

Oilseed Production

U.S. Cottonseed Industry Facing Hurdles

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Despite a summer heat wave in parts of Europe and too-plentiful rainfall in parts of the United States, when the final tally for the global 2003-04 oilseed harvest is completed, it should show about a 7% rise over the previous year's record crop.

As of mid-July, U.S. Department of Agriculture economists were forecasting an oilseed harvest of 352.1 million metric tons (MMT), while *Oil World*, the global oilseed market information organization based in Hamburg, Germany, forecast 340.4 MMT. Those two organizations estimate the 2002-03 oilseed harvest at 327.6 and 319.2 MMT, respectively. The 2003-04 crop year includes northern hemisphere harvests of 2003 and southern hemisphere harvests during the early portion of 2004. Forecasts usually assume no drastic surprises in weather or economic conditions for the remaining period before harvest.

Soybeans will account for about 60% of global oilseed production, according to this year's projections. Cottonseed provides about 10% (Table 1), close behind canola/rapeseed, in the global tally. U.S. 2003 oilseed production forecasts, from mid-August USDA data, are given in Table 2. Cottonseed is No. 2 in production among U.S. oilseed crops.



Both USDA and *Oil World* staffers expect cottonseed production to rise for the 2003-04 crop year. [*Oil World* using an estimate of 36.21 MMT and USDA forecasting 36.06 MMT.] The tables in the "By the Numbers" section provide estimates and forecasts on global cottonseed production, crushing, imports, and exports from *Oil World Annual 2003*, which is based on conditions as of late 2002. Later forecasts from the *Oil World* organization are available in its various electronic and printed publications, issued daily, weekly, and monthly to subscribers.

Such forecasts are readily available to those in the U.S. cottonseed industry, but not as accessible are precise estimates on the effect other factors—such as long-term seed/lint ratio, textile

imports, corporate dairy operations, biotechnology, and changes in cotton varieties—will have on the long-term economic welfare of that industry.

Seed/Lint Ratio

Cottonseed usually represents between 10-15% of the value of a cotton grower's crop and that makes it a byproduct of the cotton fiber industry. Theoretically, cottonseed production should rise (and fall) in correlation with cotton production. However, in recent years, the ratio of seed to lint in U.S. cotton has been declining (Table 3). Using a traditional ratio for estimating seed yield of 1.6:1, for every 480-pound bale of cotton fiber processed at a gin, there should be about 765-770 pounds of cottonseed produced. In 1981, ginners recovered about 818 pounds of seed for every bale of cotton fiber produced. U.S. Department of Agriculture data show that during the past two decades, the seed yield was 793 pounds of seed per bale in 1982-83, but by 2001-02 the average was 734 pounds. Preliminary data in for 2002-03 show an average of 719 pounds.

Companies producing varieties of cotton for planting seek to maximize lint production, and therefore try to reduce seed content. This can be accomplished by reducing the number of seeds, the size of the seed, or both. The smaller seeds reduce processing efficiency at cottonseed processing facilities, according to Ben Morgan, executive vice president of the National Cottonseed Products Association based in Memphis, Tennessee.

Table 1. Oilseed, cottonseed production, and crush (million metric tons)

	2003-04	2002-03	2001-02
Global oilseeds ^a			
Production	340.5	319.2	316.0
Crush		276.2	271.3
Global cottonseed ^a			
Production	38.2	33.3	37.1
Crush	28.0	26.5	28.1
U.S. oilseeds ^b			
Production	87.5	83.4	89.6
U.S. cottonseed ^b			
Production	5.7	5.6	6.8
Crush	2.4	2.3	2.5

Source: ^a*Oil World*, July 18, 2003; ^bU.S. Department of Agriculture's *World Agricultural Supply and Demand* estimates, Aug. 12, 2003; *Oil Crops Outlook*, August 2003.

Table 2. U.S. oilseed production, supply, and demand (thousand metric tons)

Crop	Soybean		Cottonseed		Sunflowerseed		Peanut		Rapeseed/ canola	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Beginning stocks	5,661	3,945	363	363	109	75	670	438	68	72
Production	74,291	77,892	5,610	5,701	1,133	1,399	1,506	1,797	706	706
Imports	109	114	118	204	93	101	34	29	197	200
Total supply	80,061	81,951	6,091	6,268	1,355	1,575	2,210	2,264	971	978
Exports	28,304	27,216	340	272	163	180	227	238	284	210
Crush, domestic consumption	43,817	44,225	2,282	2,404	293	630	349	305	587	677
Feed, seed, waste, etc.	3,995	4,530	3,106	3,229	804	680	192	166	28	25
Total domestic consumption	47,812	48,755	5,388	5,633	1,097	1,310	1,545	1,504	615	702
Ending stocks	3,945	5,980	363	363	75	85	438	522	72	66

Note: Domestic food use of U.S. peanuts estimated for 2002 at 1,004,000 metric tons and for 2003 at 1,033,000 metric tons.

Source: U.S. Department of Agriculture, Foreign Agricultural Service trade data.

Table 3. Cottonseed production (pounds of seed per 480-pound bale produced)

Crop Year	TOTAL																	
	AL	AR	AZ	CA	FL	GA	KS	LA	MO	MS	NC	NM	OK	SC	TN	TX	VA	U.S.
82/83	696	749	853	821	700	723	na	752	765	739	667	886	798	748	779	824	500	793
83/84	732	743	782	801	800	732	na	737	795	744	744	791	800	755	795	831	667	792
84/85	707	709	785	831	733	719	na	723	770	752	667	808	820	718	789	843	182	793
85/86	694	751	750	835	727	692	1,000	712	784	744	752	756	744	678	764	829	1,000	786
86/87	739	757	751	780	714	692	857	764	827	770	734	785	810	713	793	818	667	781
87/88	756	750	734	770	718	722	889	774	788	777	673	785	896	679	741	817	714	782
88/89	716	774	783	790	706	697	857	766	810	780	722	778	772	700	812	807	706	787
89/90	731	787	751	770	690	719	1,000	735	773	772	695	624	855	701	739	793	667	767
90/91	741	797	756	773	708	711	857	758	790	790	692	800	785	690	776	770	710	770
91/92	709	911	755	797	767	720	769	738	797	770	716	756	842	703	790	800	709	786
92/93	721	777	776	738	694	702	1,000	745	802	783	731	746	810	708	796	810	709	768
93/94	746	832	771	732	692	704	667	738	809	814	713	845	844	735	793	835	731	787
94/95	747	804	752	733	635	671	833	726	774	790	712	758	818	682	786	850	732	773
95/96	659	790	772	741	710	694	600	726	862	790	707	733	911	702	807	810	730	765
96/97	692	776	760	738	706	655	683	776	792	784	685	738	836	681	776	810	717	754
97/98	713	751	702	717	756	688	713	728	789	773	690	761	787	693	785	764	583	738
98/99	694	791	907	726	634	682	829	736	771	777	684	733	771	697	751	853	703	771
99/00	720	773	751	732	632	697	727	735	742	771	681	850	722	712	750	780	685	749
00/01	707	780	744	711	717	677	809	727	759	774	711	755	763	702	814	800	687	749
01/02	685	773	740	705	671	688	760	735	771	732	668	711	812	648	718	803	667	734
02/03*	684	751	737	709	604	689	737	733	715	720	675	720	775	672	711	730	695	719

*2002/03 based on Aug. 2003 estimates.

Source: National Cottonseed Products Association.

The seed coat shatters into smaller particles, which become impurities if they aren't fully separated as the seed is processed.

Reductions in cottonseed yield may be related to use of new varieties of cotton, or to agronomic factors, such as weather, fertilizer, or other circumstances. Morgan said more study would be needed to determine why cottonseed yields have fallen as much as they have in states such as Arizona, California, and Texas, which along with Georgia, Mississippi, and North Carolina, account for approximately 60% of U.S. cotton production.



PEGGY GREB

Textile Imports

Seed/lint ratio has not been the primary concern of the U.S. cotton textile/fiber industry during 2003. The industry this year has been clamoring for federal action to stem a flood of foreign textile imports, particularly from China, which the industry representatives charge already has cost thousands of U.S. jobs and could cost more.

On Aug. 11, 2003, a coalition of 14 textile and fiber companies met in Greensboro, N.C., and issued a call to arms for the cotton industry to contact their congressional representatives and senators. The coalition said Chinese textile exports to the United States rose 117% during 2002 and then by another 114% during the first seven months of 2003. If that trend continues, China could shortly capture 70% of the U.S. textile market, charged Allen E. Gant, chief executive officer of the Glen Raven Inc. textile firm in Glen Raven, NC, in a news conference at the Greensboro meeting.

“Since January 2001, nearly 300,000 (U.S.) textile and apparel jobs have been lost,” he added.

As textile plants close, domestic demand for cotton could decrease, leading farmers to plant more profitable crops. The coalition is seeking what it calls balanced international trade rules, and for the U.S. to insist China adhere to existing agreements. Another problem for U.S. cotton firms: Chinese currency, pegged to the U.S. dollar, is considered undervalued at present which, the coalition noted, is an economic advantage for Chinese exporters. The group also says the United States assesses lower import tariffs on textiles than do other nations, and insisted U.S. trade negotiators seek agreements in which other nations agree to match the lower U.S. tariff levels before there is any further reduction in U.S. import duties.

O.A. Cleveland of Southern Cotton Growers in Dawsonville, TN, has been quoted in news reports as saying that the domes-

tic textile industry may use about 6.8 million bales of cotton this year which would be “a devastating slide for an industry that very recently was consuming nearly 12 million bales a year.”

Another industry observer was heard to comment that U.S. usage could be five million bales for the current year. During mid-August, a normally slow time for the cottonseed industry as it awaits the fall harvest, one estimate was that fewer than a dozen of the approximately 30 U.S.

cottonseed oil mills were active. Three decades of consolidation and increasing capacity at existing mills has lowered the number of U.S. cotton oil mills from about 115 in 1972.

During the past two years, more than 11 million bales of cotton have been exported from the United States each year, easily surpassing the number of bales used by the U.S. textile industry.

Dairy Feed Usage

The oil mills of the 21st century have a major competitor for cottonseed that the mills of 30 years ago did not have—the dairy industry. USDA's mid-July *Oil Crops Outlook* report estimates that “other uses” (primarily as dairy cattle feed) would equal about 55% of U.S. cottonseed production. In the early 1970s, U.S. cottonseed crushers processed 90+% of annual cottonseed production. In the 1980s, the feeding of whole seed to dairy cattle began to rise rapidly.

Dairy cattle, as ruminant animals, can tolerate the gossypol content of cottonseed. Dairymen discovered that cows fed straight cottonseed are bountiful milk producers. So rather than pay the extra processing step of converting cottonseed into meal, they are buying whole seed directly.

Australian cottonseed competed with U.S. cottonseed for the dairy feed market in the late 1990s, when Australian cottonseed exports rose to more than 500,000 metric tons a year, with 60% of it going to the United States, and primarily to California's dairy industry. The United States supplanted Japan as the largest importer of Australian cottonseed. Recent drought years in Australia, however, have limited that nation's export supplies. USDA observers in Australia reported this spring that although rainfall totals were returning to higher levels, the volume of water available for irrigation remained below normal and probably would constrain 2003-04 cotton production to below pre-drought levels.

Whole seed feeding to dairy cattle now uses more than 50% of domestic cottonseed production, and that number may

rise. The number of large dairy farms is increasing and their proportion of total milk cows is rising. Such large operations are more apt to use whole seed feeding than are smaller operations. California—where corporate dairy farms provided a market for Australian cottonseed—has surpassed Wisconsin in milk production.

The effect of whole seed feeding on the U.S. crushing industry is obvious. The United States crushes a far smaller percentage of its cottonseed production than any other of the world's leading cottonseed-producing nations (See Tables B and C in "Cottonseed by the Numbers . . .").

Cottonseed by the Numbers . . .

A Look at the World's Top Producers, Users, and Traders of Cottonseed

Table A. Top ten cottonseed-producing nations (million metric tons)

	2002–03	2001–02	1996–97
China	8.75	8.07	7.68
United States	5.82	5.94	6.20
India	4.70	5.21	4.94
Pakistan	3.40	3.44	3.11
Uzbekistan	1.78	1.87	2.23
Brazil	1.52	1.23	0.81
Turkey	1.37	1.26	1.05
Greece	0.65	0.68	0.54
Egypt	0.48	0.44	0.52
Syria	0.45	0.55	0.40

Source: *Oil World Annual 2003* (2003–04 data are forecasts; 2002–03 data are estimates).

Table B. Top ten cottonseed-crushing nations (million metric tons)

	2002–03	1997–98
China	8.18	7.38
India	3.40	3.85
Pakistan	3.01	2.72
United States	2.36	3.53
Uzbekistan	1.56	1.69
Turkey	1.33	1.19
Brazil	1.21	0.62
Greece	0.44	0.47
Egypt	0.42	0.50
Syria	0.38	0.42

Total forecast global crushings for 2002–03, 26.5 million metric tons; for 1997–98, 27.5 million metric tons.

Source: *Oil World Annual 2003* (2002–03 data are estimates).

Table C. Top ten cottonseed exporting nations (million metric tons)

	2002–03	1997–98
United States	0.35	0.14
Australia	0.23	0.29
Benin	0.08	1.52
Togo	0.05	0.02
Greece	0.05	0.04
Syria	0.05	0.04
Zimbabwe	0.02	0.03
Ghana	0.02	0.01
Zambia	0.02	0.02
Cameroon	0.02	0.02

Total forecast global cottonseed exports for 2002–03, 1.05 million metric tons; for 1997–98, 0.95 million metric tons.

Source: *Oil World Annual 2003* (2003–04 data are forecasts; 2002–03 data are estimates).

Table D. Top ten cottonseed importing nations (million metric tons)

	2002–03	1997–98
Mexico	0.26	0.13
United States	0.20	0.09
Japan	0.16	0.18
South Korea	0.13	0.04
Spain	0.09	0.13
South Africa	0.05	0.06
Turkey	0.04	0.12
Saudi Arabia	0.03	0.02
Italy	0.02	0.06
Nigeria	0.01	—

Total forecast global cottonseed imports for 2002–03, 1.07 million metric tons; for 1997–98, 0.94 million metric tons.

Source: *Oil World Annual 2003* (2002–03 data are estimates).

U.S. Farm Policy

U.S. farm legislation is a key factor in producers' decisions as to how much acreage to plant to cotton. Cotton has enjoyed favorable treatment compared to some other crops, but the continuing decline in the ratio of rural/urban U.S. residents has diminished the political clout of the farm lobby. Recent rises in defense department expenditures have led federal budgeters to seek other areas in which to limit expenditures.

The debate on farm policy and domestic farm supports will eventually be resolved in Congress. That decision will have a major effect on growers' planting decisions.

Biotechnology

Gene jockeys' attempts to reduce gossypol, a toxic phenolic pigment in cottonseed that limits use of cottonseed protein in some animal feeds as well as in human food, are making progress, according to Tom Wedegaertner, director of cottonseed research and marketing for Cotton Inc., an industry wide trade group based in North Carolina.

"They used to tell us we were 10 to 15 years from (from having high-yielding gossypol-free cotton varieties), but now they're saying it's five or six years away," he said. "But those estimates don't change very fast."

When and if those varieties are developed, "it opens up all sorts of possibilities" for use of cottonseed protein in food, he added. "It's going to happen, maybe not in the next five or six years, maybe 10 years, maybe 20 years—but it is going to happen."

Other industry observers note that soy protein has a head start in that area and it may be difficult for cottonseed to catch up once gossypol-free varieties are commercialized.

Removing gossypol would permit use of cottonseed protein in feed rations for non-ruminant livestock (chicken, swine), and probably reduce the price differential between soybean meal, currently the primary protein feedstuff for such livestock, and cottonseed meal, according to the NCPA's Morgan. He says realistically livestock farmers are apt to stay with feed rations they traditionally have used unless a demonstrable advantage—in function or price—prods them to change.

Another biotechnology effort holds promise to increase cottonseed use, according to Morgan. Researchers from the U.S. Department of Agriculture's Southern Regional Research Center developed a derivative from wheat germ that apparently reduces aflatoxin, an anti-nutrient factor in many field crops, in cotton. The work has reached the stage where the derivative is being used this year on about 25,000 acres of cotton in Arizona. Crops contaminated with aflatoxin have reduced economic value but some-

times can be blended with wholesome material to reduce the contamination below levels where it affects animal health.

Trans Fatty Acid Labeling

The U.S. Food and Drug Administration's announcement earlier this year that it will require nutrition labels on prepared foods to list the *trans* fatty acid content beginning in 2006 may provide a boost to cottonseed oil usage. *Trans* fatty acids can be created during hydrogenation of vegetable oils to improve the shelf-life or functionality of highly unsaturated oils (which most often means soybean oil in the United States). Some research has indicated such fatty acids are less healthful than the *cis* fatty acids most predominate in unhydrogenated vegetable oils.

Cottonseed oil is more saturated than soybean oil and therefore can be used to create oil blends that, when used in products, may reduce or eliminate the need for hydrogenation that creates *trans* fatty acids.

"That may give a little bit of a kick (to cottonseed oil usage)," Wedegaertner said.

The question is how far food companies will try to go to avoid having to show *trans* content on their product labels.

For NCPA's Morgan, the key question is what major industrial users, such as Frito-Lay, will do. If such large-scale users decide to increase cottonseed oil use to avoid printing the word *trans* on product labels, Morgan said he believes it could lead to a significant boost in domestic cottonseed oil use.

For several decades, cottonseed oil has sold at a premium of approximately three cents per pound more than soybean oil. Wedegaertner noted that in mid-August, the premium was about four or five cents a pound and "that may become the norm," he added.

Morgan added that cottonseed oil processors are watching with interest research being done on acetone as an extraction solvent. Processors using hexane, the widely used solvent at present, are facing increased record keeping responsibilities to meet federal air quality regulations. Use of acetone would eliminate the need for such paperwork.

Global oilseed production is expected to increase in future years to meet demand for more protein to produce meat and more fats and oils to feed a rising world population. The U.S. cottonseed's challenge is to find its niche in a market dominated by soybean on the protein side and soybean and palm oils on the fats and oils side.

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