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Statistical Indicators can be found in the printed version of the September 1997 issue of Agricultural Outlook. For more information, please contact Randy Schnepf at (202) 219-1281.

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Published monthly (except February) by the Economic Research Service, U.S. Department of Agriculture. Materials may be reprinted without permission.

Contents have been approved by the World Agricultural Outlook Board and the summary released August 20, 1997. Price and quantity forecasts for crops are based on the August 12 *World Agricultural Supply and Demand Estimates*.

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The next issue (AO-245) is scheduled for mailing on October 6, 1997. If not delivered by October 24, call (202) 219-0566 (please have mailing label handy). The full text will also be distributed electronically; call (202) 219-0515 for further information. The text of current and back issues is available on the ERS Home Page on the Internet at www.econ.ag.gov/

In This Issue . . .

The Soybean Market . . . Rice Production & Prices . . . Everglades Restoration . . . & Impacts of NAFTA & the Farm Act

Farm Act Eases Acreage Shifts

The 1996 Farm Act granted U.S. farmers more flexibility to respond to strong market price signals by eliminating acreage reduction programs, base acreage planting requirements to maintain program payments, and limits on flex acreage that farmers could plant to other crops. Higher prices in 1996 prompted farmers to increase planted acreage of major field crops by 16 million acres, to nearly 262 million. In 1997, although total planted acreage was about the same as in 1996, the crop mix changed as farmers planted more soybeans in response to strong prices relative to other crops.

Under prior farm legislation, farmers' flexibility to switch acreage among crops was limited. But the 1996 Farm Act, by removing constraints on land use, permitted a larger supply response to the economic incentives provided by absolute and relative price movements.

Soybean Producers Look to World Market

U.S. soybean farmers responded to this spring's strong prices and greater planting flexibility by planting an estimated 70.9 million acres, up 10 percent and the largest in 15 years. Crop conditions to date suggest a record 1997 U.S. soybean crop. Soybean marketers will turn to growing international as well as domestic markets to sell the expected 1997 bumper crop.

Record supplies are projected to lift both domestic crush and U.S. soybean exports to record volumes. Recent trade agreements that have removed international barriers and opened U.S. export markets should provide a welcome boost. However, sensitivity in some European markets to the importation of new, genetically modified soybeans, and related discussions of product labeling, represent potential hurdles for future U.S. exports.

Rice Output Reflects Strong Prices

The 1997 U.S. rice crop is estimated at 182 million cwt, up over 6 percent from last year, although a cool, wet spring will keep southern rice yields from matching last year's record. The production increase comes entirely from a 15-percent rise in southern long grain rice acreage, the result of higher prices at planting for long grain rice compared with medium and short grain varieties and alternative crops.

Strong rice prices reflected an extremely tight domestic supply situation, with a stocks-to-use ratio of 13 percent at the end of the 1996/97 marketing year, the lowest since 1980/81. For long grain rice, the ratio fell even lower—to 7.4 percent. In recent years, stronger world trade, fueled by rising incomes in Asia, lower trade barriers, and faster growth in world rice consumption than in output, has helped maintain higher domestic prices for U.S. rice.

NAFTA: Third-Year Assessment

The North American Free Trade Agreement (NAFTA) has had a positive overall effect on the U.S. agricultural sector, reinforcing the trend toward greater integration of U.S., Canadian, and Mexican markets and enhancing the competitiveness of U.S. agriculture. Analysis by USDA's Economic Research Service (ERS) has attempted to isolate the economic impacts of agricultural trade liberalization under NAFTA from other economic forces. Looking at the 3-year period following NAFTA's implementation on January 1, 1994, ERS analysis found that a little more than a fifth of the $2.7-billion increase in U.S. exports to Canada and Mexico, and slightly less than a fifth of the $3.3-billion increase in U.S. imports, can be attributed to NAFTA.

The agricultural provisions of NAFTA have had small but positive impacts to date on investment and employment in agriculture and agriculture-related industries. The effects are small principally because NAFTA trade is a small component of the U.S. farm economy, and to a lesser extent because trade liberalization under NAFTA is only partially complete.

Everglades Restoration & Agricultural Options

One of the most ambitious environmental restoration efforts—the South Florida Ecosystem Restoration Project—is underway to restore the Everglades watershed. Decades of urban and agricultural development in south Florida have profoundly altered the Everglades, with wetlands lost and natural water flows disrupted.

Restoration will place increasing demands on the agricultural sector to adjust traditional patterns of land and water use. Acquisition of land or land-use rights for environmental restoration is a priority, and much of the land would likely be areas currently in crop production or pasture. Changes in cropping patterns and crop type may help to integrate agricultural production with natural water flow systems. Improved management of land, water, chemicals, and other purchased inputs will be a key element . The environmental benefits of maintaining a strong agricultural sector need to be considered when assessing the benefits and costs of alternative restoration measures.

Commodity Briefs

Field Crops

Durum Wheat Crop Dips in 1997

Fluctuating moisture conditions this year in the Northern Plains is wreaking havoc with U.S. production of durum wheat, the main ingredient for pasta. USDA's August 1 forecast indicates that farmers will harvest only 90 million bushels in 1997, down 22 percent from last year's large crop and the smallest in 4 years. As a result, U.S. durum imports are projected to rise in 1997/98, as are durum prices relative to other classes of wheat.

Extremely wet field conditions following spring storms and snowmelt slowed spring planting across much of North Dakota, which typically accounts for at least three-fourths of the U.S. durum crop. Just over one-third of North Dakota's durum planting was completed by mid-May, compared with an average of nearly half for this period during 1992-96. Dry weather allowed farmers to finish planting by early June, but lowered yield prospects when the dryness continued through the month.

The clouds opened again in July, bringing much-needed rain. Crop prospects improved somewhat, especially in the northern parts of the region where the crop matures later. However, the moist (and cool) conditions have promoted development of disease in some areas, which can reduce both yield and quality. Compounding the impact of lower projected overall yields this year, U.S. farmers had planted 10 percent less durum area, in response to prices that were lower at planting time than a year earlier.

Durum is also grown under irrigation in the desert areas of California and Arizona, where farmers are expected to harvest a combined 21 million bushels in 1997. While yields in those states are near last year's levels, planted area is down in both states, especially in Arizona. The discovery of Karnal bunt fungus in durum wheat seed last year led to restrictions on planting and marketing to prevent its spread to other wheat growing regions.

Reflecting sharply lower production prospects, farm prices for durum rose during June and July. In contrast, prices for other classes of wheat declined in mid-summer as the harvest of a bumper winter crop advanced up the Plains. Durum prices do not necessarily fluctuate in unison with other classes of wheat, because there is little substitution between durum and other classes—e.g., hard red winter, soft red winter, and white wheat, which are not well suited for pasta production. Durum is first ground into coarse flour (called semolina) and then usually processed into pasta.

Beginning stocks are higher than a year earlier, but not nearly enough to offset the expected smaller crop. The tight domestic supply situation will likely boost the season-average farm price for durum relative to other classes of wheat. The durum price premium (over the all-wheat price) may approach $1 per bushel in 1997/98, more than double last year's level but

U.S. Field Crops—Market Outlook

	Area								
	Planted	Harvested	Yield	Output	Total supply	Domestic use	Exports	Ending stocks	Farm price
	—Mil. acres—		Bu/acre	Mil. bu					$/bu
Wheat									
1996/97	75.6	62.9	36.3	2,282	2,750	1,304	1,001	444	4.35
1997/98	70.8	63.5	39.9	2,531	3,070	1,275	1,100	695	3.05-3.65
Corn									
1996/97	79.5	73.1	127.1	9,293	9,731	6,990	1,800	941	2.70
1997/98	80.2	74.0	125.3	9,276	10,227	7,330	2,050	847	2.50-2.90
Sorghum									
1996/97	13.2	11.9	67.5	803	821	565	205	51	2.33
1997/98	10.3	9.5	66.2	629	681	425	195	61	2.25-2.65
Barley									
1996/97	7.2	6.8	58.5	397	533	392	31	110	2.75
1997/98	6.8	6.4	59.4	380	530	412	45	73	2.30-2.70
Oats									
1996/97	4.7	2.7	57.8	155	319	250	3	67	1.95
1997/98	5.3	3.2	58.1	187	354	285	3	66	1.50-1.90
Soybeans									
1996/97	64.2	63.4	37.6	2,382	2,576	1,571	880	125	7.38
1997/98	70.9	69.8	39.3	2,744	2,874	1,624	945	305	5.40-6.60
			Lbs./acre	Mil. cwt(rough equiv.)					$/cwt
Rice									
1996/97	2.82	2.80	6,121	171.3	206.4	106.5	76.0	23.9	9.90
1997/98	3.07	3.04	5,994	182.0	215.9	109.9	82.0	24.0	9.25-10.25
			Lbs./acre	Mil. bales					c/lb.
Cotton									
1996/97	14.6	12.9	707	18.9	22.0	10.9	7.0	4.1	69.3
1997/98	13.9	13.4	637	17.8	21.9	11.0	7.1	3.8	*

Based on August 12, 1997 *World Agricultural Supply and Demand Estimates.*
*USDA is prohibited from publishing cotton price projections.
See table 17 for complete definition of terms and data for prior years.

Economic Research Service, USDA

similar to 1995/96. Strong prices will attract more durum from Canada, with imports forecast to rise to 25 million bushels, just under the 1993/94 record. Tight U.S. durum supplies will encourage U.S. millers to bid aggressively for high-quality Canadian durum.

Most foreign durum producers are also expecting smaller 1997 crops, which will support durum prices in 1997/98. Mirroring conditions in North Dakota, yields and area are down in Canada—the world's largest durum producer. Italy and France are also expected to harvest smaller crops, and drought has sharply curtailed prospects in North Africa. Morocco, Tunisia, and Algeria are major producers and importers of durum; in this region, semolina is used primarily to make couscous.

Although U.S. durum exports have been running higher than a year earlier, the pace is expected to slow as the season progresses, due to tight domestic supplies. Domestic food use is forecast to remain relatively flat at 80 million bushels in 1997/98. Despite the projected lower output and larger imports, the U.S. is expected to maintain its status as a net exporter of durum (grain and products), with exports of 35 million bushels.

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World Commodity Market Outlook

	Year	Production[1]	Exports[2]	Consumption[1,3]	Carryover[1]
			Million tons		
Wheat	1996/97	583.0	113.9	578.6	109.1
	1997/98	596.4	109.0	581.0	124.5
Corn	1996/97	590.7	68.1	570.5	86.3
	1997/98	572.1	70.6	587.6	70.8
Barley	1996/97	153.7	16.0	148.9	23.7
	1997/98	149.7	15.6	150.7	22.7
Rice	1996/97	380.7	18.7	376.6	54.6
	1997/98	379.3	19.2	380.5	53.4
Oilseeds[4]	1996/97	257.3	46.5	216.8	16.5
	1997/98	275.0	49.8	222.3	22.7
Soybeans[4]	1996/97	131.7	35.8	135.5	13.0
	1997/98	147.1	38.0	140.6	19.4
Soybean meal[4]	1996/97	91.3	33.2	91.7	4.0
	1997/98	95.5	35.0	95.5	3.9
Soybean oil[4]	1996/97	20.5	5.7	20.5	2.3
	1997/98	21.6	6.0	21.6	2.4
			Million bales		
Cotton	1996/97	88.5	26.6	86.6	37.0
	1997/98	87.3	27.8	88.5	35.9

NA = Not available.
[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

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Specialty Crops

New Markets Boost U.S. Tobacco Prospects

U.S. tobacco production is expected to reach 1.63 billion pounds in 1997, outpacing last years's output by nearly 7 percent and well above recent averages. Tobacco acreage expanded by about 8.5 percent in response to higher production quotas for *flue-cured* and *burley* tobacco.

Flue-cured and *burley* are the two major types of tobacco grown in the U.S., accounting for 95 percent of the crop. Both are used almost exclusively to produce cigarettes. In 1996, both types were adversely affected by disease and weather, resulting in tight supplies and high auction prices. As a result, the 1997 effective quota for *flue-cured* tobacco—the amount growers can sell, adjusted for over- and undermarketings of the previous year—is up 8 percent to 1,019.4 million pounds, and the *burley* effective quota is up 22 percent to 880 million pounds.

U.S. tobacco is grown mostly in the Southeast, with six states producing the majority of the crop. North Carolina and Kentucky, the two largest producers, account for about 65 percent of total U.S. production. North Carolina is the major state producing *flue-cured*, which is distinguished by its curing under heat in an air-tight barn or container. Kentucky is the leading *burley* producer, followed by Tennessee. *Burley* leaf is cured by hanging the entire stalk of tobacco in a barn with openings that allow outside air to circulate among the leaves. It is more dependent on ambient temperature and humidity during the curing process than flue-cured tobacco.

Commodity Briefs

This year's *flue-cured* crop is relatively good, though the quality will likely be slightly below the crops of the last 2 years. A mild winter followed by a prolonged cool, damp spring curtailed early plant development, and very hot weather in July caused additional stress to the crop. Wet weather during planting increased concerns among growers about the risk of damage from blue mold, a fungus which attacks tobacco leaves, although reports suggest little damage has occurred. The hot, dry weather which has limited the spread of blue mold, however, has itself become a threat to the growing crop. Yields in North Carolina and other *flue-cured* producing states are expected to be about 2 percent lower than in 1996, and are slightly lower than the 10-year average.

Burley faced similar growing conditions. A long, cool, wet spring delayed planting and left tobacco plants with minimal root systems. Then in July, severe drought caused considerable stress to the vulnerable crop.

The 1997 *flue-cured* tobacco marketing season opened in Florida and Georgia on July 22, followed shortly by market openings in South Carolina and the Border Belt of North Carolina and Virginia. Prices through the third week of the season were about 3 percent lower than last year. *Burley* auctions will open in *burley*-growing states in November and continue through February.

The U.S. is the second-largest tobacco producing country behind China, and alternates with Brazil as the largest exporter, depending on yearly crop conditions in the two countries. The U.S. is also the largest importer of tobacco leaf, exporting high-quality flue-cured and burley leaf and importing cheaper, lower quality leaf to blend with domestic tobacco to reduce cigarette production costs. U.S. imports also include types of tobacco not grown domestically.

U.S. *exports* of unmanufactured tobacco leaf in 1996 advanced 5 percent over a year earlier to 486 million pounds declared weight, the highest since 1992. Japan and the European Union (EU) are the major destinations for U.S. leaf, although exports to other Pacific Rim nations are increasing. Importing countries use high-quality U.S. tobacco to improve their cigarette blends and enhance the cigarette flavor. In 1996, exports to Asia and Africa declined, while shipments to Europe advanced 21 percent as a result of increased European cigarette production.

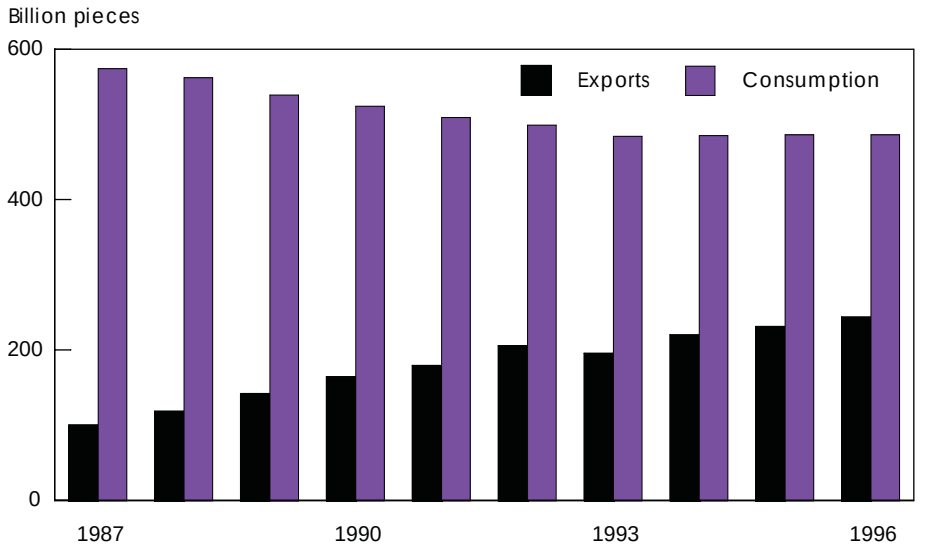
Leaf *imports* for consumption to the U.S. surged 59 percent in 1996 after declining the previous year. Stocks of imported leaf were being replenished after a tariff-rate quota replaced a 25-percent limit on foreign tobacco content in U.S.-produced cigarettes in 1996. Imports in 1996 reached 668 million pounds, a gain of 59 percent. Oriental tobacco, a type of leaf not grown in the U.S., makes up about 14 percent of a typical U.S. cigarette. Manufacturers also use cheaper imported *flue-cured* and *burley* leaf in cigarettes, especially lower priced cigarettes known as discount brands.

The U.S. cigarette industry is the second largest in the world, behind China. About two-thirds of the cigarettes produced in the U.S. are consumed here, and the remaining third are exported. The major markets for U.S. cigarettes are the EU and Japan, and new markets are opening around the Pacific Rim and in the Newly Independent States of the former Soviet Union.

Although domestic cigarette consumption has been virtually constant for the past 4 years, cigarette exports have continued to rise, pushing U.S. cigarette output to a record 755 billion pieces in 1996. U.S. cigarettes have achieved a high level of popularity worldwide, and demand is increasing as the number of smokers expands and higher incomes enable consumers to purchase more expensive foreign cigarettes. About a third of U.S.-produced tobacco is used in exported cigarettes, and increased exports have boosted purchases at U.S. auction warehouses.

Per capita cigarette consumption in the U.S. has been falling for two decades, although population growth has limited the overall decline in consumption. During the past 10 years, cigarette consumption declined 15 percent—from 575 to 487 billion cigarettes, while per capita consumption fell 22 percent—from 3,047 to 2,390 cigarettes per person. Increased awareness and publicity about links between smoking and disease, restrictions on permissible smoking areas, and increasing cigarette prices have led to lower U.S. demand for cigarettes.

Cigarette Exports Rise As Domestic Consumption Levels Off



Economic Research Service, USDA

Tobacco Program: Quotas & Price Support

Flue-cured and *burley* marketings are restricted by the tobacco program, which limits the quantity of leaf that may be marketed without a penalty and sets a support price for each grade and type of tobacco. The purpose of the program is to ensure a stable market and reduce fluctuations in grower income.

The basic tobacco quota for *flue-cured* and *burley* is based on the quantity of leaf cigarette manufacturers indicate they will purchase, the previous 3 years' exports, and the amount of reserve stocks on hand. The basic quota is adjusted by previous years' over- and undermarketings to calculate the effective quota, the actual amount growers can market. The national quota is allocated among quota owners according to the proportion of the total quota they own.

The support price or loan rate for each type and grade of tobacco is set by adjusting the previous year's loan rate by the cost-of-production index and changes in the 5-year moving average of prices. Costs of operating the price support program are borne by the growers and buyers of tobacco leaf through an assessment levied on each pound of tobacco sold.

The cigarette industry and tobacco producers continue to face numerous challenges. The recent Federal budget agreement signed into law included a cigarette tax increase—beginning at 10 cents per pack in 2000 and rising to 15 cents in 2002—which will have a further dampening effect on consumption. As cigarette consumption continues to fall, demand for domestically produced leaf will become more dependent on the export market.

State attorneys general and U.S. cigarette manufacturers completed negotiations on a comprehensive settlement of litigation on liability for cigarette-related illnesses on June 20 of this year. The agreement requires congressional approval and will face intense scrutiny.

In its current form, the proposed agreement would require cigarette manufacturers to pay up to $368 billion over 25 years to settle lawsuits and reimburse states for smoking-related Medicaid expenses. The settlement also contains provisions that restrict forms of advertising, hold cigarette manufacturers responsible for reducing teen smoking, and require cigarette companies to fund smoking cessation programs. The agreement's provisions would likely lead to a 25-50-cent increase in the retail price of cigarettes.

In exchange, manufacturers would receive immunity from future punitive damage claims resulting from past actions. The final form of the settlement and thus its impact on the industry will not be known until Congress approves legislation codifying the agreement.

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September Releases—USDA's Agricultural Statistics Board

The following reports are issued electronically at 3 p.m. (ET) unless otherwise indicated.

September

2 *Crop Progress (after 4 pm)*
3 *Broiler Hatchery*
Egg Products
4 *Dairy Products*
Poultry Slaughter
8 *Crop Progress (after 4 pm)*
10 *Broiler Hatchery*
Vegetables
11 *Turkey Hatchery*
12 *Cotton Ginnings (8:30 am)*
Crop Production (8:30 am)
15 *Milk Production*
Crop Progress (after 4 pm)
17 *Broiler Hatchery*
18 *Hop Stocks*
19 *Cattle On Feed*
Cold Storage
22 *Chickens & Eggs*
Potatoes
Crop Progress (after 4 pm)
23 *Catfish Processing*
Citrus Fruits
24 *Broiler Hatchery*
25 *Cotton Ginnings (8:30 am)*
26 *Hogs & Pigs*
Livestock Slaughter
Peanut Stocks & Processing
Trout Production
29 *Agricultural Prices*
Crop Progress (after 4 pm)
30 *Grain Stocks (8:30 am)*
Small Grains Summary (8:30 am)

Commodity Spotlight

Market Braces for Record U.S. Soybean Crop

This year's soybean acreage is strong evidence that a major goal of the 1996 farm legislation—to increase market orientation—has been achieved. U.S. farmers have more flexibility to plant as many soybeans as they believe may be sold to growing domestic and international markets.

Acreage and crop conditions to date suggest a record 1997 U.S. soybean crop. Soybean marketers will have to turn to growing international as well as domestic markets to sell the expected 1997 bumper crop.

U.S. soybean farmers responded to this spring's strong prices by planting an estimated 70.9 million acres, up 10 percent and the highest in 15 years, according to USDA's June *Acreage* report. This would be the third-largest soybean area planted on record and the first time in history that U.S. planted acreage for soybeans has exceeded wheat area. The bumper crop is expected to pressure 1997/98 U.S. farm prices into the range of $5.40-$6.60 per bushel, down sharply from 1996/97's estimated season average of $7.38.

Expected record supplies are projected to lift both domestic crush and U.S. soybean exports to record volumes of 1.485 billion and 0.945 billion bushels, respectively. Recent trade agreements that have removed international barriers and opened U.S. export markets should provide a welcome boost. However, sensitivity in some European markets to the importation of new, genetically modified soybeans, and related discussions of product labeling, represent potential hurdles for future U.S. exports.

1996 Farm Act Facilitates Acreage Gains

Prior to 1996, each farmer participating in the commodity programs had an established crop-specific base acreage for wheat, feed grains, cotton, or rice. Government program payments for most crops were based on a 5-year average of acreage planted or considered planted to program crops. Soybeans were not among the commodities for which farmers received payments.

Farmers were frequently reluctant to risk reducing future deficiency payments by chasing potentially temporary spikes in soybean prices and planting soybeans instead of program crops. Consequently, high cash prices for soybeans did not always provide enough incentive to summon the amount of U.S. acreage needed to satisfy growth in world market demand. Instead, foreign producers were often left with an opportunity to capture these gains. Between 1985 and 1995, combined Brazilian and Argentine soybean production increased 69 percent, compared with U.S. growth of only 4 percent.

Farm legislation in 1990 initiated greater planting flexibility by excluding 15 percent of each producer's base acreage from deficiency payments. Program participants were allowed to plant any field crop on the excluded acreage without sacrificing base acreage and future payment eligibility. The 1996 Farm Act completely eliminated any link between farm payments and the crops grown. Expected relative market returns between crops has become the major determinant for crop selection.

Farm prices for soybeans climbed above $8 per bushel this spring, the highest level since the 1988 drought as the market rationed dwindling stocks. Despite a relatively large 1996 harvest, it became apparent early in the year that robust domestic use and exports were drawing down U.S. stocks of soybeans rapidly and driving the price rise. Projected yearend stocks of 125 million bushels for the September-August 1996/97 marketing year would be the smallest inventory in two decades.

Farmers responded to last spring's very attractive price signals by expanding soybean planting, mostly at the expense of corn, wheat, and sorghum acreage. Every state will have more soybean area this year, with the sole exception of Ohio, which held to its 1996 record acreage.

Spring planting conditions for soybeans were nearly ideal this year, unlike the very late start in 1996. Moisture this summer has been favorable, pushing the U.S. average soybean yield forecast to 39.3 bushels per acre, second only to 1994/95's 41.4 and up from last year's 37.6. The combination of high acreage and yields is expected easily to push 1997/98 soybean production beyond the 1994/95 record of 2.517 billion bushels. As of August 12, 1997 production was forecast at a record 2.744 billion bushels. The final output will depend on growing conditions through harvest, which is expected in September and October for most of the crop.

To supplement tight U.S. supplies, the first-ever shipments of soybeans from Brazil began arriving this summer. Larger imports were made possible by a historically wide price differential between U.S. and Brazilian ports. These imports will be a short-lived phenomenon and will likely revert to only 5 million bushels in 1997/98 as record U.S. supplies become available. In fact, both Brazil and Argentina will likely import new-crop U.S. soybeans later this year, crush them, and export the products. By then U.S. soybean prices will be much lower, and domestic supplies available to South American crushers will be very short because of Brazil's prolific summer

exports and a drought-reduced harvest in Argentina.

The U.S. is not the only country where farmers have responded to strong world soybean prices. The world's second-leading producer of soybeans, Brazil, is also expected to produce a record harvest next year. Attractive soybean prices, an improved farm debt situation, and improvements in transportation infrastructure are encouraging Brazilian farmers to plant more soybeans than ever, including some land never before farmed.

A 1996 policy change eliminated Brazil's system of differential export taxes that had been used to encourage domestic processing. For soybeans, eliminating the tax not only filtered down to producers in the form of higher prices at the farm, but also erased domestic processors' advantage over soybean exporters. As a result, soybean exports from Brazil dramatically increased last spring and summer, more than double the previous year's volume. However, Brazilian crushers have been compelled to operate their facilities at a reduced level this year as foreign buyers have outbid them for domestic supplies.

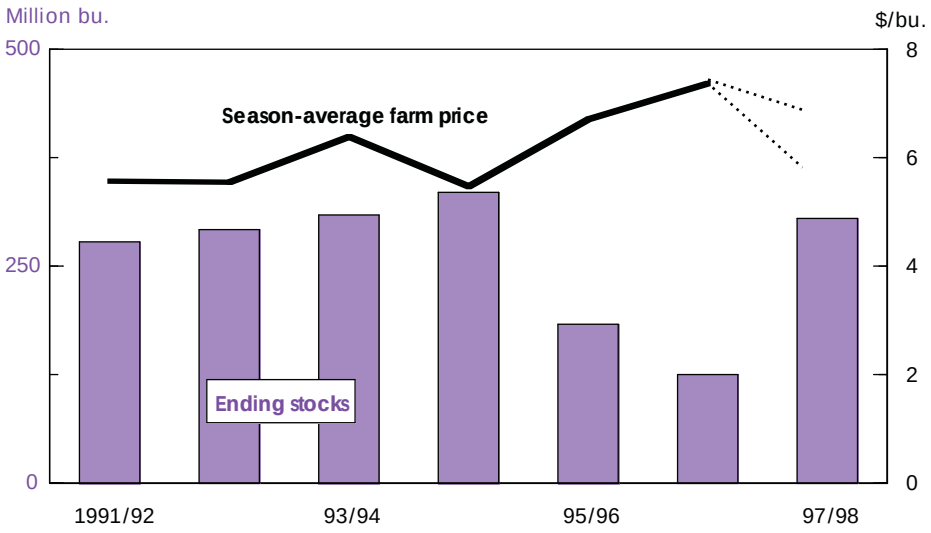
Together, the U.S. and Brazil accounted for 70 percent of global soybean output in 1996/97, with shares of 51 and 19 percent. A larger crop is also projected for the world's third-largest producer, Argentina (9-percent world share in 1996/97), on the strength of expanded area and improved yields.

Trade Pacts Boost Growth In Key U.S. Markets

Recent trade pacts are expected to increase U.S. exports to two key markets—the European Union (EU) and Mexico—while growing demand is improving prospects in China.

The *European Union* is the world's largest import market for soybeans and soybean meal. In 1995/96, U.S. soybean exports to the EU were 7.8 million metric tons (valued at $2.1 billion), about one-third of total U.S. soybean trade. U.S. soybean *meal* exports to the EU totaled 0.9 million tons (nearly $200 million), about 15 percent of total U.S. soybean meal trade. EU soybean imports in 1997/98 are expected to slip because of record EU oilseed production, although imports of soybean *meal* should rebound following a mild downturn the past 2 years.

Soybean Prices to Dip As Stocks Recover



1996/97 estimated, 1997/98 projected range.

Economic Research Service, USDA

In 1992 the U.S. and EU completed bilateral trade negotiations that produced a common U.S.-EU position—known as the Blair House agreement—with respect to several unresolved agricultural issues in the then-ongoing Uruguay Round of trade negotiations. Under the terms of a side accord to the Blair House agreement, the EU committed to a maximum area for oilseed production with penalties for overplanting.

EU producers are currently very close to their maximum allowed oilseeds area, if not already in excess. Thus, future growth in protein meal demand must be increasingly filled by non-EU sources. Imports of sunflowerseed from the Newly Independent States of the former Soviet Union, and Eastern European countries (which lack adequate processing facilities), have risen in recent years. By processing high-oil-type oilseeds, the EU is self-sufficient in vegetable oil production. However, substantial EU soybean imports from the U.S. and South America are still necessary to obtain the superior protein meal of those exporting regions.

U.S. trade barriers with *Mexico*, one of the world's most rapidly growing soybean customers, have been falling since implementation of the North American Free Trade Agreement (NAFTA). Prior to NAFTA, Mexico had a seasonal tariff of 15 percent on U.S. soybeans. Under the treaty this tariff, as well as duties on soybean meal and oil, will be phased out over 10 years, giving the U.S. a unique advantage in supplying this expanding market. Improvements in Mexico's rail links at the border have also expedited oilseed trade between the two countries.

Since 1994 implementation of NAFTA, the *value* of annual U.S. exports of soybeans to Mexico has increased 50 percent. However, the increase was not all due to NAFTA implementation. The initial years of NAFTA coincided with significant changes in the domestic agricultural policies of the U.S., Canada, and Mexico and in the global trade policy environment. In addition, the peso crisis and subsequent recession in Mexico seriously disrupted trade in 1995, overwhelming the effects of the early tariff reductions under NAFTA. Further, adverse weather conditions, which affected Mexican grain and cattle production, influenced trade in several agricultural commodities in North American markets.

Commodity Spotlight

ERS analysis which isolated the economic impacts of NAFTA from other developments estimated that U.S. soybean exports to Mexico were 2-5 percent higher in 1996 than they would have been without the reduction in trade barriers under NAFTA.

For 1997/98, import *volume* is forecast nearly 30 percent above 5 years earlier. Cumulative 1997 Mexican soybean imports from the U.S. to date are 16 percent above a year ago. Mexico's rapidly expanding crushing capacity is supplied almost entirely by U.S. exports. Very little soybean production now exists in Mexico following the dramatic rise in less costly imports from the U.S. and substantial reforms in Mexican farm policy. On the other hand, Mexican soybean oil imports have been cut because of the greater oil supplies being produced by domestic processors.

China was traditionally a net exporter of soybeans and soybean meal, mainly supplying other Asian markets. In the 1993/94 marketing year, China exported 1.1 million metric tons of soybeans and 1.05 million tons of soybean meal. However, a rapidly expanding domestic market is cutting into exportable supplies. Only 200,000 tons of soybeans and 30,000 tons of soybean meal are projected to be exported from China in 1997/98.

With greater harvested area projected for 1997/98, China's soybean output is forecast up 7 percent. Even with a larger domestic output, booming consumption has transformed China into a major importer. While China's per capita consumption of meat and cooking oils is still among the world's lowest, rising incomes have led to greater spending by Chinese consumers in recent years to improve diets. Since 1991, China's total soybean consumption has nearly doubled. This has required imports of soybeans and soybean products to supplement domestic supplies.

China's domestic soybean production has lagged behind demand because of inefficient price and marketing systems and outdated technology. Moreover, China's agricultural policy typically skews producer prices in favor of rice, wheat, corn, and cotton production, making it difficult to expand soybean area. The government procurement price paid to Chinese soybean farmers by local grain bureaus is usually lower than the world market price. And internal taxes between provinces discourage movement from major northern producing regions to the main consumption centers in the south, making it more practical for these southern areas to import from abroad.

China's imports of soybeans and soybean meal have catapulted from only 160,000 and 50,000 tons in 1994/95 to projected levels of 2.7 and 3.35 million tons in 1997/98. Just 2 years ago, China imported only 3 percent of the soybean volume of Japan, the world's largest soybean importing country. In 1997/98, China's soybean imports are projected to be more than half the volume of Japan's, making China the world's fourth-largest importing country. Dryness in some regions has already cut into current production and could push China's soybean and soybean product imports even higher.

Transgenic Soybeans Face Trade Hurdles

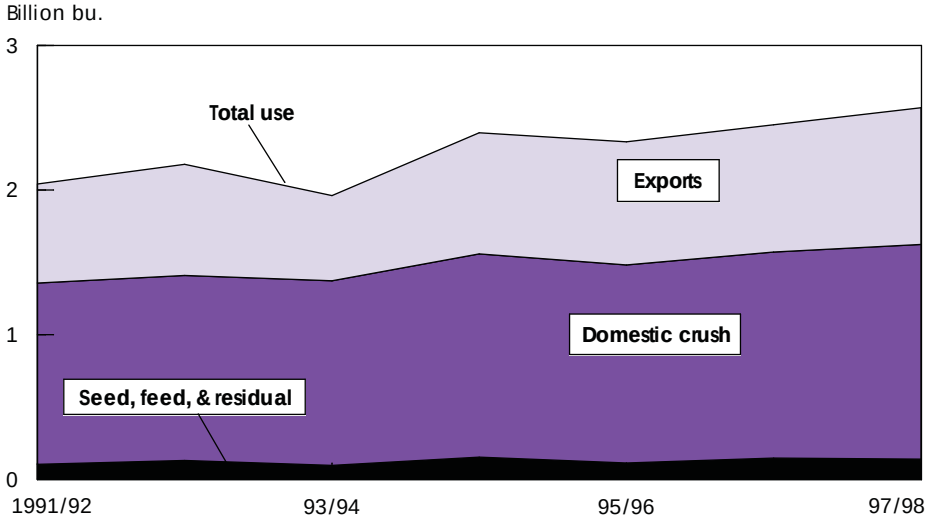
The development of genetically modified soybeans has the potential to reduce U.S. farmers' production costs. But these commodities face a number of hurdles in the trade arena. Upon approval in 1995, the first significant U.S. commercial production of transgenic soybeans—genetically modified to be herbicide resistant—began last year, with more than 1 million acres harvested. Industry estimates are that 12-15 percent of the 1997/98 U.S. crop will be from transgenic soybean seed and could be double that level in 1997/98.

One advantage many farmers may gain by producing such varieties is the cost savings from fewer herbicide applications—reduced by one-third—without yield loss. Although herbicide-resistant seed costs are higher than standard varieties, the cost savings can be substantial for farmers with significant weed problems. Other genetically modified soybeans that may be commercially produced within a few years would enhance the use properties and fat composition of the oil, although their high value would segregate them from conventional uses in the market.

Producers in Argentina are also planting the herbicide-resistant soybean, as seed adaptable for these areas becomes available. Argentine producers may harvest an estimated 3.25 million acres in 1998.

Prior to 1997, Brazil had no plant variety protection legislation that would safeguard the patent rights of seed developers. This prevented seed research and devel-

Soybean Crush and Exports to Reach Record-High Levels



1996/97 estimated, 1997/98 projected.

Economic Research Service, USDA

opment within Brazil, including bio-engineered seeds. Now, with such legislation in place, experimental production of transgenic soybeans is occurring, but commercial output awaits government approval.

EU protein meal needs declined in 1996 when meat consumption dropped because of the bovine spongiform encephalopathy or "mad cow" disease crisis that devastated British beef production (*AO* June 1996). At the same time, this food scare heightened the sensitivity of EU countries toward genetically modified organisms (GMO's) in their food supplies, including the herbicide-resistant soybeans.

In 1996, the EU approved imports of these soybeans, concluding that processing them into oil and meal destroyed any novel genetic material. However, given the area constraints on EU oilseed production, and the increasing amounts of U.S.-produced GMO soybean imports, some Europeans have expressed the desire for product labeling of GMO and non-GMO soybean content. There is no easy method to visually or chemically distinguish a GMO variety from conventional varieties.

In late July, the European Commission agreed to guidelines on drafting legislation for product labeling required for GMO content under its Novel Foods legislation, with final plans due late this year. For products manufactured without GMO's, no labels would be required, but certified non-GMO product could voluntarily label (e.g., "this product does not contain..."). Mandatory labeling (e.g., "this product contains...") would apply to products known and verified to consist of GMO material. For products possibly containing material of GMO origin but with no evidence available, a mandatory label (e.g., "this product may contain...") would be used.

If the final directives apply to all food or feed products produced from GMO's, such labeling could require GMO segregation beginning at the farm level. Requirements for separate storage space would be imposed on commercial handlers at great expense. Rail cars, barges, port loading facilities, and ocean freighters would have to be dedicated to GMO or non-GMO commodities. The costs of complying with such a system could seriously undermine foreign import demand for U.S. soybeans.

In 1996, Japan also approved imports of GMO soybeans. Large amounts of soybeans are used directly for food in Japan such as tofu. Japanese authorities are now facing significant popular support for regulation of transgenic food products. The well-publicized illnesses caused by contamination of some food with *e. coli* bacteria cast doubt on Japan's food safety system and still lingers in the memories of many consumers. Interest in organic soybeans by Japanese consumers has increased, although these are still very expensive and only a small component of the current market.

Under the rules of the World Trade Organization (WTO), required labeling of commodities as having GMO content could be construed as a technical barrier to trade. If the GMO's are scientifically determined to be as safe to consume as conventional varieties, the justification for labeling would not be apparent. But international consensus on this point has not yet been reached.

The U.S. Food and Drug Administration has cleared these GMO's as posing no threat to human health. Tests by USDA's Animal and Plant Health Inspection Service concluded that this soybean variety posed no risk to the natural environment. Although some countries have determined transgenic soybeans are safe, public perceptions of biotechnology have pressured other governments to ban domestic production, obtain imports from alternate origins, or require labeling. As a result, the treatment of GMO's in international trade will likely remain a subject of discussion for some time to come.

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** Update on the Conservation Reserve Program*
** International trade in cattle and beef*
** Farm labor issues*

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Texas Department of Agriculture

High Prices Pull Up U.S. Rice Acreage

U.S. farmers planted over 3 million acres of rice in 1997, up nearly 9 percent from 1996 and more than 6 percent higher than producers' planting intentions reported in March. Nearly all of the area increase was for long grain rice, grown almost exclusively in the South. The increased plantings—indicated in USDA's June *Acreage* report—were due to relatively high rice prices at planting compared with those for alternative crops grown in the South—primarily soybeans.

When the 1996 Farm Act was signed in April 1996, many industry analysts expected rice acreage to decline for a few years before stabilizing, then modestly increase to pre-1996 Farm Act levels. Expectations of declining rice area arose from provisions in the act that terminated deficiency payments and supply management programs, ending the connection between income support measures and historic production of a particular crop and giving producers much greater planting flexibility.

In fact, planted area did drop nearly 10 percent in 1996. Farmers in the South took advantage of the opportunity to switch some rice area to soybeans and in some cases to corn, as prices for these crops were very high at planting in 1996. In many of the southern rice planting areas, soybeans are regularly grown in 1- and 2-year rotations with rice to improve yields. Rice area would likely have declined even more in 1996 had rice prices not been high as well.

During the spring planting period, no year-to-year decrease in the season-average rice price was projected for the 1997/98 marketing year (August-July). But season-average farm prices for both soybeans and corn were expected to drop. At the time, both new-crop futures and monthly rice prices exceeded $10 per cwt, higher than any season-average price after 1980/81.

The 1997 U.S. rice crop is estimated at 182 million cwt, up over 6 percent from last year and the first increase since 1994's record 198-million-cwt crop. Long grain rice accounts for this year's production increase, estimated at 127.3 million cwt—12 percent above 1996. Long grain rice acreage posted an increase of over 15 percent from 1996—to 2.28 million acres—the result of stronger prices for long grain relative to other rice types.

In 1996/97, strong domestic and world demand for high-quality long grain rice, coupled with tightening U.S. long grain supplies, raised the price of southern long grain above prices for medium grain. Medium grain crops are estimated at 53.2 million cwt, down 4 percent from last year--the result of a 20-percent drop in southern medium grain plantings.

Output Up For Southern Rice

The projected gain in southern rice output for 1997 is due entirely to the increase in planted area, offsetting an expected decline in average southern yield this year to 5,546 pounds per acre, down from last year's record of 5,851. Wet weather delayed plantings along the Texas gulf coast, making the crop more susceptible to damage from weeds, diseases, and pests, as well as increasing the potential for heat stress later in the season. Cool spring weather also delayed emergence of the crop.

In addition, the delayed planting prevented most Texas producers from growing a second, "ratoon," crop by reflooding the stubble of the first. About 40 percent of Texas producers typically harvest a ratoon crop, accounting for about 10 percent of the state's total output. Cold weather this spring also delayed crop emergence in the Delta, postponing field flooding and causing many farmers to rely on herbicides to control weeds until the flood was established.

Rice area is up in five of the six rice producing states, with the greatest increases appearing in the Mississippi Delta region. Arkansas, which produces over 40 percent of the U.S. crop, accounts for 69 percent of the net gain in U.S. rice area this year. All of the increase was for long grain, the bulk of it in the Mississippi Delta region of the state, according to state extension specialists. Other states in the Delta rice-growing region reported increased acreage as well—Mississippi and Missouri expanded long grain plantings 29 and 8 percent, and state extension specialists believe northeast Louisiana plantings are up.

Texas is the only state to report declining rice area for 1997. Long grain area—which accounts for over 95 percent of the state's crop—is down 35,000 acres, a 12-percent decline, while medium grain area fell 5,000 acres, a 50-percent decline. The recent farm program changes account for some of this loss. Because of higher costs, Texas producers had relied more on farm program payments to make rice farming profitable. With the end of such programs in 1996, many Texas landowners have abandoned rice farming and moved acreage they had previously maintained to meet minimum planting requirements for rice program benefits, into other uses.

Texas rice acreage, however, had been declining steadily in recent years and is down nearly 100,000 acres from the early 1990's and nearly 300,000 since 1980/81. Texas producers face several production disadvantages compared with other southern states. First, the state is a high-cost rice producer, especially in expenses for water, which must be pumped from much deeper wells than in the Delta, and for which rice farmers compete with urban areas like Houston. Second, considerable

seed is lost to migrating blackbirds. Finally, the climate is too hot and moist for many farmers to produce an economically viable rotation crop. Many producers in Texas leave a portion of their land idle, contributing nothing to covering fixed expenses during the years when their rice land is rested.

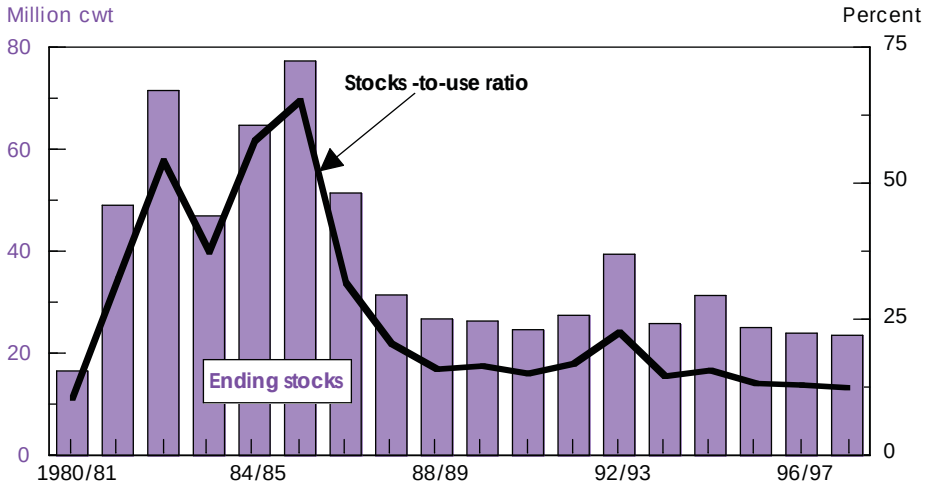
Yields in California, in contrast to the South, are expected to exceed 1996 due to very favorable weather throughout the growing season. The average yield in California is estimated at 8,200 pounds per acre, up over 9 percent from 1996. California producers achieve average yields 40 percent higher than in the South. This is due partly to the cooler, drier climate, which typically has less pest and disease problems and supports higher yielding varieties. The California "japonica"-type rice is viewed by most international buyers as superior to southern medium grain rice for direct food use and typically sells at a premium. In fact, the two largest foreign buyers of U.S. medium grain rice—Japan and Turkey—generally purchase only California rice.

California, which grows primarily medium grain rice and accounts for the bulk of the U.S. medium grain crop, reported rice plantings of 515,000 acres, up 13,000 from 1996, including a 7,000-acre increase for medium grain. An additional 5,000 acres of the increase was in short grain plantings, accounting for the entire 25-percent increase in U.S. short grain acreage. Short grain rice, grown also in Arkansas, accounts for less than 1 percent of U.S. rice area. California short grain acreage has increased steadily over the past 2 years—from 10,000 acres in 1995 to 13,000 in 1996 and 18,000 for 1997.

Rice Prices Show Steady Strength

The 1997/98 season-average farm price for rough—unhusked—rice is projected to be $9.25 to $10.25 per cwt, with the midpoint 15 cents below last season's $9.90. The 1996/97 season-average price was the highest since 1980/81, and this year's projection would be the second highest. Since 1980/81, only the 1995/96 season-average price exceeded $9 per cwt.

U.S. Rice Stocks Drop to Lowest Level Since 1980/81



Rough (unhusked) basis. August-July marketing year. 1996/97 estimated, 1997/98 projected.

Economic Research Service, USDA

U.S. rough rice typically traded at $6-$9 per cwt from 1982/83 through 1994/95, although in the mid-1980's, when exports were stagnant or declining, some monthly prices dropped to just $4-$5 per cwt, and the 1986/87 season-average farm price dropped to just $3.75 per cwt. U.S. farm-level monthly-average prices started to climb in the second half of 1995, in response to continued growth in U.S. rice consumption, a smaller U.S. crop, and increased world demand for high-quality rice imports. Since November 1995, U.S. farm prices have exceeded $9 per cwt. Monthly rice prices continued to rise during 1996/97 and have averaged over $10 per cwt since January 1997.

This spring's strong U.S. rice prices were supported by expectations of extremely tight domestic supplies, especially for long grain rice. The 1996/97 marketing year ended on July 31 with total rice stocks estimated at 23.9 million cwt and a stocks-to-use ratio of 13 percent, both down slightly from the previous year's already low values. The 1996/97 stocks and stocks-to-use ratio were the lowest since 1980/81, a year when the season-average farm price for rice was $12.80 per cwt.

For long grain rice—which accounts for nearly 70 percent of U.S. rice production—ending stocks in 1996/97 were only 9.1 million cwt, yielding a stocks-to-use ratio of 7.4 percent. In addition, the delayed planting this year in Texas—typically the first state to harvest rice—meant that the 1997 harvest began later than normal, stretching last year's stocks further and adding to the already tight long grain supply situation. Long grain stocks and stocks-to-use ratio had declined each year since 1993/94.

The medium grain situation in 1996/97 was less tight, with ending stocks estimated at 14.2 million cwt and the stocks-to-use ratio at 24 percent, although both were down from a year earlier. An 11-percent increase in production in 1996, with only a very small increase in exports in 1996/97, account for the relatively abundant medium grain supply situation.

For 1997/98, total rice ending stocks are projected to be 24 million cwt, yielding a stocks-to-use ratio of just 12.5 percent, down from 13 percent for 1996/97. The stocks-to-use ratio for 1997/98 would be the lowest since 1980/81, with 1996/97's ratio ranking second.

The larger 1997 rice crop is projected to raise long grain ending stocks in 1997/98 to 12.6 million cwt, increasing the stocks-to-use ratio to 9.5 percent. But even with these increases, the tight supply situation

will keep long grain prices strong during the 1997/98 marketing year.

For medium/short grain rice, a smaller Delta crop and essentially steady demand will pull ending stocks down 10.8 million cwt in 1997/98, lowering the stocks-to-use ratio to 18 percent.

World Rice Trade Stronger Since 1995

A contributing factor in strong U.S. rice prices has been that world trade increased to a record 21 million tons in 1995 and has remained at an elevated level since then. From 1980/81 through 1990/91, world rice trade had accounted for under 4 percent of total use and never reached 14 million tons. Since 1995, trade has accounted for almost 5 percent of total use.

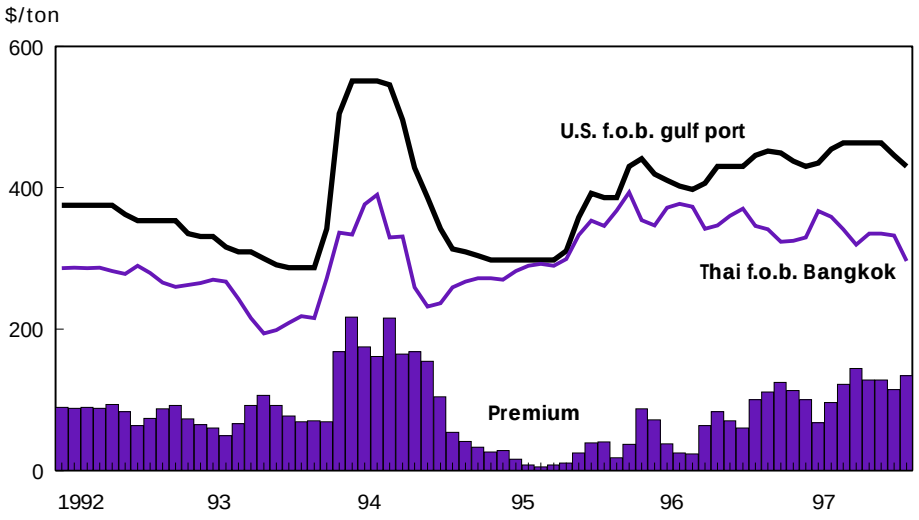
Several factors explain the higher level of world rice trade in recent years. First, strong income growth in much of Asia has led to greater demand for better quality rice by higher income urban consumers. Second, a reduction in trade barriers has opened some markets to rice trade—most importantly the partial opening of the Japanese and South Korean markets.

Japan imports almost exclusively high-quality japonica-type rice, with U.S. growers accounting for nearly half of these sales. Korea has thus far turned to India and China for its imports.

Finally, a faster rate of growth in world consumption than in production in recent years has created greater demand for imported rice. This has been particularly true for Latin America. Since 1993, Brazil has been one of the world's largest importers, typically taking over a million tons annually. Argentina and Uruguay have supplied most of Brazil's import needs.

Thailand is the world's largest exporter of rice, and trades a broad array of rice types and qualities. The U.S. exports mostly high-quality rice, primarily to the Western Hemisphere, Western Europe, some higher income Middle Eastern countries, and Japan. U.S. rice exports for 1998 are projected at 2.7 million tons, up 200,000 from 1997. The increase is a result primarily of the greater U.S. supply. U.S. exports were projected to decline along with rice acreage following the termination of deficiency payments in the 1996 Farm Act, but strong demand and larger-than-expected supplies have allowed the U.S. to remain a major exporter.

U.S. Price Premium Over Trade Competitors Has Widened



Thai 100-percent grade B and U.S. No. 2, 4 percent brokens are comparable quality milled long grain rices. Monthly-average of offer-price quotes.

Economic Research Service, USDA

World rice production is projected to be 379 million tons, just below the 1996/97 record of more than 380 million but 1.2 million tons below projected use. These projections would result in an almost 2-percent drop in ending stocks from a year earlier, yielding a stocks-to-use ratio of 14 percent, down from 14.5 percent in 1996/97. Global trade is projected to reach 18.4 million in 1998, up from 17.9 million this year and the third highest on record. The combination of tighter supplies and greater trade limit the likelihood of any drop in trading prices from the already high levels of 1996/97.

El Nino Delays Asian Monsoon

El Nino—a periodic warming of the tropical Pacific Ocean that alters weather patterns in tropical and subtropical regions—is currently affecting weather in parts of Asia, western South America, and Australia and will continue to affect weather into the spring of 1998. While current projections assume normal weather for the remainder of the 1997/98 crop year, analysts will closely monitor El Nino for any potential impacts on crop production.

Thus far, the weather effects of El Nino have included a delayed and erratic monsoon in parts of South and Southeast Asia, which has disrupted normal rainfall patterns in several major rice producing and exporting countries. About 90 percent of the world's rice crop is grown in Asia, with much of the Asian crop dependent on the timing and consistency of the monsoon.

Rice growing areas in Thailand—the world's largest rice exporting country—and in the Philippines and Indonesia—two of the world's largest rice importing countries—are experiencing droughts. Drought has also affected the primary rice growing region of Australia. In contrast, India and Bangladesh have experienced heavy rain and flooding in their main rice growing areas. Parts of western South America have faced torrential rains as well.

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Policy

Jack Harrison

1996 Farm Act Sets Stage for Acreage Shifts

In the first two seasons under the new farm legislation, U.S. farmers adjusted their planting decisions to take advantage of strong crop prices. In 1996, total acreage planted to principal crops rose more than 16 million acres to 334.5 million, with acreage in 1997 remaining nearly unchanged from the 1996 level.

The Federal Agriculture Improvement and Reform Act of 1996 (1996 Farm Act) allows farmers more flexibility to respond to strong market price signals (*AO Supplement* April 1996). The eight major crops most affected by the change in policy are wheat, corn, sorghum, barley, oats, upland cotton, rice—all previously covered by supply management programs—and soybeans. Total plantings for these eight crops rose from about 245 million acres in 1995 to 261.6 million in 1996, falling only slightly to 261 million in 1997. These crops accounted for virtually all of the changes in principal crop acreage during the past 2 years.

Increased total acreage reflects the supply response to higher absolute prices. In addition, a change in the mix of planted crops is a response to changes in relative prices among the crops, combined with some year-specific weather-related events. Increased planting flexibility under the new farm legislation facilitated producers' ability to change land use.

The farm legislation enacted in 1996 made important changes in the nature of government commodity programs, including supply management for major field crops. The 1996 Farm Act increased farmers' planting flexibility by eliminating acreage reduction programs (ARP's), base acreage planting requirements to maintain eligibility for program payments, and limits on flex acreage that farmers could plant to other crops. The increased planting flexibility has facilitated producers' ability to adjust both total land use and the cropping mix over the past 2 years. Some planting constraints continue for program participants under the 1996 act, in the provisions for conservation of highly erodible lands and protection of wetlands.

Under a continuation of previous farm law, higher prices in 1996 and 1997 would have brought additional land into production from previously idled acres, and 25-percent planting flexibility would have allowed switching among crops (15 percent "normal" flex acres and 10 percent optional). However, base acreage considerations, limited flexibility, and ARP's would likely have constrained acreage adjustments farmers could make to the large runup in prices and to the price relationships among crops. This spring, for example, soybean prices exceeding $8 a bushel were high in relation to prices for competing crops such as corn.

By removing the base acreage planting constraints and flexibility limitations of previous farm law, the 1996 Farm Act permitted a faster supply response to the economic incentives provided by absolute and relative price movements. Greater ability of producers to respond to signals from the marketplace results in agricultural production being economically more efficient.

The significant gain in the 1996 aggregate acreage planted to major field crops was due largely to higher prices for most major field crops, combined with commodity program changes that increased planting flexibility. Some of the 1996 acreage increase resulted from double counting of failed winter wheat land that was replanted to alternative spring-planted crops. In 1997, total plantings remained near the 1996 level, but a new set of relative prices led to a different mix of crops planted.

Land idled in 1995 likely provided much of the acreage gains during the past 2 years, brought into use in response to high price incentives. In 1995, the last year under the previous farm law, nearly 5 million acres had been idled under corn and rice ARP requirements. Flex acreage voluntarily left idle by farmers accounted for an additional 5 million acres. Another 13.6 million acres had been idled under voluntary 0,50/85-92 programs.

Within the higher acreage total of the last 2 years, changes in the mix of crops planted have resulted from relative price shifts among various crops combined with year-specific weather-related events. Large acreage shifts to corn and spring wheat in 1996 and to soybeans in 1997 reflected price incentives that favored planting those crops rather than competing crops, as well as some weather-induced planting adjustments.

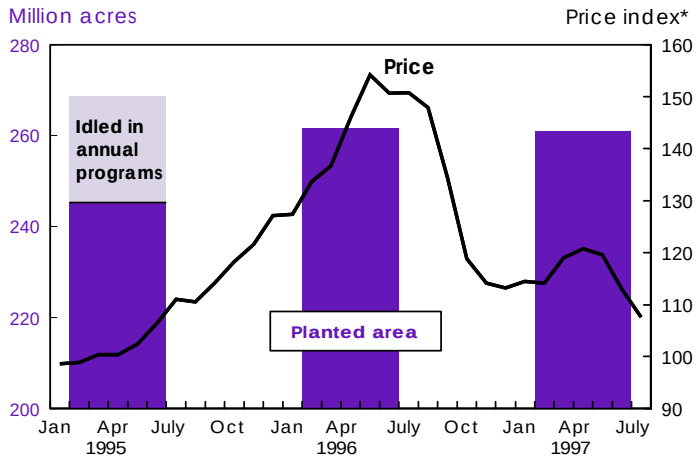
For 1996, in eight southeastern and Delta states (Arkansas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, North Carolina, and Tennessee), corn acreage increased sharply and soybean plantings rose, while upland cotton and rice acreage fell. Corn prices in the spring planting season were very attractive relative to cotton prices, and opportunities for early harvest provided additional incentives for the shift to corn. In 1997, soybean plantings grew further in these states as strong soybean prices drew acres from upland cotton, corn, and wheat. Rice acreage also rose in 1997, reflecting strong prices this year.

In Texas, Oklahoma, and Kansas, acreage rose sharply for sorghum in 1996, due in part to its strong prices. Sorghum gains also reflected replanting of failed winter wheat area to sorghum and drought-induced shifts from cotton in Texas. In 1997, total planted area in these states is smaller partly because of the double

Policy

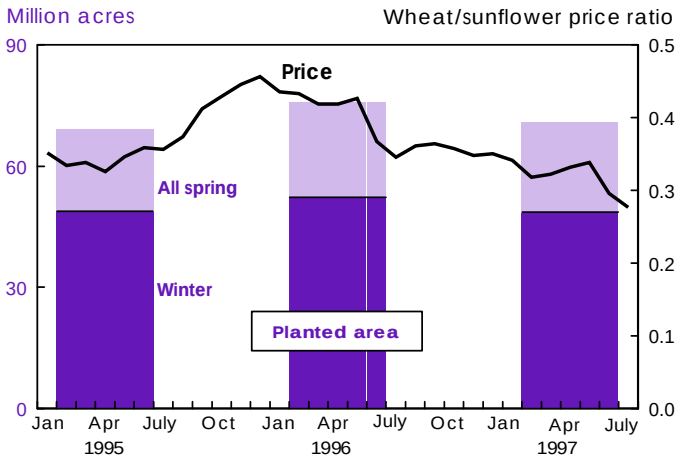
Relative Commodity Prices Are a Key Factor in Planting Decisions

8 Major Crops

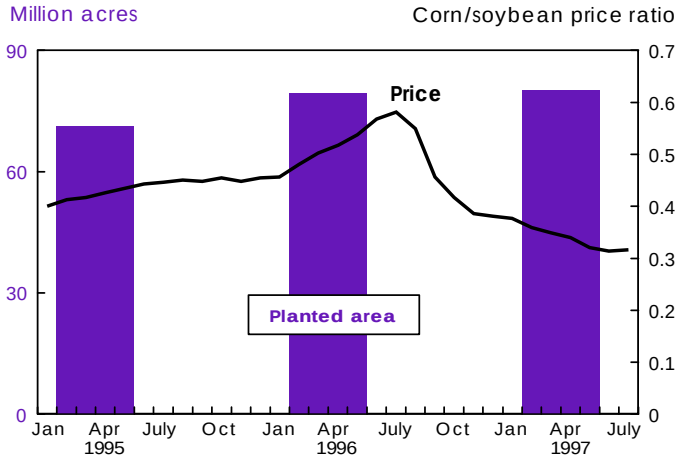


Wheat, corn, sorghum, barley, oats, rice, upland cotton, and soybeans.
*1990-92=100

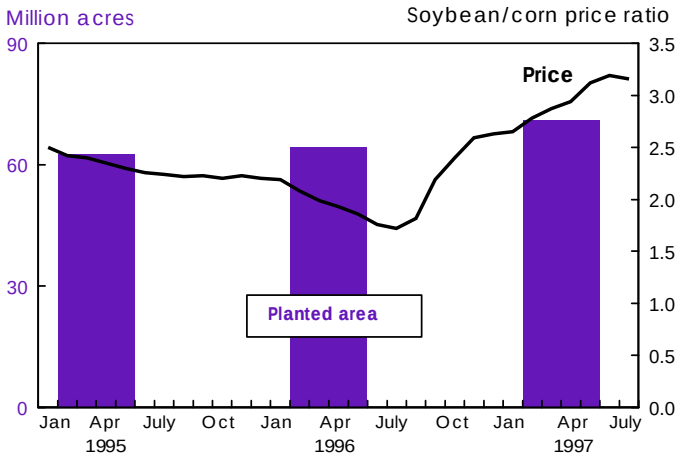
Wheat



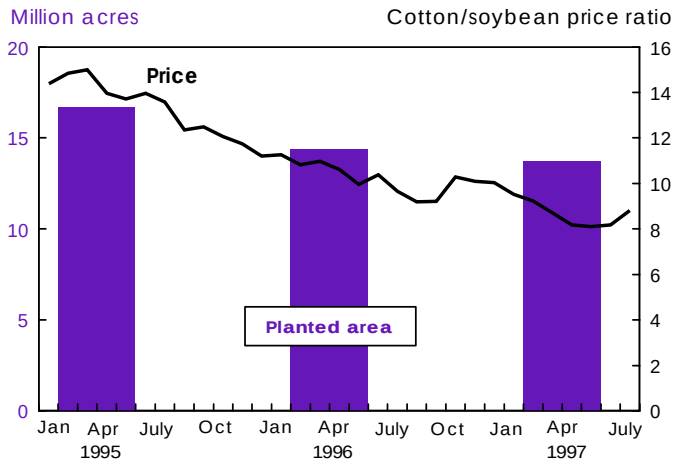
Corn



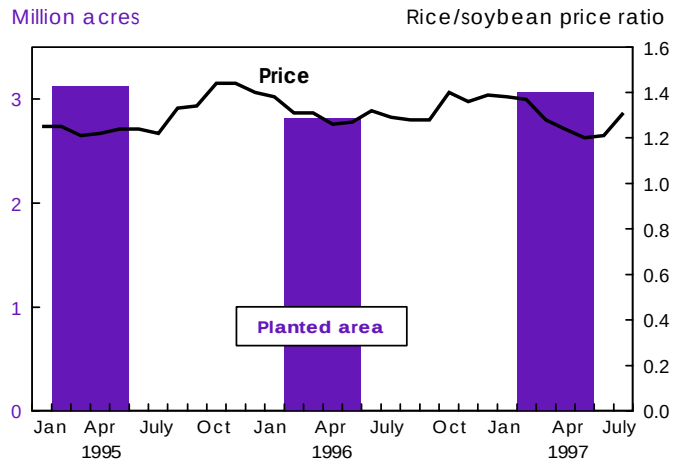
Soybeans



Upland Cotton



Rice



Economic Research Service, USDA

counting in 1996 of failed winter wheat land that was replanted. Plantings of sorghum in 1997 declined sharply as its prices fell relative to wheat and cotton, although sorghum area remained above 1995 levels.

In Minnesota, North Dakota, and South Dakota, strong prices in 1996 pushed up total plantings. For the three-state total, the increase in plantings was about equal to the amount of land idled under annual commodity programs in the previous year. Spring wheat and corn captured most of the 1996 acreage gain, reflecting higher relative prices, with soybeans and barley rising less. Notably, high wheat prices in the spring of 1996, following the reduction in winter wheat production potential in other regions of the country, provided a strong incentive for spring wheat area expansion. Also, acreage planted to sunflowers and other minor oilseeds fell in 1996, reflecting lower prices relative to wheat.

Some of the 1996 gain in spring wheat acreage likely occurred on land typically in summer fallow, as plantings were no longer limited to the program crop acreage base of prior law. In particular, 1996 wheat plantings in North Dakota equaled that state's 1995 wheat acreage base plus about two-thirds of the 1995 total normal flex acreage of other program crops. This suggests that 1996 North Dakota wheat plantings would have been hard to achieve within the program bounds of previous legislation.

For 1997, in contrast, strong soybean prices relative to corn, wheat, and barley shifted land in the tri-state region to soybeans from those competing crops. Acreage planted to minor oilseed crops also rebounded somewhat this year on the strength of oilseed prices.

In the Corn Belt, a large increase in 1996 plantings came mostly from land idled under annual commodity programs in the previous year. Strong prices for corn relative to competing crops led to corn plantings capturing nearly all of the region's increase in total acreage. Additional increases in Corn Belt plantings in 1997 pushed the 2-year gain in acreage above the amount of land idled under annual commodity programs in 1995. Strong soybean prices relative to corn and wheat prices shifted land to soybeans in the region for 1997, with corn acres rising less and wheat area falling. The nearly complete planting flexibility helped in attaining these adjustments.

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Florida Tourism Industry Marketing Corp.

Restoring the Everglades: Challenges for Agriculture

One of the most ambitious environmental restoration efforts—the South Florida Ecosystem Restoration Project—is now underway to restore the natural functions of the Everglades watershed. The Florida Everglades watershed is among the world's most productive and biologically diverse wetland/estuarine ecosystems. But urban and agricultural development in south Florida, supported by past public policies, has resulted in significant damage to the Everglades' natural systems.

Restoration of natural systems, combined with a rapidly expanding urban sector, will place increasing demands on the agricultural sector to adjust traditional patterns of land and water use. But the precise demands on agriculture, and the appropriate mix of strategies to meet those demands, are not fully known. An economic analysis can aid in developing restoration strategies that balance resource allocations among competing uses. Economic analysis provides a framework to assess the tradeoffs and potential joint benefits between agricultural, urban, and environmental demands.

Development & Its Impacts

The historic Everglades basin—extending from the Kissimmee River drainage to the Florida Bay—was a vast system of hydrologically connected wetlands and a rich mosaic of smaller micro-ecosystems reflecting different topographic features and soil types, small-scale climatic variation, and frequent natural disturbances. Over the years, the various wetland plant communities provided an abundance of wildlife habitat and sufficient habitat diversity to sustain populations through natural disturbances such as flooding, drought, fire, and tropical storms. Waterflows through the watershed tended to follow a predictable seasonal pattern—critical to life cycles of native wildlife.

During the wet summer-to-fall season, Lake Okeechobee—the heart of the regional hydrologic system—would swell and overflow with heavy runoff from northern tributary basins, forming a vast, slow-moving "river of grass" through the Everglades marsh roughly 50 miles wide and extending 100 miles south to the Florida Bay and Gulf estuaries. As floodwaters receded during the dry season, moisture stored in the thick peat soils of the Everglades would help to maintain surface water in wetlands and deepwater sloughs, providing continued freshwater flows to the marsh and coastal estuaries throughout the year and across multiple dry years. The naturally low nutrient content of the water accounted for the rather sparse, open character of much of the Everglades marsh—providing well-oxygenated conditions for many aquatic species at the base of the food chain.

Human settlement and economic expansion have profoundly altered the Everglades. Wetland conversion for agricultural and urban uses substantially reduced available land for wildlife habitat, natural environmental functions, and opportunities for recreation and other services. Of the remaining wetlands, large areas are seriously degraded due to disruptions in natural water flows and impaired water quality, with dramatic effects on native wildlife, including changes in community composition, loss of biodiversity, and risk of extinction for many species. Moreover, the continued decline in natural systems threatens the

The Central & South Florida Project

The Central and South Florida Project (C&SFP) is the primary means of drainage, water supply, and flood control for agricultural, urban, and environmental purposes in south Florida. The U.S. Army Corps of Engineers (USACE) has had lead responsibility for project design and construction. The South Florida Water Management District, a regional public agency, manages the system in cooperation with the USACE.

Project construction extended from the mid-1950's through the mid-1980's—with main features essentially in place by the mid-1960's. Construction costs totaled $252 million between 1950 and 1985, 80 percent financed through the Federal government.

The C&SFP represents regional water management on a massive scale. Encompassing an 18,000-square-mile service area stretching from Orlando to the Florida Bay, the project includes more than 1,400 miles of canals and levees, with pumping stations, locks, floodgates and other water control structures.

Main components of the C&SFP infrastructure are the upper Kissimmee basin impoundments and channelized Kissimmee River; the Lake Okeechobee levee and pumping system; the Everglades Agricultural Area, a large area of the northern Everglades designated for agriculture; three Water Conservation Areas consisting of five pools managed primarily for water supply and flood-control purposes; and the perimeter levee through the eastern Everglades, providing flood protection to agricultural and urban areas, and serving as the westward limit for most development.

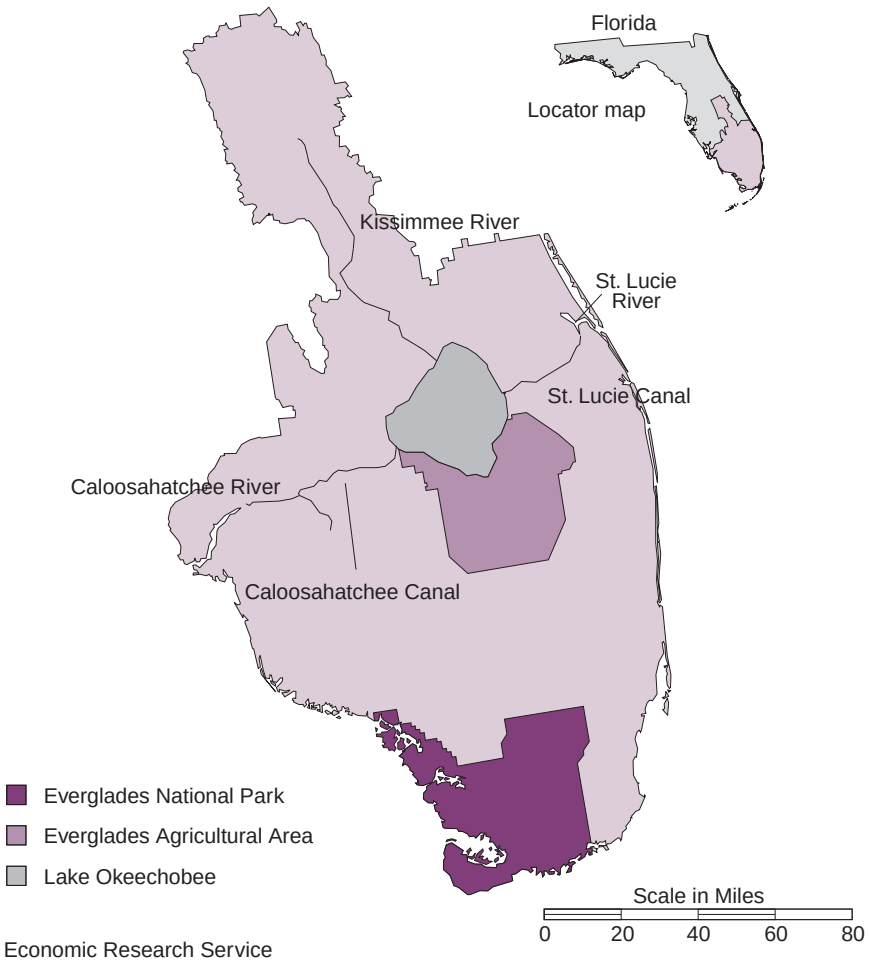
long-term prosperity of local economies dependent on tourism, fishing, and adequate freshwater supplies.

Wetland conversion. Land development for agriculture and urban expansion—supported by earlier public policy to reclaim wetlands for economic uses—has diminished the wetland resources in south Florida by an estimated 1.1 million acres, about one-half of the original wetland expanse. Early development activities during the 1920's and 1930's focused on land reclamation and drainage for agriculture. Construction of the Central and Southern Florida Project permitted an acceleration of wetland conversion after the mid-1950's. North of the Everglades, extensive diking and channelization eliminated historic floodplain wetlands, and large tracts of wetland/upland prairie were converted to improved pasture.

South of Lake Okeechobee, 700,000 acres of marsh—roughly one-fourth of the historic Everglades—has been developed for irrigated production of sugarcane and other crops in the Everglades Agricultural Area (EAA) since the 1950's. Extensive seasonal wetlands in southeast Florida were drained and developed for high-valued fruit and vegetable production and residential development. While agricultural development on private lands remains a factor in wetland conversion—particularly the expansion of citrus in southwest Florida—urban growth in the coastal areas of south Florida is expected to account for most future wetland losses. Although public ownership and state and local controls over much of the central and southern Everglades have restricted land development, much of the remaining wetland has been degraded.

Water-flow modifications. Highly regulated water systems—initially to support agriculture and increasingly for urban development—have vastly altered the quantity, distribution, and timing of water flows throughout the Everglades watershed. Alteration of historic flow patterns has degraded much of the remaining undeveloped wetlands, and is perhaps the single most important factor underlying ecosystem decline in south Florida. Managed water releases through the Everglades marsh system have been limited in most years, with much of the northern basin runoff diverted to sea for flood-control purposes. Natural patterns of high and low flows have been replaced with rapid fluctuations in water depth and loss of flow variability across the years.

South Florida Ecosystem and Major Natural Resource Areas



Economic Research Service

Landscape fragmentation—due to canals, levees, roads, and other structures—has further disrupted the natural flow of water from Lake Okeechobee through the Everglades. Land subsidence due to drainage has limited the basin's capacity to store and regulate water flows, while reducing the gradient necessary to route water southward. As a result, reduction of freshwater inflow to southern estuaries has increased saline concentrations and is believed to be a major factor in the declining marine life of Florida Bay.

Water quality impairment. Degraded water quality from agriculture and other land uses is a serious concern in areas of the watershed. Water quality can have significant impacts on native wildlife—either directly through adjustments in toxicity and oxygen concentrations—or indirectly through changes in plant communities and animal organisms required to support aquatic systems.

Nutrient runoff from livestock operations and urban development in the northern drainage area has contributed to high phosphorus concentrations, low dissolved oxygen levels, and large blooms of algae in Lake Okeechobee. Irrigation drainage flows containing chemical fertilizers and pesticides have impaired water quality in some discharge areas of the northern and

eastern Everglades. Sediment from farm fields and canals has caused silting damage in coastal estuaries. In addition, drainage of organic soils releases naturally occurring nitrogen and phosphorus to the environment. Finally, wetland conversion has limited the land's capacity to filter pollutants and sediment, while water diversions alter pollutant concentrations.

Adjustments in Agriculture Will Aid Restoration

Agriculture is a major industry in south Florida, accounting for more than half of U.S. cane sugar production and a significant share of winter vegetables, citrus fruits, and other products. While the south Florida economy has diversified in recent decades, agriculture remains an important source of income to the region—providing about $1.5 billion in annual sales. Current options to restore ecologic functions in south Florida could affect the area's agricultural production in several ways.

Increased freshwater inflows to the Everglades marsh would be accomplished, in part, through wet-season water retention on agricultural lands. Some restrictions on water supply and flood control for agricultural purposes would likely be required to meet environmental and expanding urban needs. Much of the land sought for environmental restoration—flow-ways, filtration ponds, water preserves, and wildlife corridors/buffers—would have to be obtained through acquisition of private land currently in crop production or pasture. Changes in farming practices and input use will be required to achieve state water management and water quality standards.

Cropland reductions. Land acquisition is a high-priority activity under the south Florida restoration program. The 1996 Farm Act allocated $200 million from the Treasury to the Secretary of the Interior for south Florida restoration, to be used for land acquisition and other purposes. Specific land-acquisition needs potentially affecting agriculture include reservoir-storage development, flow-way construction, constructed wetlands, canal system improvements, and wildlife management areas.

Government Efforts to Restore the Everglades

Growing concern over recent decades about the degradation of natural systems in south Florida led to increasingly insistent calls for public action. In 1983, the state of Florida initiated the first of a series of regional restoration projects designed to protect and restore key features of south Florida's natural landscape—the Kissimmee River, Lake Okeechobee, Big Cypress Swamp, the Water Conservation Areas, and Everglades National Park. The litigation that followed over legal and financial responsibilities of private, state, and Federal entities in the recovery process led to the Everglades Forever Act, passed by the Florida Legislature in 1994.

Principal elements of the act include directives to restrict pollutant discharges in the northern Everglades, to restore more natural hydrologic flows through the Everglades marsh system, and to establish financing mechanisms for recovery programs. The act also reaffirmed a strong Federal commitment to the south Florida restoration effort.

The Federal Restoration Task Force, founded in 1993, has sought to integrate ecosystem restoration efforts across principal Federal and state agencies and Native American tribal governments engaged in restoration efforts in south Florida. The Governor's Commission for a Sustainable South Florida was established in 1994 to define broad principles for south Florida ecosystem restoration and to prioritize restoration activities.

The U.S. Army Corps of Engineers, in cooperation with the South Florida Water Management District, is directing a major Reconnaissance Study of the Central and South Florida Project water control system to identify operational and structural modifications to meet long-term regional water needs. The intent of the study is to provide broad strategies guiding hydrologic restoration while maintaining or enhancing other authorized project purposes.

However, large-scale buy-out of agricultural interests to meet all environmental needs may not be economically feasible. Other potential means of acquiring land-use rights include land exchanges, short-term or permanent easements, and temporary transfer of use rights (wet-year flood retention/dry-year water storage) on an as-needed basis. Easements, long-term contracts, and other avenues for restoration may play a more prominent role in south Florida under the Everglades restoration program. The removal of a large amount of acreage from agricultural production could have significant economic costs to the region; equivalent environmental benefits may be possible through other farm-level adjustments that aid restoration.

Cropping shifts. Changes in cropping patterns and crop type may help to integrate agricultural production with natural hydrologic systems, enhancing on-farm water storage and slowing soil subsidence. Researchers are developing new sugarcane varieties with greater tolerance for shallow water tables and extended flooding. Rice—currently grown in rotation with sugarcane on limited acreage in the EAA—has been recommended as a cost-effective means of controlling soil loss because it is a flood-tolerant crop with peak irrigation demands during the wet summer season, and it has comparatively low fertilizer requirements.

Other possible enterprises include aquatic cover crops and partial conversion to wet-pasture beef-cattle production or to aquaculture. Adjustments in cropping patterns will depend on the economic viability in large-scale production, restrictions on expansion of alternative enterprises, compensation incentives to encourage adoption, and effects on water quality.

Improved management practices. On-farm resource management—or the managed allocation of land, water, chemicals, and other purchased inputs within the farming system—is a key element of the Everglades restoration program. USDA—

in coordination with the South Florida Water Management District and the Florida Department of Environmental Protection—helps identify agricultural best management practices (BMP's) to reduce production impacts on natural systems, and provides technical assistance and cost sharing to promote BMP adoption.

Management of applied fertilizers and pesticides—involving assessment of crop needs and improved application and timing techniques—is essential in meeting water quality standards. Water-table management is required to minimize soil subsidence, reduce release of soil nutrients, and enhance ground-water storage. Recommended practices include timed pumping of water based on rainfall events, and installation of canal riser controls to maintain higher average water tables and reduced depth fluctuations. Drainage management—involving water retention and re-use—can minimize pollutant loadings into the regional water system.

Improved soil and water management practices across the Everglades watershed have already had significant beneficial impacts on natural systems. Adoption of BMP's in the 1980's for dairy, livestock, and poultry production has contributed to improved water quality and reduced algal blooms in Lake Okeechobee. Improved practices for sugarcane production in the EAA have reduced phosphorus discharges into the northern Everglades by 68 percent over the 1979-88 base period, well ahead of regulatory schedules. An initial evaluation of a 4,000-acre filtration pond indicates that 40,000 pounds of phosphorus per year were successfully removed from EAA drainage flows prior to discharge into the regional drainage system.

Balanced Approach Is Needed

The environmental benefits of maintaining a strong agricultural sector need to be considered when assessing the benefits and costs of alternative restoration measures. Agriculture may be the most environmentally benign use of developed land and, in some cases, may produce larger benefits than nonmanaged uses.

Agricultural lands often serve as a buffer to encroaching urban development, and can restrict the spread of exotic and nuisance species to undeveloped areas. Cropland soils may be managed to store wet-season water supplies, reducing flood impacts downstream. Under proper management, crop production can also improve water quality by removing excess nutrients from ground and surface waters. Land management practices—such as filterstrips, set-asides, flooding of fallow fields, and drain-water retention—provide important wildlife habitat benefits. Finally, a strong agricultural sector will remain an important source of revenue for ongoing restoration initiatives.

Efforts to restore the south Florida ecosystem will depend on success in recreating essential functions of the natural system while providing for managed growth and economic activity. The role of agriculture will depend ultimately on tradeoffs in benefits among agricultural, urban, and environmental uses of land and water resources. An economic assessment of relative benefits and costs that arise from future resource allocations is essential to achieve a balance between agricultural producers, the regional economy, and environmental quality.

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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.

September

15	*Cotton & Wool Outlook (4 pm)***
	*Feed Outlook (4 pm)***
	*Oil Crops Outlook (4 pm)***
	*Rice Outlook (4 pm)***
	*Wheat Outlook (4 pm)***
16	*Tobacco**
17	*Europe Data Update*
	Livestock, Dairy, & Poultry (12 noon)
19	*Sugar & Sweeteners**
22	*Agricultural Outlook**
23	*U.S. Agricultural Trade Update**
30	*Agricultural Income & Finance**

*Release of summary, 3 pm.
**Available electronically only.

Special Article

Mexican Government Tourism Office

NAFTA's Impact on U.S. Agriculture: The First 3 Years

The North American Free Trade Agreement (NAFTA) has had a positive overall effect on the U.S. agricultural sector, reinforcing the trend toward greater integration of markets in North America and enhancing the competitiveness of U.S. agriculture. From implementation of NAFTA through 1996, total U.S. agricultural trade has grown rapidly, rising from nearly $68 billion (exports $43 billion, imports $25 billion) to about $94 billion (exports $60 billion, imports $34 billion). In relative terms, the share of trade with NAFTA partners has held steady at about 24 percent of total U.S. agricultural trade.

During the 12 months prior to NAFTA's January 1, 1994 implementation, U.S. agricultural trade with Canada and Mexico totaled just over $16 billion (more than $9 billion in exports and $6 billion in imports). By the end of 1996, just 3 years after implementation, it had grown to over $22 billion (nearly $12 billion in exports and nearly $11 billion in imports).

But quantifying the trade effects directly attributable to NAFTA is less than straightforward. The increase was not all due to the implementation of NAFTA or the already-existing U.S.-Canada Free Trade Agreement (FTA). The initial years of NAFTA implementation have coincided with significant changes in the domestic agricultural policies of the U.S., Canada, and Mexico and in the global trade policy environment. These policy reforms have affected some commodity markets in ways that are difficult to separate from the direct effects of NAFTA trade reforms, because the two are compatible and mutually reinforcing.

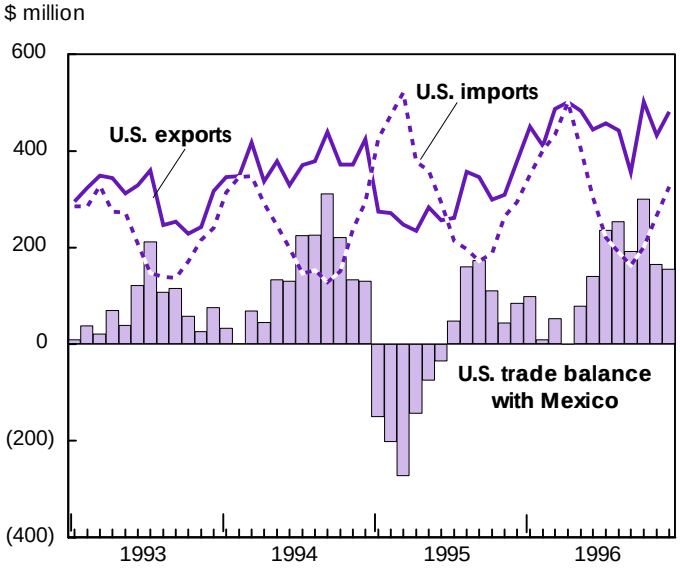
Moreover, the peso crisis and subsequent recession in Mexico seriously disrupted trade in 1995, overwhelming the effects of the early tariff reductions under NAFTA. Adverse weather conditions which affected Mexican grain and cattle production, and changing production technology for vegetables, influenced trade in several agricultural commodities in North American markets.

The collapse of the Mexican peso in December 1994 and the subsequent recession reduced Mexican consumers' purchasing power and increased short-term price competitiveness of Mexican exports. Consequently, U.S. agricultural exports to Mexico plunged 22 percent in 1995, offsetting the gains from 1994, while Mexican exports to the U.S. grew 32 percent. The Mexican economy began a strong recovery in 1996, and U.S. agricultural exports to Mexico rebounded, increasing almost 55 percent from the previous year, while imports from Mexico dropped slightly.

Analysis by USDA's Economic Research Service (ERS) examined the impact of agricultural trade liberalization under NAFTA and the FTA on trade through 1996—the third year of NAFTA implementation. The analysis attempted to disentangle the effects of the changes in tariffs and nontariff barriers under the agreement from other forces influencing economic conditions and agricultural markets in North America.

To what extent is the trade growth due to NAFTA? ERS analysis, which isolated the economic impacts of NAFTA from other developments, found that U.S. agricultural *exports* to Mexico were about 3 percent higher in 1996 than they would have been without the reduction in trade barriers under NAFTA. U.S. agricultural exports to Canada were about 7 percent higher because

Peso Devaluation in December 1994 Disrupted Normal U.S.-Mexican Agricultural Trade Flows



Economic Research Service, USDA

Nuts & Bolts of NAFTA

Calendar 1996 marked the third year of trade liberalization between the U.S. and Mexico under the North American Free Trade Agreement (NAFTA) and the eighth year of an earlier trade agreement between the U.S. and Canada. NAFTA liberalizes trade and investment rules among the U.S., Mexico, and Canada. It encompasses the U.S.-Canada Free Trade Agree-ment (FTA), in place since January 1, 1989, and builds on the "Framework of Principles and Procedures for Consultations Regarding Trade and Investment Relations" between the U.S. and Mexico, initiated in 1987.

The U.S. and Mexico began discussions on a free trade agreement in 1990, and Canada joined the discussions in 1991. The presidents of all three countries signed the agreement in December 1992. The U.S. Congress approved it in November 1993, and it was signed into law on December 8, 1993. NAFTA, which went into effect on January 1, 1994, established two new bilateral agreements on cross-border trade—one between the U.S. and Mexico and the other between Canada and Mexico—adding to the original FTA between the U.S. and Canada. The agricultural provisions of NAFTA addressed tariffs, nontariff barriers, safeguards, rules of origin, and sanitary and phytosanitary regulations.

Under NAFTA's agricultural provisions, all tariffs, quotas, and licenses that restrict agricultural trade between the U.S. and Mexico will be eliminated by the end of the 15-year implementation period. Restrictions on about half of all U.S. agricultural exports to Mexico were eliminated immediately upon NAFTA implementation in 1994, and numerous other restrictions will be eliminated over 10 years. Agricultural trade between Mexico and the U.S. will be completely liberalized by 2008.

Regarding agricultural trade between the U.S. and Canada, NAFTA provided no new market access provisions beyond the FTA, and in general, the rules of the FTA continue to govern U.S.-Canadian trade. Tariffs on most agricultural products traded between the U.S. and Canada will be eliminated by January 1, 1998. Tariffs on certain products previously subject to nontariff barriers will remain in place. Canada will continue to be able to protect its supply-managed products: dairy, poultry, and eggs.

NAFTA established an agreement among the U.S., Canada, and Mexico on sanitary and phytosanitary standards. The agreement requires that regulations for the protection of food safety and plant and animal health be consistent with internationally accepted scientific standards. And the agreement recognized the concept of regional, as opposed to national, certification for plant and animal health standards, and established a dispute settlement mechanism to address sanitary and phytosanitary issues.

of the free trade agreement. Similarly, U.S. agricultural *imports* from Mexico were just over 3 percent higher in 1996 than they would have been without NAFTA, while imports from Canada were about 5 percent higher. A little more than one-fifth of the increase in U.S. *exports* to NAFTA countries since 1993 can be attributed to trade liberalization under NAFTA provisions, and slightly less than a fifth of the increase in U.S. *imports*.

In addition, analysts at the Dallas Federal Reserve indicate that NAFTA eased trade flows in the wake of the peso crisis and promoted more rapid economic recovery in Mexico than might otherwise have occurred. Perhaps NAFTA's greatest contribution was in preventing the Mexican government from reverting to the restrictive trade policies that had been so destructive during the debt crisis of the early 1980's.

A primary U.S. goal in seeking a trade agreement with Mexico was to lock in the unilateral trade and investment reforms Mexico had undertaken in the mid-1980's. Mexico's adherence to its NAFTA commitments and the rapid recovery of trade in 1996 provide compelling evidence that NAFTA has achieved this.

Trade Effects Vary Across Countries & Commodities

For most commodities, the direct impact of NAFTA has been small because trade barriers were relatively low before the agreement, liberalization is only partially complete, and tariffs are only one of many factors that influence trade. The largest NAFTA-induced trade changes have occurred among products having the highest tariffs and nontariff barriers before the agree-

Animal Products Led NAFTA-Induced Trade Effects

	U.S. exports to		U.S. imports from	
	Canada	Mexico	Canada	Mexico
	Range of percent change			
Grains & products				
Corn		2-5		
Sorghum	6-15	2-5		
Barley		2-5	2-5	
Wheat & wheat products	6-15		2-5	
Oilseeds & products				
Oilseeds		2-5	(2-5)	
Vegetable oils	6-15	6-15	2-5	
Animals & animal products				
Cattle & calves		>15	(>15)	
Beef & veal	>15	6-15	>15	
Hogs		2-5		
Pork		6-15		
Dairy products		>15		
Other crops				
Peanuts				>15
Fruits & vegetables				
Fresh tomatoes	2-5			6-15
Processed tomatoes	>15			6-15
Cucumbers				2-5
Squash	2-5			
Eggplant	2-5			2-5
Snap beans	2-5			2-5
Fresh & processed potatoes			6-15	
Frozen broccoli & cauliflower				6-15
Orange juice				2-5
Apples		>15		
Pears		>15		

Trade gain/loss attributable to NAFTA. Commodities with changes of at least 2 percent. Data in parentheses are negative (loss).

Economic Research Service, USDA

Special Article

Measuring NAFTA'S Impact

USDA's Economic Research Service used a dynamic computable general equilibrium (CGE) model to isolate the economic impacts of NAFTA on investment and employment in U.S. agriculture and agriculture-related industries, and on agricultural trade among NAFTA signatories. The global model included 7 countries or regions and 12 commodities or sectors. The base-year data used in the study (1992) were drawn from USDA's Global Trade Analysis Project database. The model results for consumption, production, investment, and trade are derived from consumer and producer optimization for each country or region.

In deriving the results, the model first estimated the levels of investment, employment, and trade that would have occurred without NAFTA. This was done by using the Most Favored Nation (MFN) tariffs and nontariff measures that each of the three countries applied to other members of the World Trade Organization (WTO) in 1992. Then the MFN rules were replaced in the model with NAFTA provisions for 1996, and the impacts on investment and employment were calculated. The difference between the two outcomes represents the pure impact of the tariff and nontariff changes under NAFTA to date. This approach assumes that the domestic agricultural policy reforms and multilateral trade reforms undertaken in each member country would have happened without NAFTA.

To evaluate the impact of NAFTA on trade for individual commodities, the CGE analysis was supplemented with more detailed country and commodity models. These static equilibrium models were used to evaluate two scenarios for the 1994-96 period based on actual exchange rate and income data.

The first scenario simulated the trade flows that would have occurred without NAFTA. As in the CGE-only analysis, the MFN tariffs and nontariff measures for each country were used to generate a base estimate of the trade that would have occurred without NAFTA. Where import licenses or quotas were replaced by tariff-rate quotas under the Uruguay Round agreement (implemented at the beginning of 1995), analysts made informed judgments about the level of imports that might have occurred in the absence of NAFTA. The second scenario altered the trade rules for each member country following the terms of the NAFTA agreement, and compared the estimated trade changes to those derived without NAFTA. By comparing the difference in the two scenarios, it was possible to estimate NAFTA's impact in the absence of the economic, weather, and other forces that have affected specific North American commodity markets in the past 2 years.

Since NAFTA is essentially three bilateral agreements (Canada-Mexico, U.S.-Mexico, and U.S.-Canada under the FTA), analysis of NAFTA without assessing the impact of changes in Canada would have provided an incomplete picture of the effects of trade liberalization on the U.S. The FTA was subsumed under NAFTA at the beginning of 1994, and the no-NAFTA scenario explicitly assumes no FTA as well. Because U.S. bilateral trade liberalization has proceeded further with Canada than with Mexico for many commodities, a return to MFN treatment implies a larger shift in bilateral trade rules with Canada than with Mexico. Consequently, the results for Canada may seem larger than one would expect intuitively, because they are capturing the full scope of liberalization between the U.S. and Canada since 1989, not just the liberalization that has occurred since 1994.

ment and undergoing significant reductions in trade barriers the first few years of implementation.

Of the U.S.'s two NAFTA trade partners, Mexico is the faster growing agricultural market, averaging nearly 15 percent growth per year since 1993, compared with about 12 percent for U.S. exports to the world. U.S. agricultural exports to Mexico climbed to $5.4 billion by 1996.

The largest *rates* of NAFTA-specific gains in U.S. exports to Mexico have been for sorghum, cattle, beef, dairy products, apples, and pears. Analysis by ERS indicated that U.S. exports of these products were 10-30 percent higher in 1996 than would have occurred without the agreement. At the same time, U.S. imports of fresh vegetables from Mexico were about 5-10 percent higher in 1996 than they would have been without the agreement.

Growth in U.S. agricultural trade with Canada during the 1993-96 period has been slower but less volatile than trade with Mexico because, as a mature market, Canadian consumer demand is relatively stable. Also, the U.S.-Canada Free Trade Agreement had already been in place for over 4 years by 1993. U.S. agricultural exports to Canada grew to $6.1 billion by 1996. The largest gains for U.S. agricultural exports to Canada because of NAFTA (and the subsumed FTA) have been in beef and veal, wheat and wheat products, vegetable oils, processed and fresh tomatoes, and other vegetables.

Agricultural commodities that were freely traded before NAFTA have not been directly affected by the agreement. The U.S. tariff on coffee imports was zero before NAFTA; therefore, the recent increase in U.S. coffee imports from Mexico cannot be credited to NAFTA. Likewise, trade in oats between the U.S. and Canada carried zero tariffs before the FTA, so NAFTA does not explain the recent increases in U.S. imports of oats from Canada.

NAFTA has not yet provided for significant trade liberalization in all agricultural products. For Mexican imports of corn, dry beans, and poultry, over-quota tariffs remain prohibitively high. However, the Mexican government chose to expand the quotas in some years, and this policy rather than NAFTA has allowed U.S. exports of these commodities to increase. Similarly, dairy, poultry, and eggs still face prohibitive over-quota tariffs in Canada.

NAFTA tariff reductions on U.S. imports of winter tomatoes from Mexico have been very small, less than 1.5 percent on an ad valorem basis. Therefore, only a small part of the increase in trade can be attributed directly to the tariff changes. The peso

NAFTA: Impacts on U.S. Consumers

Trade liberalization under NAFTA increased product availability, lowered prices for some products, and provided greater variety. During the 3 years since NAFTA's inception (1994-96), U.S. agricultural imports from Mexico grew 38 percent compared with the 3-year period preceding NAFTA (1991-93), while U.S. imports from Canada grew 46 percent. U.S. imports from all non-NAFTA source countries grew only 18 percent, suggesting that NAFTA has had a significant effect on imports from Canada and Mexico over and above the general increase in imports from all source countries. Still, much of this growth was due to factors other than NAFTA, such as peso devaluation in Mexico and the continuing integration of the food production and marketing economies of the U.S., Mexico, and Canada. ERS analysis estimates that about 3-5 percent of this trade growth can be attributed directly to NAFTA provisions.

In 1996, the U.S. imported more than $33 billion of agricultural products from more than 200 countries. Of this total, $6.8 billion, or 20 percent, came from Canada—the largest U.S. import source—and another $3.8 billion came from Mexico. Together, Canada and Mexico supplied 31 percent of U.S. agricultural imports in 1996.

Imports lead to *increased product availability* in two ways. First, some imports are purely supplementary in that the supply of imports adds to the supply of domestic product, increasing total supply available to consumers. Second, some domestic industries produce at costs that are low enough to limit competition from imports. However, even in these industries, occasional tight supplies sometimes occur due to poor harvests or demand miscalculations. Imports then may compensate for domestic shortfalls.

Lower import tariffs for many products and the arrival of Mexican products—produced and shipped at lower costs than domestically produced goods—result in directly lower consumer prices. In addition, increased competition from abroad has the indirect effect of *lowering consumer prices* by forcing domestic marketers to lower their own prices—typically through cost cutting measures, increased productivity, or by importing inputs and ingredients at lower costs than on the domestic market.

Trade liberalization also provides consumers with *greater variety*. On the grocery shelves, this takes two forms. Foreign firms may provide an entirely new product line, or new alternatives to an existing product line.

Objectively measuring consumer impacts can be difficult. For most goods produced or consumed in the U.S., international trade tends to be small relative to domestic consumption or production. And while Canada and Mexico are among the largest U.S. trading partners, the economies of these countries are relatively small compared with the U.S. economy. This means that for most goods produced and marketed in the U.S., decisions by Canadian and Mexican producers and consumers will have only a small effect on U.S. prices.

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crisis in Mexico, technological shifts in tomato production, and unusual weather in Florida were far more important than the tariff reductions under NAFTA (*AO* June 1996).

For many agricultural products, FTA has fostered two-way trade between the U.S. and Canada since implementation. ERS analysis shows that in 1996, U.S. beef exports to Canada were about 100 percent higher, and U.S. beef imports from Canada were about 50 percent higher, because of FTA. At the same time, bilateral trade between the U.S. and Canada in wheat and wheat products and vegetable oils were 5 to 10 percent higher than they would have been without the agreement.

The agricultural provisions of NAFTA have had small positive impacts on agricultural investment and employment to date. Three years into NAFTA, investment in U.S. agriculture and agriculture-related industries has increased on the order of 0.19 percent over what would have been expected without the agreement. Employment in agriculture and agriculture-related industries has increased slightly due to NAFTA, on the order of 0.07 percent.

While specific job losses will occur due to direct import competition or the relocation of production facilities, the overall increases in employment and trade since 1993 suggest that any job losses in agriculture-related industries have been more than offset by job gains elsewhere in agriculture and the general economy.

These effects are small because NAFTA trade is a small part of U.S. agriculture, and to a lesser extent because trade liberalization under NAFTA is only partially complete. As NAFTA creates competitive challenges and opportunities, labor and capital will seek out their highest returns, driving out less efficient performers while bolstering more efficient enterprises. This dynamic process of adjustments will continue throughout implementation of the agreement.

Trade liberalization through NAFTA expands agricultural producers' ability to compete in a larger marketplace, as more market-oriented domestic policies increase producers' reliance on trade. As the markets of North America become more integrated, regional production shortfalls will increasingly be mitigated by trade flows. Evidence to date appears to support the claim that NAFTA is creating incentives for resources, labor, and capital to remain in the U.S. agricultural sector.

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