

## Conserving Biodiversity . . . WTO Issues . . . Ag Trade & the Environment . . . Farmland Values . . . & World Pork Markets

### Farm Real Estate Values Still On the Rise

*U.S. farm real estate values* rose for the ninth consecutive year in 1995. The January 1, 1996 value of \$890 per acre for farmland and buildings reflected an increase of 7 percent, up from 6.4 percent in 1993 and 1994 and the strongest gain recorded since 1987. In inflation-adjusted terms, the rise during 1995 was 4 percent, the fourth consecutive year of real increases. With economic conditions favorable in 1996, farm values are likely to increase for the year, supported by improved farm returns and strong domestic and foreign demand for U.S. farm products.

### U.S.: Key Player in Pork Trade

*The U.S. became a net exporter* of pork for the first time in over 40 years in 1995. Long-term USDA projections indicate an increase in pork exports through 2005. Net exporter status represents a culmination of structural changes in the U.S. pork industry since the 1970's. The restructuring effectively places the U.S. in the company of the two other largest pork-exporting countries—Denmark and Taiwan.

### The U.S. Hay Market

*Hay is among the most widely* produced U.S. crops. It is harvested in every state, and trails only corn and wheat in harvested area. Because hay is bulky, transportation costs are relatively high. Consequently, hay is usually marketed and fed in the area where it is produced. About 70 percent of hay output is consumed on farms where it is grown. However, purchasing rather than raising hay for on-farm use is becoming more prevalent. In years such as 1996 when subpar weather has affected hay production and feeding patterns, high prices in hay-deficit regions may lead to more interstate trade than in other years. Reduced U.S. hay supplies are expected to keep prices firm into 1997.



### Agricultural Trade Under the WTO

*The Uruguay Round (UR)* of multilateral trade negotiations, completed in 1994, was the first successful, comprehensive attempt to bring agriculture into the general discipline of the General Agreement on Tariffs and Trade. A new miniround of agricultural negotiations is scheduled to begin in 1999. The agenda will most likely cover issues left outstanding in the UR Agreement on Agriculture, particularly those relating to market access, domestic support, and export competition. But emerging issues not directly addressed by the Agreement on Agriculture might also be high on the negotiating agenda. These include sanitary and phytosanitary provisions, and state trading enterprises such as the Canadian Wheat Board.

### Trade Liberalization & the Environment

*Agricultural and trade policy* implementation or reform can create a complicated set of environmental effects—some negative, some positive. However, trade liberalization and environmental goals can

work in tandem. Trade agreements can help remove policies that support or protect environmentally harmful practices. They can also help establish common health and environmental standards on traded goods. Trade liberalization can also contribute to economic growth—a crucial factor in increasing demand for environmental quality indirectly as incomes grow, and in providing the means for remedial action.

The World Trade Organization and its predecessor have been involved in discussions over trade-environment linkages for several years. As part of the Final Act embodying the results of the Uruguay Round, participating Ministers agreed to establish a Committee on Trade and Environment, which will present recommendations to the WTO Ministerial Conference in December.

### Agriculture & Biodiversity

*Diverse biological resources*—from individual plants' genetic traits, to habitats for birds that consume pests, to the complex interactions of tropical ecosystems—sustain the environment in which living things grow. While biodiversity is an important input for agricultural production, agriculture in turn affects the level and nature of biodiversity through its impacts on land, water, and other environmental resources. But agriculture's impacts on biodiversity can be mitigated, and can even be managed to enhance biodiversity; examples are integrated pest management, crop rotations, precision farming, and conservation land uses.

A critical issue for U.S. agriculture is how America's farmers can continue to produce abundant, low-cost varieties of food and fiber, while preserving and enhancing biological resources. The 1996 Farm Act recognizes the urgency of protecting the diversity of biological resources, and has included conservation of wildlife habitat as a goal of agricultural environmental programs.

## Agricultural Economy



Natural Resources Conservation Service

## Field Crops Overview

Favorable late-season growing conditions in the Corn Belt have raised 1996 U.S. corn and soybean production forecasts from earlier months. Corn production is projected to be the third highest on record, with soybean production the second highest. Increased production will result in some stock rebuilding, and prices have eased from highs reached during the spring. Harvest progress remains behind the 5-year average, but both corn and soybeans have matured to the point where any freezes in November will not affect the crops significantly.

Despite forecast production increases, U.S. grain and soybean supplies for 1996/97 remain tight relative to the earlier years of this decade. Season-average farm prices for grains are projected to remain strong, although reduced from the high levels of 1995/96. U.S. wheat and coarse grain exports are facing increased competition from foreign exporters whose supplies are projected up.

**U.S. corn production is up 26 percent from 1995/96**, projected at 9.3 billion bushels, the third highest on record behind 1994 and 1992. The projected increase has occurred despite late plantings, as fall weather was excellent. Damage from frost was minimal.

Total corn use is projected up only slightly from 1995/96 as higher projected domestic use offsets lower exports. With total use virtually unchanged and production up, ending stocks are projected to more than double from 1995/96, but remain 30 percent below 1994/95.

U.S. corn exports are projected to drop 12 percent in 1996/97 because of increased foreign competition expected in global feed grain markets. Argentina and Canada—major coarse grain exporting countries—are expected to ship more than a year ago. In addition, U.S. corn exports will face greater competition from larger world supplies of feed wheat during 1996/97. As a result, U.S. coarse grain exports are projected to decline to the lowest level since 1993/94.

The increase in corn supplies, and building stocks, have dampened corn prices from a year earlier. Farm prices are forecast to average \$2.50-\$2.90 per bushel, compared with \$3.24 in 1995/96. Stocks still will be tight relative to the early 1990's, which will provide some support to prices.

Sorghum prices are forecast to drop further, with farm prices averaging \$2.20-\$2.60 per bushel compared with \$3.19 in 1995/96. The U.S. sorghum supply is projected to rise over 50 percent from a year ago—producers in the Southern Plains sharply expanded acreage this spring, and yields are forecast up significantly in Kansas, Nebraska, Oklahoma, and Missouri.

### U.S. Field Crops—Market Outlook

	Area		Yield	Output	Total supply	Domestic use	Exports	Ending stocks	Farm price
	Planted	Harvested							
	— Mil. acres —		Bu/acre	— Mil. bu —				\$/bu	
Wheat									
1995/96	69.1	60.9	35.8	2,183	2,757	1,140	1,241	376	4.55
1996/97	75.6	62.9	36.3	2,282	2,728	1,343	950	435	4.10-4.50
Corn									
1995/96	71.2	65.0	113.5	7,374	8,948	6,294	2,228	426	3.24
1996/97	79.6	73.3	126.5	9,265	9,702	6,645	1,950	1,107	2.50-2.90
Sorghum									
1995/96	9.5	8.3	55.6	460	532	316	198	18	3.19
1996/97	13.3	12.0	68.4	820	839	529	225	85	2.20-2.60
Barley									
1995/96	6.7	6.3	57.3	360	513	351	62	100	2.89
1996/97	7.2	6.8	58.5	397	541	401	35	105	2.40-2.80
Oats									
1995/96	6.3	3.0	54.7	162	343	275	2	66	1.68
1996/97	4.7	2.7	57.8	155	307	235	3	69	1.65-2.05
Soybeans									
1995/96	62.6	61.6	35.3	2,177	2,516	1,482	851	183	6.77
1996/97	64.3	63.4	37.9	2,403	2,590	1,510	870	210	6.15-6.85
Rice			Lbs./acre		Mil. cwt (rough equiv.)				\$/cwt
1995/96	3.12	3.09	5,621	173.9	212.7	105.5	82.3	25.0	9.09
1996/97	2.94	2.91	5,981	174.0	206.7	107.1	74.0	25.6	8.75-9.75
Cotton			Lbs./acre		Mil. bales				¢/lb.
1995/96	16.9	16.0	537	17.9	21.0	10.6	7.7	2.6	75.4
1996/97	14.2	12.8	698	18.6	21.7	11.0	5.8	4.9	*

Based on November 12, 1996 World Agricultural Supply and Demand Estimates.

\*USDA is prohibited from publishing cotton price projections.

See table 17 for complete definition of terms.

Economic Research Service, USDA

## Agricultural Economy

**U.S. soybean production for 1996/97 will be the second highest on record** and 10 percent above last year's output. Soybean acreage increased in 1996 in response to high prices. In addition, when wet weather prevented corn from being planted in some states, farmers shifted to soybeans, which have a shorter growing season. Despite harvest progress behind the 5-year average because of late planting and below-normal temperatures this summer, soybean yields are above 1995, propelled by nearly ideal weather conditions in the latter stages of the growing season, particularly in the eastern Corn Belt.

U.S. soybean crush and exports are projected higher in 1996/97, with increased supplies and stronger export demand. Even with greater exportable supplies expected from Argentina and Brazil, stronger import demand from China in 1996/97 will boost U.S. exports.

With production up more than use, ending soybean stocks are projected to recover somewhat from 1995/96's extremely low level while remaining significantly below the average of the 1990's. The farm price for soybeans is projected to average \$6.15-\$6.85 per bushel, compared with \$6.77 in 1995/96.

U.S. soybean meal production for 1996/97 is projected to increase because of greater soybean supplies. Meal prices have declined below 1995/96 levels, but greater export demand will provide some cushion. Soybean meal exports are projected to be 6 percent higher in 1996/97, as U.S. sales to China of both soybeans and soybean meal have risen. Average U.S. soybean meal prices are projected at \$210-\$225 per short ton in 1996/97, compared with \$236 in 1995/96.

A higher U.S. soybean crush will boost soybean oil output. With beginning stocks up more than 75 percent after a slowdown in exports in 1995/96, soybean oil prices are expected to decline from last year. The lower prices are expected to encourage greater domestic usage in 1996/97.

U.S. soybean oil exports are projected to rebound somewhat from a year ago, still well below 1994/95's level as competition

## World Commodity Market Outlook

	Year	Production <sup>1</sup>	Exports <sup>2</sup>	Consumption <sup>1,3</sup>	Carryover <sup>1</sup>
<i>Million tons</i>					
Wheat	1995/96	536.9	93.2	551.7	103.2
	1996/97	579.1	90.1	571.5	110.8
Corn	1995/96	513.1	65.5	542.7	63.3
	1996/97	571.2	62.3	555.2	79.3
Barley	1995/96	141.6	12.4	150.0	17.7
	1996/97	154.6	13.7	149.2	23.2
Rice	1995/96	370.4	19.1	371.1	48.8
	1996/97	378.7	18.4	377.9	49.5
Oilseeds <sup>4</sup>	1995/96	255.6	43.6	215.7	22.3
	1996/97	257.3	43.4	213.5	21.4
Soybeans <sup>4</sup>	1995/96	124.3	31.8	111.6	17.2
	1996/97	133.7	32.7	113.0	18.0
Soybean meal <sup>4</sup>	1995/96	88.6	32.3	88.6	4.2
	1996/97	89.7	32.7	89.7	3.9
Soybean oil <sup>4</sup>	1995/96	20.1	5.3	19.9	2.3
	1996/97	20.4	5.7	20.3	2.3
<i>Million bales</i>					
Cotton	1995/96	91.6	27.4	84.6	35.6
	1996/97	87.0	26.3	85.7	36.9

1. Aggregate of local marketing years. 2. Wheat, July-June; coarse grains, October-September; cotton, August-July. Rice trade is for the second calendar year. All trade includes trade among countries of the former Soviet Union. All grain trade excludes intra-EU trade; oilseed and cotton trade include intra-EU trade. 3. Crush only for soybeans and oilseeds. 4. Brazil and Argentina adjusted to October-September.

Economic Research Service, USDA

increases from palm oil exports. Although domestic use and exports are projected higher in 1996/97, larger beginning stocks and output will push ending stocks to a record. Average U.S. soybean oil prices are projected to range from 22 cents to 23.5 cents per pound compared with 24.75 cents in 1995/96.

**U.S. wheat exports are projected to decline 23 percent** from 1995/96, despite greater U.S. production. Wheat output has increased this year in several major exporting countries (Australia, Argentina, Canada, and the European Union) as well as importers (China and North Africa), heightening export competition and reducing import demand. Global wheat production for 1996/97 is currently projected to be the second highest on record after 1990/91, and world wheat prices

have tumbled from their record highs of this past spring.

Partially offsetting the projected decline in U.S. wheat exports will be higher feed and residual use. Ending stocks are projected up 16 percent 1995/96, but still the third lowest on record. Since domestic supplies will remain relatively tight this year, U.S. farm prices are projected to average \$4.10-\$4.50 per bushel in 1996/97, compared with \$4.55 in 1995/96.

With the 1996 wheat harvest complete, attention has turned to prospects for next year's crop. Winter wheat plantings recently were completed in November, and 73 percent of the crop was rated in either good or excellent condition as of November 10, compared with 54 percent

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a year earlier. Moisture conditions have improved in both Kansas and Texas since late summer, after drought conditions severely affected 1996 wheat production in these states. The crop is now entering dormancy, and weather will have little influence on yields until spring. In January, USDA will issue its first forecast of U.S. winter wheat seedings for harvest in 1997.

### **With record rice yields, U.S. production is projected nearly equal to last year's**

even with acreage down 6 percent. Acreage declined in response to changes in government support programs, greater planting flexibility, and high corn and soybean prices which stimulated some substitution of these crops for rice in some states. Rice yields in 1996 are projected to be records (or tie records) in Arkansas, Louisiana, Mississippi, and Texas. In contrast, yields in California are projected to be well below the 1994 record due to poor kernel filling and problems with disease and weeds.

With the U.S. supply forecast down 3 percent in 1996/97 due to low beginning stocks, prices are expected to rise slightly. Ending stocks are projected to remain tight. Season-average farm prices are projected to average \$8.75-\$9.75 per cwt, compared with \$9.09 in 1995/96. With total supply below last year and domestic demand projected to show a steady gain, U.S. exports are projected to decline 10 percent. However, rough (unmilled) rice exports to Latin America are expected to increase, and medium grain exports are expected to rise as Japan seeks to meet its Uruguay Round commitments.

**U.S. cotton production will increase in 1996.** Projected yields in the Southwest states, up from 1995, have offset lower acreage, boosting cotton production 4 percent over 1995/96. Nearly 70 percent of the U.S. cotton crop had been harvested as of November 10, almost matching the 5-year average.

Total use is projected down from 1995/96 as a sharp drop in exports more than offsets stronger domestic use. U.S. exports are projected down nearly 25 percent for

1996/97 as global imports contract (especially by China). Reduced exports and higher production are expected to allow projected U.S. ending stocks to almost double from the 1995/96 level.

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## Livestock, Dairy & Poultry Overview

*Pork exports are up sharply this year due to increased shipments to Japan and Canada. However, total pork shipments to Japan will not be significantly different from last year, because the Japanese government raised imported pork prices to protect domestic producers.*

*Milk production has increased slightly, while prices for cheese and butter have declined from earlier peaks. However, nonfat milk prices remain strong. Milk production is expected to resume gradual growth for the rest of this year and into next year.*

*While demand for broilers continues to be strong, falling corn prices may induce growers to increase production. Turkey production will be larger than last year, but retail prices for turkey hens are expected to remain steady.*

**U.S. pork exports were up 29 percent from a year earlier** during January-August 1996, with shipments amounting to 653 million pounds. Large shipments to Japan last spring and increases to Canada account for the strong growth.

Japanese buyers imported huge quantities of pork from the U.S., Taiwan, Denmark, and Canada in the first quarter of Japanese FY 1996, anticipating that the Japanese government would legally raise the price of imported pork (through the Safeguard or SG) in order to protect domestic producers. The government raised the minimum price of imported pork on July 1, 1996 by 24 percent to \$2.88 per pound. This price will be the minimum price of pork imported into Japan until March 31, 1997, and will make imported pork less competitive with domestically produced pork.

From the perspective of the Japanese government, the SG appears to be having the desired effect, as expectations now are that 1996 Japanese pork imports will not significantly differ from last year's 1.8 billion pounds. The U.S. is expected to export slightly more pork to Japan this year than in 1995, because over half of U.S. exports are of fresh products, which have a higher profit margin than frozen pork and are less affected by the increase in the minimum import price.

Taiwan, the main U.S. competitor in the Japanese market, is expected to export less pork to Japan in 1996 than last year. In Taiwan, high domestic pork prices have resulted partly from disease problems that are reducing supply, both for domestic consumption and export. In addition, mounting environmental problems are restricting production expansion, and also slowing export growth. The slowdown in Taiwanese pork exports will create market opportunities in Japan for the U.S., particularly in the fresh market. Competitors such as Canada may provide some competition in the Japanese fresh market.

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Restructuring of the pork industry has made the U.S. a net exporter. But the U.S. faces strong competitors. **World Ag & Trade, page 15**

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## U.S. Livestock and Poultry Products—Market Outlook

		Beginning stocks	Production	Imports	Total supply	Exports	Ending stocks	Consumption		Primary market price
								Total	Per capita	
								Million lbs.	Lbs.	\$/cwt
Beef	1996	519	25,692	2,134	28,345	1,971	475	25,949	67.9	64.61
	1997	475	26,207	2,050	28,732	2,225	475	26,032	67.5	62-67
Pork	1996	396	17,195	614	18,205	909	420	16,876	49.3	53.45
	1997	420	17,538	605	18,563	1,064	400	17,099	49.5	51-55
Broilers*	1996	560	26,250	0	26,810	4,607	600	21,603	71.7	60.4
	1997	600	27,673	0	28,372	5,075	640	22,657	74.5	54-58
Turkeys	1996	271	5,399	0	5,671	461	300	4,910	18.5	66.3
	1997	300	5,509	0	5,809	510	300	4,999	18.7	64-69
Eggs**	1996	11.2	6,376.3	5.2	6,392.6	260.0	12.0	5,257.9	237.6	85.8
	1997	12.0	6,600.0	4.0	6,616.0	280.0	12.0	5,414.0	242.4	72-78

Based on November 12, 1996 World Agricultural Supply and Demand Estimates.

\*Cold storage stocks previously classified as "other chicken" are now included with broiler stocks. \*\*Total consumption does not include eggs used for hatching. See tables 10 and 11 for complete definition of terms.

Economic Research Service, USDA

Canada also figured prominently in the U.S. pork market in the first 7 months of 1996. U.S. hog imports from Canada (the only foreign supplier of slaughter hogs) expanded to 1.78 million head during January-August, compared with 1.01 million head a year ago.

Canadian producers are exporting hogs to the U.S. because of higher U.S. hog prices, favorable U.S.-Canadian exchange rates, and lower countervailing duties. Hog prices are relatively lower in Canada partly because high variable costs in the processing industry, particularly labor costs, keep packers from bidding hog prices higher. Also, increased slaughter capacity in the U.S. eastern Corn Belt has increased demand for hogs in that region from both the U.S. and Canada. Lower Canadian slaughter resulting from increased live exports to the U.S., together with higher Canadian exports to Japan in the runup to the SG, raised pork prices in Canada, particularly on the processing side of the market.

Consequently, lower valued U.S. cuts have flowed into Canada, at rates double those of 1995. However, the U.S. continues to be a large net importer of Canadian pork products. In the first 8 months of

1996, U.S. imports from Canada were 218 million pounds higher than exports.

**Beef cow slaughter remains well above a year ago** and is rising seasonally as this year's calf crop is weaned. Continued weak feeder cattle prices and winter hay supply concerns are likely to result in even closer culling of the cow herd.

The October *Cattle on Feed* report, covering feedlots with over 1,000 head of capacity, indicated inventories in the seven monthly reporting states were down only 3 percent from a year earlier. Placements on feed during September were up 4 percent from a year earlier, following gains of 6 and 19 percent in July and August. Fed-cattle marketings at heavier slaughter weights will increase in December and remain strong through at least first-quarter 1997.

Increased production and continued sluggishness in high-quality export markets—especially Japan, which remains concerned with *E.coli* problems in its food system—will likely push U.S. fed-cattle prices down to the mid-\$60's by early winter. If export demand for U.S. beef remains sluggish, more production will have to be absorbed domestically, along with likely larger beef imports as other

countries seek alternative markets for their beef. This would place additional downward pressure on U.S. processing beef prices.

**Recovering milk production** has eased very tight dairy markets. Exchange prices for cheese and butter have declined sharply from summer highs, although nonfat dry milk prices have remained strong. In early 1997, wholesale prices will be considerably below September levels. However, for first-half 1997, brisk demand, forage quality problems, and high prices for feed concentrate will keep dairy markets fairly tight.

Milk per cow in the 22 monthly reporting states returned to the 1995 level in August and posted an 0.7-percent increase in October. Despite this partial recovery, milk per cow remains fairly weak—up only 0.9 percent from 2 years ago. Even with the relatively unfavorable milk/feed price ratios of recent years, growth in milk per cow would normally be expected to exceed 1 percent per year.

Milk cow numbers continue to run slightly more than 1 percent below a year earlier. Although a significant number of producers probably would like to expand their operations in response to favorable

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prices this summer and early autumn, reduced availability of quality forage has been a substantial deterrent to growth. In addition, expansion in western milk production has remained relatively modest.

Milk production in late 1996 and in 1997 is projected to resume gradual growth. Relatively high returns over feed concentrate costs are expected to induce farmers to increase supply. Fourth-quarter 1996 output is projected to be similar to a year earlier, while 1997 growth is expected to offset 1996's 1-percent decrease.

**Retail turkey prices are expected to be unchanged** in fourth-quarter 1996 from a year earlier, while wholesale prices are down about 5 cents per pound. Higher production this fall and slightly higher stock levels of whole birds has pushed down wholesale prices. With higher feed costs in 1996, turkey producers have been facing negative net returns all year. However, a 5-percent increase of poult placements in September indicates that producers are still planning to continue increasing production in 1997.

**Recent declines in corn prices will push down costs of producing broilers** over the next few months. September corn and soybean meal prices yield the lowest feed costs since February. Feed costs this fall, while 20 percent above a year ago, are 13 percent below the peak in July. Starting in January, feed costs are projected to fall below levels of a year earlier.

With cost reductions, and with wholesale prices continuing to hold above last year, companies could consider more rapid production growth. Production increases continue at about 5 percent above a year ago. Additional expansion may be possible later, as cumulative potential placements to the hatchery supply flock show a 2-3-percent increase over a year earlier for October 1996 through March 1997. However, productivity levels will determine the availability of additional birds for placement in growout houses.

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## Specialty Crops Overview

**U.S. production of tung oil has started up again.** It will be the first time since 1973 that this inedible vegetable oil (extracted from an inedible tree nut) was produced in the U.S. Tung oil's physical and chemical properties make it useful as a protective coating, solvent, and/or drying agent in lacquers, resins, fiberboard, paints, varnishes, concrete sealers, electronic circuit boards, and printing inks. Its superior drying properties allow it to be sold at a price premium over other vegetable-derived drying oils, such as linseed oil.

Current production of tung nuts is from several hundred acres of 3- to 4-year-old trees wholly owned by the American Tung Oil Corporation (ATO) located in southern Mississippi. ATO plans on expanding acreage by planting 5,000 additional acres of tung trees, 500 acres of which will be company owned and the rest contracted with individual growers. Although current tung nut production is in Mississippi, ATO may contract with growers in other parts of the U.S. production region (a 100-mile-wide area along the Gulf Coast extending from north central Florida into eastern Texas). The oil will be extracted at ATO's Tung Ridge Ranch mill in Mississippi.

Company officials estimate 1996 U.S. tung oil production at about 50,000 pounds, which will have little impact on world markets. However, as acreage is planted and trees reach production maturity in about 4 to 5 years (when they will be 7 to 8 years old), the U.S. will be a significant producer of tung oil. The company projects that in 5 years U.S. production will amount to about 2 million pounds of oil. In 8 years, if all 5,000 acres are planted and producing, output could be over 4 million pounds. These trees could sustain commercial production for about 25 years, barring damage or destruction.

The world supply of tung oil, which averages an estimated 100 million pounds a year, can be very volatile, as tung orchards can be greatly affected by adverse weather conditions and by the age of the orchards. Though hardy, fast growing, and naturally resistant to disease and insects, tung trees are grown in subtropical regions and are very sensitive to temperature levels during fruit-set. A poor crop in any of the major producing countries (China, Paraguay, Argentina, and Brazil) often contributes to volatile world tung oil prices. And there is concern that aging orchards in South America may be losing productivity.

The current U.S. tung oil market is supplied largely by Argentina and Paraguay. During 1991-95, 50 percent of U.S. imports of tung oil came from Argentina, another 37 percent from Paraguay, and 11 percent from China. Small South

**Argentina and Paraguay Are Major U.S. Suppliers of Tung Oil**

Country	1991	1992	1993	1994	1995
			\$1,000		
Argentina	2,584	6,828	4,175	1,881	2,739
Paraguay	3,051	835	2,801	2,438	1,044
China	206	709	926	1,201	382
Brazil	0	525	0	0	0
Other	0	0	70	43	18
Total	5,841	8,888	7,971	5,563	4,182

Source: Bureau of the Census, U.S. Department of Commerce, Economic Research Service, USDA

American crops in 1991/92 and 1992/93 led to extremely high tung oil prices of about \$1.30 per pound in the U.S. from mid-1992 through most of 1993. With good crops in South America and China in 1993, prices receded to about 76 cents on average in 1994. Decreased demand from Japan and Europe in 1994 and 1995 helped keep U.S. tung oil prices down—about 60 cents per pound in 1995—despite smaller crops the last two seasons.

However, U.S. tung oil prices increased slightly this summer to 64 cents per pound, and may rise even further, as South America and China anticipate relatively small crops again this season. In addition, a lower supply of Chinese tung oil, and renewed demand from Japan as its economy strengthens, are likely to put more upward pressure on prices for South American tung oil. How far prices will rise remains to be seen, but the market's continued volatility will likely encourage some companies to use other natural and synthetic alternatives in their product formulations.

During the 1940's, most tung oil use in the U.S. was by the paint and varnish industry. However, as the protective coatings industries shifted to synthetic substitutes and water-based latex paints, domestic consumption of tung oil declined dramatically. Now, tung oil is used by a wide range of industries.

One industry expert estimates current U.S. tung oil use at around 10 million pounds, with 40 percent in paints, varnishes, and wood coatings; 40 percent in inks and overprint varnishes for graphic arts; 14 percent in fiberboard and other building materials; and 6 percent in miscellaneous items like caulk, concrete sealers, and brake pads.

Current and future uses of tung oil in the U.S. depend on several factors, including regulations in the Clean Air Act Amendments of 1990 (CAAA) requiring coatings manufacturers to reduce volatile organic compounds (VOC's) in their formulations. Because of these regulations, many companies are formulating new products, a number of which use tung oil because of its good drying ability and inherent solvency. However, these regu-

### U.S. Crambe Oil Production Peaked in 1994

	Planted area	Crop yield	Oil production
	<i>Acres</i>	<i>Lbs./acre</i>	<i>1,000 lbs.</i>
1990	2,359	988	2,330
1991	4,475	1,153	5,160
1992	23,204	1,057	24,538
1993	57,683	972	56,090
1994	43,925	1,359	59,200
1995	400	N/A	N/A
1996	22,000	1,520	29,800

N/A = Not available.

Source: North Dakota State University.

Economic Research Service, USDA

lations have also caused the phaseout of some older products using tung oil that include petrochemical solvents, since these contain VOC's. The net effects of CAAA regulations for the coatings industries will continue to play a major role in tung oil consumption.

In addition to air quality regulations, other influences in U.S. tung oil use are likely to include supply stabilization, price, and product development. Various new applications for tung oil and its by-products are being developed for use in products such as cosmetics, insecticides, and lubricants. Lower prices and the success of new products will be vital to increasing the demand for tung oil.  
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**Industrial rapeseed and crambe are annual oilseeds grown for erucic acid** in their oils. To meet industry requirements, industrial rapeseed oil must contain at least 45 percent erucic acid. In contrast, edible canola oil—made from canola varieties of rapeseed—must contain less than 2 percent erucic acid, according to Food and Drug Administration standards.

The primary use for high-erucic-acid oils is in erucamide, a chemical used in the production of plastic film. An estimated 48 million pounds of high-erucic-acid oils are used worldwide in making about 15 million pounds of erucamide per year.

Erucamide is sold by a half dozen oleochemical producers in the U.S., Europe, and Asia, with Witco Corporation, headquartered in Greenwich, Connecticut, the largest worldwide producer and marketer. Manufacturers have used erucamide for decades in bread wrappers and garbage bags.

Cationic surfactants that function as active ingredients in personal-care products, laundry softeners, and other household products appear to be an up-and-coming use for high-erucic-acid oils. Some companies in Japan and the U.S. are using cationic surfactants, such as those produced from rapeseed, crambe, and meadowfoam oils, as the active ingredient in hair conditioners. An estimated 18 million pounds of high-erucic-acid oil is used annually worldwide to manufacture roughly 6 million pounds of cationic surfactants.

Because rapeseed and crambe oils have a high degree of lubricity, they also are used either directly as lubricants or in lubricant formulations. They are used as spinning lubricants in the textile, steel, and shipping industries; as cutting, metal-forming, rolling, fabricating, and drilling oils; as automatic transmission fluid additives and power steering fluids; and as marine lubes. Among the selling points of the erucic-acid-oil products is their enhanced biodegradability compared with their petroleum-based counterparts. Several companies are reportedly in the market for industrial rapeseed and canola oils for lubricant applications because of

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their benign environmental impact, which has caused a recent increase in demand.

Industrial rapeseed and crambe oils are the only commercial sources of erucic acid. While the U.S. produces both crops, other industrialized countries rely on industrial rapeseed for erucic acid. Industry sources estimate the U.S. supply of industrial rapeseed oil at about 5 million pounds of domestic production and around 25-30 million pounds shipped in from Canada and Europe.

Although no data are available on U.S. crambe oil production, the oil reportedly gained acceptance in the U.S. high-erucic-acid market in the early 1990's when Witco began relying on it as a domestic source of erucic acid. Witco currently uses both industrial rapeseed and crambe oils.

Industrial rapeseed has been grown in the Pacific Northwest for birdseed and oil for over 40 years. Recently, harvested acreage of industrial rapeseed has declined from 19,400 acres in 1987/88 to 2,400 in 1995/96. During the same period, domestic production has dropped from 22 million pounds to an estimated 3 million. Historically, birdseed has accounted for at least 50 percent of U.S. production, according to an industry source. However, after becoming familiar with canola, birdseed manufacturers now buy either industrial rapeseed or canola, whichever costs less. Rapeseed is crushed for oil by Koch Agricultural Services of Great Falls, Montana.

Crambe is a relatively new U.S. crop. It has been in commercial production only since 1990, primarily in North Dakota. U.S. acreage peaked in 1993 at about 58,000 acres. In 1994, the American Renewable Oilseed Association (AROA), an organization of crambe growers, took responsibility for marketing the crop after the company that was buying crambe seed left the crushing business. No commercial acreage was planted in 1995 because much of the crambe oil produced in 1994 had not been sold prior to spring planting.

About 29.8 million pounds of crambe was harvested in 1996 from 19,600 acres. The crop will be processed for AROA by Archer Daniels Midland at its Enderlin, North Dakota, oilseed crushing plant. AROA has contracted with Witco to buy the crambe oil. AROA will then market the crambe meal to manufacturers of feed for beef finishing rations.

World supplies of high-erucic-acid oils have tightened in the last few years as older rapeseed varieties were replaced with canola types. For example, Poland and the former East Germany historically had been heavy producers of industrial rapeseed oil because much of it was also used for edible purposes. However, since the breakup of the Eastern Bloc, industrial rapeseed has yielded to canola because industrial rapeseed oil cannot be sold to European Union countries for edible purposes. Erucic-acid-containing rapeseed varieties are now considered specialty crops in Canada and Europe, the major producers. China, Russia, and India, however, still use high-erucic-acid rapeseed oil for human consumption.

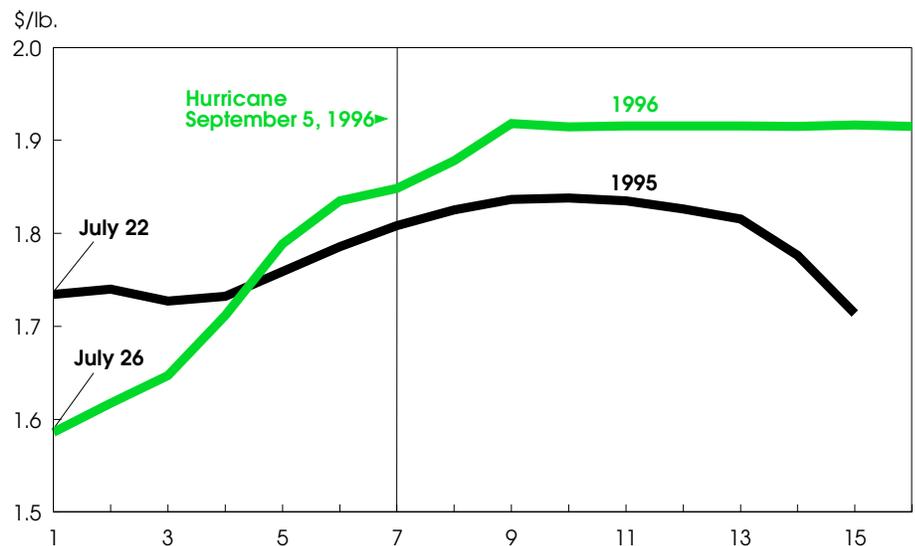
World supplies of industrial rapeseed oil are expected to remain tight in 1997. Although Canadian production is fairly

stable, European production was below expectations in 1996 for a second consecutive year. As supplies have tightened, world prices for erucic acid oils have increased. The oil prices have reverberated as companies raised their prices for erucic acid products in 1995 and 1996. [Lewrene Glaser (202) 219-0091; lkglaser@econ.ag.gov]

**Hurricane Fran has limited flue-cured tobacco output.** During the first week of September, Hurricane Fran smashed into North Carolina's prime coastal tobacco producing region, with high winds damaging the crop in the field and electric outages causing leaf to spoil in curing barns. North Carolina typically accounts for about 60 percent of the U.S. flue-cured crop, and flue-cured tobacco is about 55 percent of U.S. tobacco output.

The effect on flue-cured auction markets was immediate and dramatic. Prices jumped from \$1.75 per pound before the storm to \$1.87 in the first days following the storm. After a couple of weeks, prices climbed higher, and held at around \$1.92 per pound for the remainder of the season. Production of burley, the other major tobacco variety, was unaffected by

### Flue-Cured Tobacco Prices Continued High After the 1996 Hurricane



Weekly-average auction prices. Markets opened July 26, 1996 and July 22, 1995.  
Economic Research Service, USDA

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the hurricane—it is produced primarily in Kentucky and Tennessee.

Prior to Hurricane Fran, total U.S. flue-cured production had been estimated at 898 million pounds. In the days following the hurricane, losses appeared to be as much as 100 million pounds. But as of November 1, total U.S. acreage and average yields were higher than early-season projections, and the estimate was lowered only by 14 million pounds to an output of 884 million, up from 747 million in 1995.

The 2-percent output decline from early-season estimates does not reflect the economic havoc wreaked on counties that suffered most from the high winds and associated damage. In some counties, about 20 percent of the crop was remaining in the fields, and much of it was destroyed. However, most growers suffering heavy losses will receive some reimbursement from crop insurance. To participate in the Federal tobacco program, farmers must purchase crop insurance or waive rights to disaster payments.

U.S. flue-cured growers expect to harvest 415,000 acres, compared with 386,000 acres in 1995. Higher yields are giving an additional boost to production volume this year. Overall flue-cured yields are expected to be about 2,130 pounds per acre, up from 1,933 pounds in 1995.

Despite losses from the hurricane, 885 million pounds (excluding resales) had been marketed through auction warehouses by the end of October, compared with 854 million in 1995. About 6 million pounds was carried over by growers from the previous year, and much of this leaf is being marketed this season.

Even with higher output and marketings, strong demand has strengthened prices, to an average of \$1.84 per pound for all sales this fall, compared with \$1.79 last

year. The effective quota—the amount growers are allowed to market under the Federal tobacco program—will not be filled in 1996, indicating that demand increased more than supply. Carryover this season will be zero.

The effective quota increased from 925 million pounds in 1995 to 944 million in 1996, mostly because of an adjustment for last year's low production and marketings. Farmers may market 3 percent above or below their individual quota in a given year and carry the difference to subsequent crop years.

The quota is also based on reserve stocks, cigarette company purchase intentions, and the previous 3 years' exports. Reserve stocks were at a low level in 1995, which adjusted the quota upward. The quota would have been even higher, but cigarette companies lowered their purchase intentions in 1996 (after raising them in 1995), and the 3-year average of flue-cured exports was also lower.

Strong demand and high auction prices have limited the amount of flue-cured tobacco placed under loan to the lowest level in over 10 years. In 1996, growers are expected to place less tobacco under loan than last year's total of only 12 million pounds, compared with an average of 105 million pounds in 1991-94. As a part of the Federal government price support program, tobacco growers are assured a minimum price through loans from USDA's Commodity Credit Corporation to producer-owned cooperative associations. The cost of the price support program is borne by the tobacco growers and buyers under the no-net-cost provisions of the program.

Cigarette prices probably will not rise as a result of the hurricane. Tobacco is a relatively small part of the total cost of producing cigarettes—about 3 percent—and cigarette companies can adjust for domestic shortfalls by importing larger

amounts of leaf from countries like Brazil, Zimbabwe, and Malawi. In 1995, about 23 percent of the flue-cured used to manufacture cigarettes was imported. This may rise slightly in 1996.

Flue-cured tobacco production worldwide is forecast up 13 percent in 1996. Excluding China, which does not export much tobacco, the gain is 5 percent. World stocks are expected to be down, so international demand for U.S. flue-cured is likely to increase, advancing exports. [Tom Capehart (202) 219-0890; thomasc@econ.ag.gov]

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**Upcoming Reports—USDA's Economic Research Service**

The following reports will be issued electronically on dates and at times (ET) indicated.

**December**

- 4 *Agricultural Exports\**
- 13 *Cotton & Wool Outlook (4 pm)\*\**
- Feed Outlook (4 pm)\*\**
- Oil Crops Outlook (4 pm)\*\**
- Rice Outlook (4 pm)\*\**
- Wheat Outlook (4 pm)\*\**
- Dairy Outlook (9 am)*
- 16 *Tobacco Yearbook\**
- 17 *Agricultural Income & Finance\**
- 19 *Sugar & Sweeteners Yearbook\**
- 20 *Agricultural Outlook\**
- 23 *U.S. Agricultural Trade Update (3 pm)*
- Livestock, Dairy, & Poultry (9 am)*

\*Release of summary, 3 pm.

\*\*Available electronically only.