.4% for cotton as a whole.

Therefore, it is not unreasonable to conclude that the consumption of extra long staples would tend to increase, not at the lower limit, but rather at the higher limit, of the range of 1.7% (cotton consumption) to 2.9% (aggregate fiber consumption).

The growth rate, however, would have to be double the lower limit of 1.7% for consumption to approximate production.^{1/} This higher growth rate, although quite optimistic, is attainable on the basis of two hypotheses regarding price stability and consumption growth in the Soviet Bloc.

As shown in Table 3, prices of extra long staple cotton have fluctuated widely in the past. The substantially greater degree of stability in prices of synthetics has resulted in substitution. If it can be assumed that prices will be more stable in the years ahead, perhaps resulting from an international commodity arrangement, which is technically feasible for extra long staple cotton, the growth rate could be higher than 2.9%. It is recognized, however, that even with stability, the price level would have to be substantially below present levels for the growth rate to be higher than 2.9%.

^{1/} It should be noted that the difference in growth rates for production and consumption between 1953/54-1955/56 is due to differences in levels during the base period. Production in 1953/54-1955/56 was 1,040,000 bales; consumption was 1,139,000 bales.

The second hypothesis concerns consumption in the Soviet Bloc. If the growth rate in consumption of extra long staple cotton in the Soviet Bloc has followed the increasing rate of exports to the Bloc of this type of cotton (an increase of 129% between 1950/51-1952/53 and 1954/55-1956/57), and if this growth should continue, even at a more moderate rate, the growth rate for consumption of extra long staple cotton on a world-wide basis could be higher than 2.9%.

c. Price Prospects

Price prospects for 1965 are obviously dependent upon the consumption growth of extra long staple cotton (with a growth rate for consumption of 2.9% believed to be the most realistic rate) and upon assumptions with regard to production growth in the major producing countries.

Uncertainty with regard to production levels in the Sudan, and to a lesser extent in Egypt, however, represents a more difficult problem. For purposes of price forecasts, two assumptions are made with regard to Sudanese production of extra long staple cotton. Assumption I holds that the Sudan will utilize all newly irrigated land resulting from the Managil project to increase the production of extra long staple cotton. Assumption II would mean that only some of the new acreage will be used for extra long staple cotton. Both assumptions keep Egyptian extra long staple cotton production constant at slightly above the 1953/54-1955/56 average for the reasons stated in part 3a, above. A third possible assumption to the effect that none of the additional cultivable acreage in the Sudan will be used for extra long staple cotton is not made because it would not be realistic in the light of Sudanese plans or estimated supply-demand relationships for extra long staple cotton.

Assumption I would mean consumption of 1,515,000 bales of extra long staple cotton in 1965 at a growth rate of 2.9% per annum as compared with estimated production of 1,615,000 bales. This disequilibrium is substantial when considered together with the stock level in 1965 which would consist of (a) the present level of stocks (estimated at about 1,000,000 bales in producers hands on August 1, 1958), (b) releases from the U.S. stockpile during the third, fourth, and fifth years of the program (an additional 150,000 bales by August 1, 1961) and (c) any increments to stocks resulting from excess of production over consumption between the present and 1965. The stock level at the beginning of the 1964/65 season on this basis would theoretically exceed 2,000,000 bales. It is inconceivable that such an unprecedented level of stocks - even when related to the estimated consumption level - would, in fact, occur. It is more realistic to assume that prices would fall to a level which would increase consumption, even at the expense of the medium staple varieties, and inhibit stock accumulation. In the absence of known price elasticities of demand and of the degree of substitution between extra long staple and upland cotton, it is not possible to compute the level to which the price would need to decline in order to hold down stocks. It is possible, however, to look at previous prices for extra long staple cotton and their relationship to prices of upland cotton. This relationship is quite pertinent to a forecast of extra long staple cotton prices in view of (a) the interchangeability of production of the two varieties in all areas where extra long staple cotton is grown and (b) the substitution which is known to exist - although to an unknown degree - between the consumption of longer staple upland varieties and the extra long staples.

As shown in Table 6, in the period from 1906 to 1938, the price of Egyptian extra long staples 1/ in Liverpool ranged from 115% (1922) to 232% (1920) of American upland 2/. Both the mean and median differentials for the entire period were 167%. In only three years out of 33 was the differential less than 133%; in only 5 years was it above 200%. In the period 1935-38 the differential was 150%. During the 1953/54 marketing season, a period between the Korean conflict and the Suez crisis, the differential in Liverpool between the Egyptian extra long staples 3/ and American upland cotton was 148.8%. 4/ In February 1958 the differential was 148%.

Under Assumption I, with its substantial build-up of stock, it is not inconceivable that the price of extra long staple cotton would drop to as low as 133% of the price of upland cotton, or even lower. A differential of 133% related to the estimated Liverpool price of middling 1 inch upland cotton of 30 cents per pound, 5/ would mean a price of around 38 cents per pound for Egyptian Karnak Fully Good. The price of Sudanese Sakel, based on traditional differentials, might be 10% lower.

Assumption II would mean that the Sudan would not put all of the increased irrigated acreage into extra long staple cotton production, but perhaps use only half of the additional acreage for extra long staple cotton. Under this assumption, production in 1965 would total 1,415,000 bales, and at a consumption growth rate of 2.9% per annum, would be 100,000 bales less than consumption. Stocks at the beginning of the 1964/65 season would bear about the same relationship to consumption during the 1964/65 season (about two-thirds of consumption) as stocks at the beginning of the current (1957/58) season bear to estimated consumption during this season. There would be one major difference between the two seasons: during the current season production is expected to exceed consumption by over 200,000 bales; in 1964/65 under Assumption II it is expected that consumption will exceed production by 100,000 bales. In the period between the current season and the 1964/65 season consumption could be expected to exceed production by relatively small margins (an average of 4%) during the last 5 years of the period.

On this basis it would be reasonable to assume that prices in 1965 can be expected to be somewhat higher than current levels. Related to the mean and median differentials between extra long staple and upland cottons in the period 1906-1938 of 167%, the price for Egyptian Karnak Fully Good, c.i.f. Liverpool, would be around 48 cents per pound. Sudanese Sakel would be about 10% lower. A more conservative estimate would use the differential of 150%, resulting in a price of about 43 cents per pound for Egyptian Karnak.

1/ Sakel Fully Good Fair.

2/ Middling 7/8 inch.

3/ Karnak Fully Good.

4/ Middling 15/16 inch.

5/ From Prospects for Cotton, IBRD Report No. EC-62, April 1958. An adjustment has been made in the price in relating the historic differentials, based on 7/8 inch or 15/16 inch cotton, to 1 inch cotton.

The supply-demand relationship in 1964/65 under the two assumptions, compared with the current season, is shown in summary in the following tabulation, in thousand bales:

	<u>1957/1958</u>	<u>1964/1965</u>	
		<u>Assumption I</u>	<u>Assumption II</u>
Beginning Stocks	672	2,200	1,030
Production	1,335	1,615	1,415
Consumption	1,100	1,515 ^{b/}	1,515
Ending Stocks	1,000 ^{a/}	2,300 ^{b/}	930
Price (US cents per lb.)	51.98 ^{c/}	38 ^{d/}	43-48 ^{d/}

a/ Includes 100,000 bales from U.S. stockpile.

b/ As pointed out in text, under this assumption consumption would likely be higher and stocks lower.

c/ Average August 1957-March 1958 for Karnak Fully Good, c.i.f. Liverpool; average price in March 1958 was 45.38 cents per pound.

d/ Karnak Fully Good, c.i.f. Liverpool.

It is recognized that in the medium-term it is quite possible that the present plans of the Sudan to utilize all of its increased irrigated acreage for extra long staple cotton (Assumption I) will materialize. If this should occur, prices could decline to the 38-cent level described above. The impact of such a situation, however, could be expected to result in a partial shift away from the extra long staples to the medium staples (Assumption II), bringing with it a recovery in price. Under such circumstances, a reasonable price forecast for the mid-1960's would be around 45 cents per pound for Egyptian Karnak, c.i.f. Liverpool.

Table 6 : Prices of U.S. Upland Cotton and Egyptian
Extra Long Staple Cotton in Liverpool,
1906/07-1938/39 and 1950/51-1957/58

<u>Year beginning August 1</u>	<u>Upland ^{a/} (cents per lb.)</u>	<u>Extra long Staple ^{b/} (cents per lb.)</u>	<u>Extra long Staple as Pct. of Upland</u>
1906	12.60	27.00	214.5
1907	12.73	23.82	186.5
1908	11.00	18.27	166.2
1909	15.70	29.88	190.7
Average 1906-09	13.02	24.74	189.5
1910	16.32	28.12	172.4
1911	12.63	23.33	184.7
1912	14.00	21.87	156.2
1913	15.08	21.35	141.7
1914	15.00	18.33	166.8
Average 1910-14	13.81	22.60	163.8
1915	15.04	26.32	175.0
1916	24.72	50.99	206.2
1917	43.56	61.27	140.6
1918	39.46	54.56	138.2
1919	42.40	96.35	229.7
Average 1915-19	33.04	57.90	175.2
1920	19.73	45.72	232.4
1921	20.19	33.97	168.8
1922	28.70	32.99	115.1
1923	32.99	39.35	119.4
1924	27.09	58.76	216.0
Average 1920-24	25.74	42.16	163.8
1925	21.82	40.47	185.5
1926	16.57	31.20	188.4
1927	22.65	39.38	173.9
1928	21.36	36.83	172.5
1929	18.44	29.44	159.7
Average 1925-29	20.17	35.46	176.0
1930	11.61	18.42	158.7
1931	7.54	10.69	141.1
1932	8.52	11.77	138.7
1933	12.47	16.73	134.1
1934	14.24	17.49	122.8
Average 1930-34	10.88	15.02	138.1
1935	13.50	18.99	140.6
1936	14.62	22.19	151.9
1937	10.31	17.06	165.6
1938 ^{c/}	10.15	14.46	143.4
Average 1935-38	12.15	18.18	150.4

<u>Year beginning August 1</u>	<u>Upland (cents per lb.)</u>	<u>Extra long Staple (cents per lb.)</u>	<u>Extra long Staple as pct. of Upland</u>
1950 <u>d/</u>	48.81	115.76	237.2
1951	43.44	105.01	241.7
1952	38.20	55.27	144.7
1953	36.82	54.80	148.8
1954	37.31	59.60	159.7
Average 1950-54	40.92	78.09	190.8
1955	32.95	64.65	196.2
1956	28.38	72.11	254.1
1957 <u>e/</u>	29.26	53.84	184.0
Average 1955-57	30.20	63.53	210.4

a/Middling 7/8 inch for 1906 to 1938; Middling 15/16 inch for 1950-57
b/Sakel Fully Good Fair for 1906 to 1938; Karnak Fully Good for 1950-57
c/11 months
d/ 7 months
e/ 6 months

Source: 1906-38: US Department of Agriculture, World Cotton Situation,
September 5, 1939
1950-57: International Cotton Advisory Committee