Table 10—Returns above cash expenses in U.S. feed grain production, 1985-93

Crop year	Value of output[1]	Direct payments[2]	Gross income	Total cash expenses[3]	Returns over cash expenses[4]		
					Total	Per bushel	
						Nominal	Real
	Billion dollars					*Dollars*	
Corn							
1985	19.79	2.685	22.48	16.55	5.93	.67	.71
1986	12.34	6.864	19.20	13.03	6.17	.75	.77
1987	13.83	8.102	21.93	11.08	10.85	1.52	1.52
1988	12.52	4.154	16.67	11.60	5.07	1.03	.99
1989	17.76	4.061	21.82	12.93	8.89	1.18	1.09
1990	18.09	3.241	21.33	13.58	7.75	.98	.86
1991	17.72	2.382	20.10	14.22	5.88	.79	.67
1992	19.62	3.989	23.61	14.79	8.82	.93	.76
1993[5]	15.84	2.708	18.55	14.26	4.29	.68	.54
Sorghum							
1985	2.16	.248	2.41	1.65	.76	.68	.72
1986	1.29	.642	1.93	1.27	.66	.70	.72
1987	1.14	.832	1.97	1.03	.95	1.29	1.29
1988	1.31	.472	1.78	.97	.81	1.41	1.36
1989	1.29	.560	1.85	1.32	.53	.86	.79
1990	1.22	.448	1.66	1.08	.58	1.02	.90
1991	1.32	.308	1.62	1.14	.48	.82	.70
1992	1.65	.456	2.11	1.42	.69	.79	.65
1993[5]	1.23	.320	1.55	1.18	.37	.70	.56
Barley							
1985	1.17	.181	1.35	1.13	.22	.36	.39
1986	.98	.395	1.38	1.08	.29	.48	.49
1987	.95	.460	1.41	.85	.56	1.07	1.07
1988	.81	.306	1.12	.78	.33	1.15	1.11
1989	.98	.203	1.18	.81	.37	.92	.84
1990	.90	.207	1.11	.75	.36	.86	.75
1991	.97	.313	1.29	.81	.48	1.04	.89
1992	.93	.299	1.23	.77	.46	1.01	.83
1993[5]	.80	.363	1.16	.80	.36	.90	.72
Oats							
1985	.83	.009	.84	.58	.26	.51	.54
1986	.60	.039	.64	.46	.18	.48	.49
1987	.66	.066	.72	.42	.30	.80	.80
1988	.67	.109	.78	.36	.42	1.90	1.84
1989	.67	.074	.74	.49	.25	.67	.61
1990	.49	.077	.57	.43	.14	.40	.35
1991	.30	.098	.40	.33	.07	.29	.25
1992	.39	.084	.47	.35	.12	.42	.35
1993[5]	.28	.093	.37	.31	.06	.30	.24

[1]Grain production times season-average price received by farmers. Value of output for oats also includes value of oats straw, which applies to acres harvested for grain.
[2]The sum of deficiency, diversion, disaster, reserve storage, and long-term CRP payments.
[3]Costs per planted acre times acreage planted; cost of maintaining conserving-use acreage is 20 percent of variable expenses reported in *Economic Indicators of the Farm Sector: Costs of Production,* U.S. Dept. of Agr., Econ. Res. Serv., various years. Cash expenses for 1993, which are not yet available, are estimated based on 1992 costs of production and prices paid by farmers.
[4]The difference between gross income and total cash expenses; this difference was divided by quantity produced and was then deflated by the GNP implicit price deflator (1987 = 100) for per-bushel returns.
[5]Preliminary.

acted, compared with 17 percent during 1989-90 (fig. 11).

The North American Free Trade Agreement (NAFTA) and the GATT Uruguay Round Agreement promise to raise the level of global income and thereby boost demand for U.S. feed grains. Larger domestic demand is also expected. Whether the expanding demand leads to higher prices depends on farmers' productivity and how much land remains in the CRP. Nevertheless, budget constraints, which will drive the 1995 Farm Bill, will mean that feed grain producers can expect to rely more on the marketplace and less on the government as a source of income in the future.

Costs of Production

During 1991-92, producers experienced a slight increase in their cash expenses of growing feed grains over the 1989-90 level, ranging from 1 percent for oats to 2 percent for sorghum and barley, and 5 percent for corn (ERS-USDA). According to the ERS Farm Costs and Returns survey, total cash expenses of growing corn averaged $183 per planted acre for 1991-92, about 5 percent higher than the expenses in 1989-90, of which $139 were variable cash expenses, or $1.14 per bushel. Fertilizer, chemicals, seed, energy, taxes and insurance, repair expenses, and interest payments are major expense items.

About half of feed grain producers had their variable cash costs below the average cash expenses of production. In 1991, 49 percent of corn farms, covering 60 percent of production, had variable cash costs at or below the average variable cost of $1.25 per bushel (McBride). Similarly, 57 percent of sorghum farms had variable cash costs at or below the average cost of $1.26 per bushel in 1990, which covered about 70 percent of the total grain sorghum harvest (Jinkins and McBride). Figures 12 and 13 illustrate the cumulative distribution of corn and sorghum variable production costs. Similar patterns in the cumulative distribution of variable production costs exist for barley and oats.

Given the $1.62 loan rate for corn in 1991, the loan rate more than covered variable costs for over 80 percent of corn production. Similarly, given the $1.49 loan rate for sorghum in 1990, the loan rate more than covered variable costs for about 75 percent of sorghum production. Thus, the current levels of loan rates are effective in serving as a marketing tool, when needed, for feed grain producers.

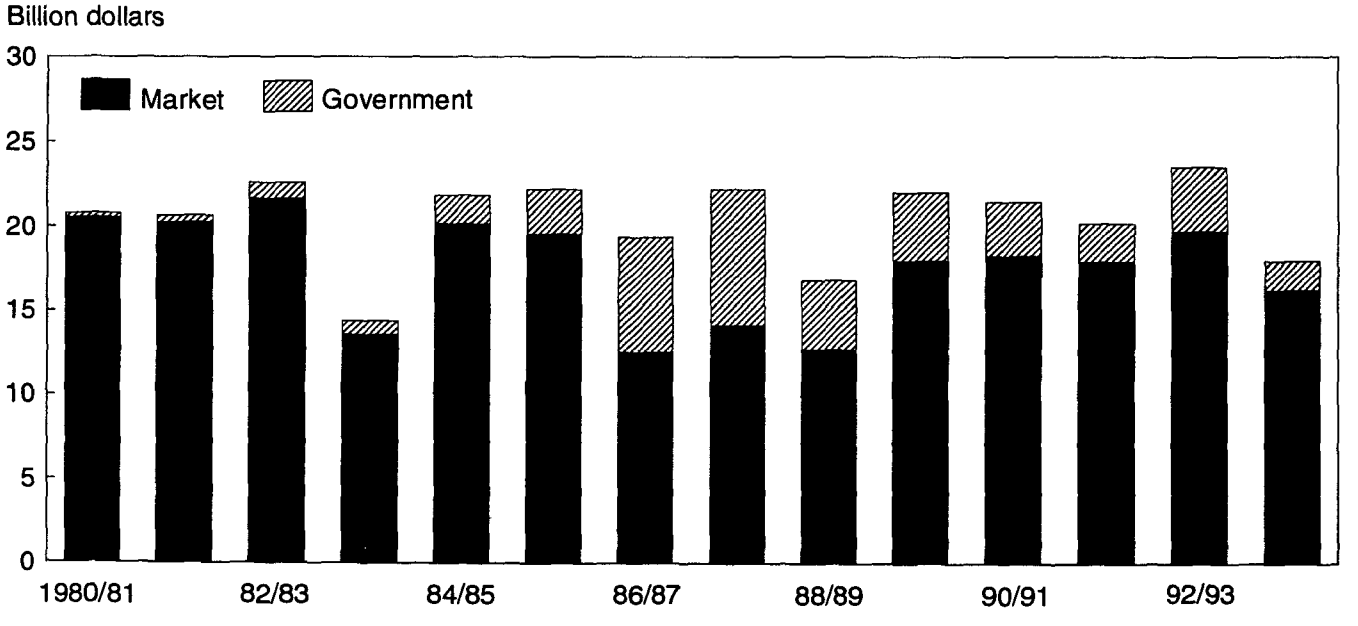
Characteristics of World Feed Grain Markets

World Feed Grain Trade

Corn is the major component of global coarse grain trade, generally accounting for about two-thirds of total volume over the last decade. Barley follows with

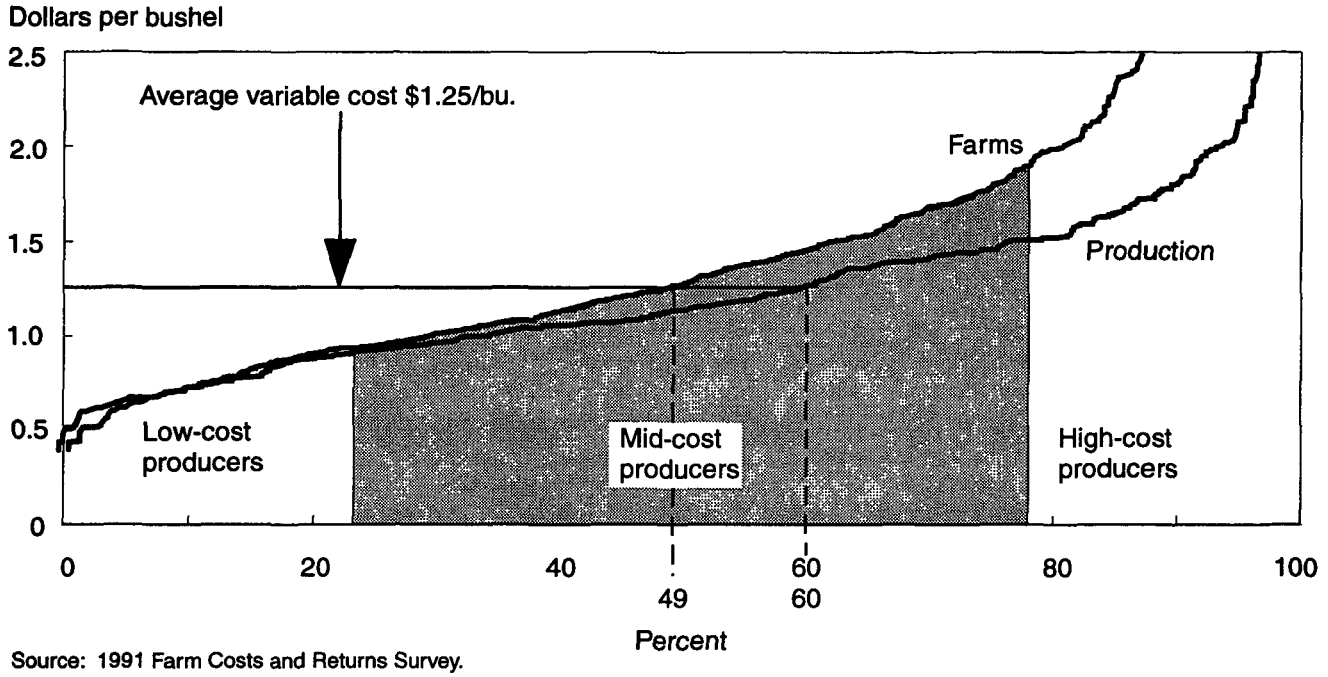
Figure 11

U.S. Corn Sector: Sources of Revenue 1980/81 - 1993/94



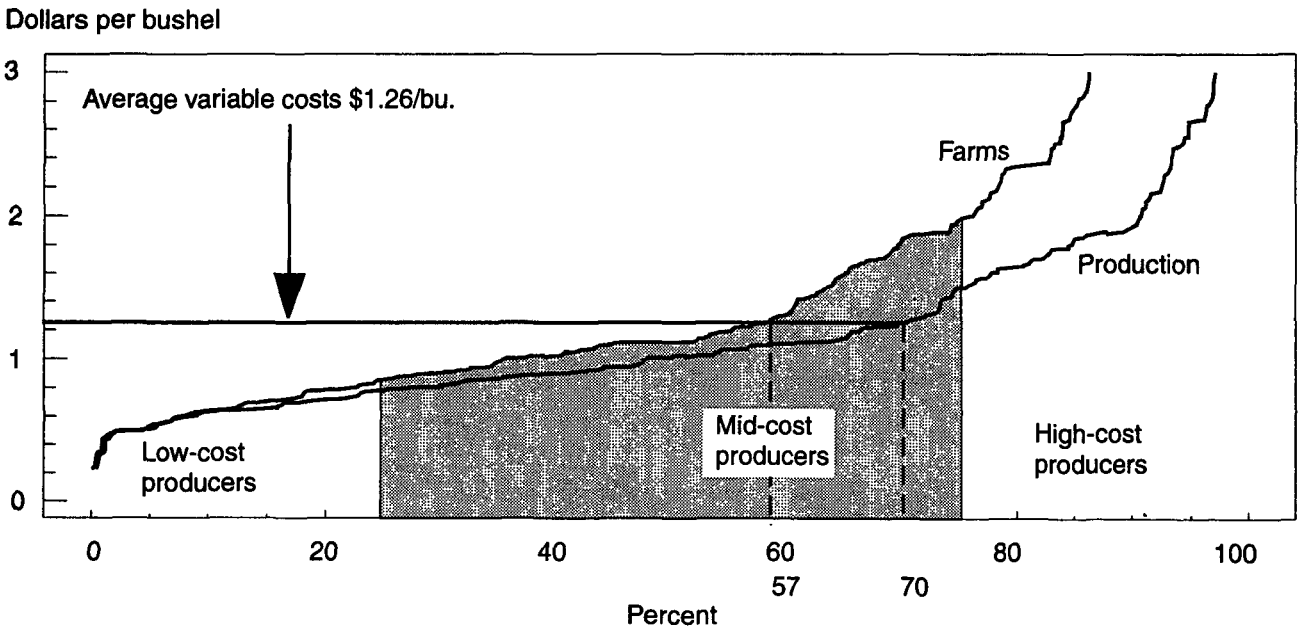
Government sources include deficiency payments, CRP, disaster payments, paid land diversion and FOR.

Figure 12
Cumulative Distribution of Variable Cash Production Costs for Corn, 1991



Source: 1991 Farm Costs and Returns Survey.

Figure 13
Cumulative Distribution of Sorghum Variable Production Costs, 1990



Source: 1990 Farm Costs and Returns Survey.

nearly 20 percent, sorghum at slightly less than 10 percent, and oats and rye make up the balance with about 5 percent. In contrast to the wheat market, export subsidies are not widely used for corn and sorghum. The main exceptions are for corn exported by the European Union and South Africa. A large share of barley exports are subsidized, chiefly from the EU and the United States. Scandinavian oats exports and EU rye exports are also subsidized, accounting for large portions of world trade in these grains.

Most of the coarse grain traded is for feed. Much smaller amounts go for industrial uses, such as starch-making and malting. Trade for food use is small, with occasional spurts in response to droughts. Grain imported for food or industrial use is usually of better quality than that used for feed, and price premiums reflect this.

Feed. There is a certain amount of flexibility in coarse grain trade for feed purposes, with the grains largely competing against each other, against wheat for feed use, and, to a lesser extent, against other nongrain feedstuffs such as tapioca and various byproducts used as energy sources. Oilseed meal and other protein sources largely serve as complements to grains rather than competitors, except in the EU. Flexibility in many markets, however, is quite limited in the interest of fairly stable rations, local preferences, or import laws. Thus, many importers avoid substituting among the grains, even though they switch suppliers on the basis of price, quality, availability, credit, or other trade services. For example, many Asian markets do not import barley for feeding because it is considered a food grain.

Industrial. Imports of corn for industrial processing, for products such as starch, alcohol, and sweeteners, are largely restricted to Japan, South Korea, Canada, and Mexico. Trade for this type of use will likely continue to increase, and could expand to other markets. However, foreign demand will be subject to technological change and internal policy changes that adjust prices or availability of competing products, such as sugar or raw materials such as sweet potatoes used for starch. The experience of the EU is illustrative. Formerly the largest market for U.S. corn used for starch, the EU during the 1980's began to replace imported corn with domestic wheat and more locally grown corn. Now it imports little U.S. corn for this use. EU trade policies and developments in wheat gluten technology provided the incentive to do this.

A small but growing share of barley is imported for malting, a more dynamic component than feed trade. Most countries import barley malt (discussed below) rather than importing the barley to process themselves. The number of malting barley importers is small, excluding trade within the EU, and consists primarily of China and a few countries in Latin America. However, strong growth in China's imports, and thus world trade in this category, is likely because economic and population growth will lead to further increases in China's beer production.

Food. This component of trade is generally small, mainly restricted to white corn, except in years of crop failures in countries where coarse grains are still staple foods. Thus, the potential market is basically corn in Latin America and corn and sorghum in Africa. Because locally produced varieties are generally preferred, and growth in incomes generally leads to more diversification of diets away from coarse grains, there is limited potential for sustained import gains in the future. However, NAFTA may lead to some increased imports of corn for food by Mexico, along with higher imports for feed and industrial processing.

Processed Products. Trade in value-added coarse grain products is small relative to trade in the grain itself. Barley malt is the main product that is widely traded, with smaller amounts of trade in products such as corn meal, flour, and sweeteners. Some byproducts of processing, such as corn gluten feed and meal, are also traded. Trade in manufactured feeds and pet foods, for which coarse grains are an ingredient, is growing fairly rapidly. Some U.S. feed manufacturers establish plants in overseas markets, which then import coarse grains for feed manufacturing locally.

Global trade in barley malt grew dramatically from the late 1960's up through the mid-1980's, when it stagnated. In recent years, growth has resumed but at a less rapid pace. A large component of this trade is subsidized, reflecting the dominant position of the EU, the leading malt exporter.

U.S. Role in World Trade

The United States is the largest coarse grain exporter, but the volume of exports and market share have fluctuated considerably in recent years (table 11). The United States is the largest exporter of corn and sorghum, but it usually ranks only fourth as a barley exporter (table 12).

U.S. coarse grain exports experienced their greatest growth in the 1970's, when world trade boomed. U.S. exports more than tripled during the decade, reaching a record high in 1979/80, along with a re-

cord market share. Import growth in this period was largely fueled by the Soviet Union, but strong gains were also registered by Japan, Eastern Europe, and the developing countries. Over the next few years, exports began to drop, bottoming out in the mid-1980's. World coarse grain trade slumped as widespread credit problems and economic difficulties cut import demand, at the same time that competing exporters gained market share at the expense of the United States.

During the second half of the 1980's, U.S. exports began to rebound and the U.S. market share made a strong recovery. This largely reflected a more competitive position bolstered by cuts in U.S. loan rates and very large U.S. supplies. However, in the early 1990's, U.S. exports experienced another serious slump mainly due to external developments. The breakup of the Soviet Union led to a severe drop in imports, pulling down world trade, while China, somewhat surprisingly, was increasing its corn exports. In 1993/94, U.S. coarse grain exports and market share declined to their lowest levels since 1985/86.

In 1994/95, U.S. exports will be up sharply, because of a dramatic gain in corn sales. Corn exports are forecast to rise more than 600 million bushels from 1993/94, the largest year-over-year gain on record (fig. 14). Key factors boosting U.S. export prospects are the record U.S. corn harvest that replenished supplies and a turnaround in China's corn trade, with China reducing exports and beginning to import. In addition, global import demand, even without significant imports by the former Soviet Union, has strengthened considerably in 1994/95.

As the world's dominant producer, user, and exporter, the United States is the price leader for corn and sorghum. No export subsidies are used for U.S. corn and sorghum exports. In the absence of export programs, export prices of corn primarily reflect domestic supply and demand conditions. In addition, developments

Table 11—Coarse grains: Global trade, U.S. exports, and U.S. market share[1]

Year	World trade	U.S. exports	U.S. share
	------Million tons------		*Percent*
Avg. 1970-74	58.1	30.9	52.0
Avg. 1975-79	88.1	56.9	64.3
Avg. 1980-84	97.6	58.6	59.9
1985/86	82.7	36.4	44.0
1986/87	82.9	47.5	57.3
1987/88	88.3	53.5	60.6
1988/89	95.5	60.4	63.3
1989/90	103.9	69.0	66.5
1990/91	88.3	51.8	58.7
1991/92	94.4	50.2	53.2
1992/93	90.0	50.1	55.7
1993/94[2]	84.6	40.0	47.3
1994/95[3]	89.4	56.9	63.7

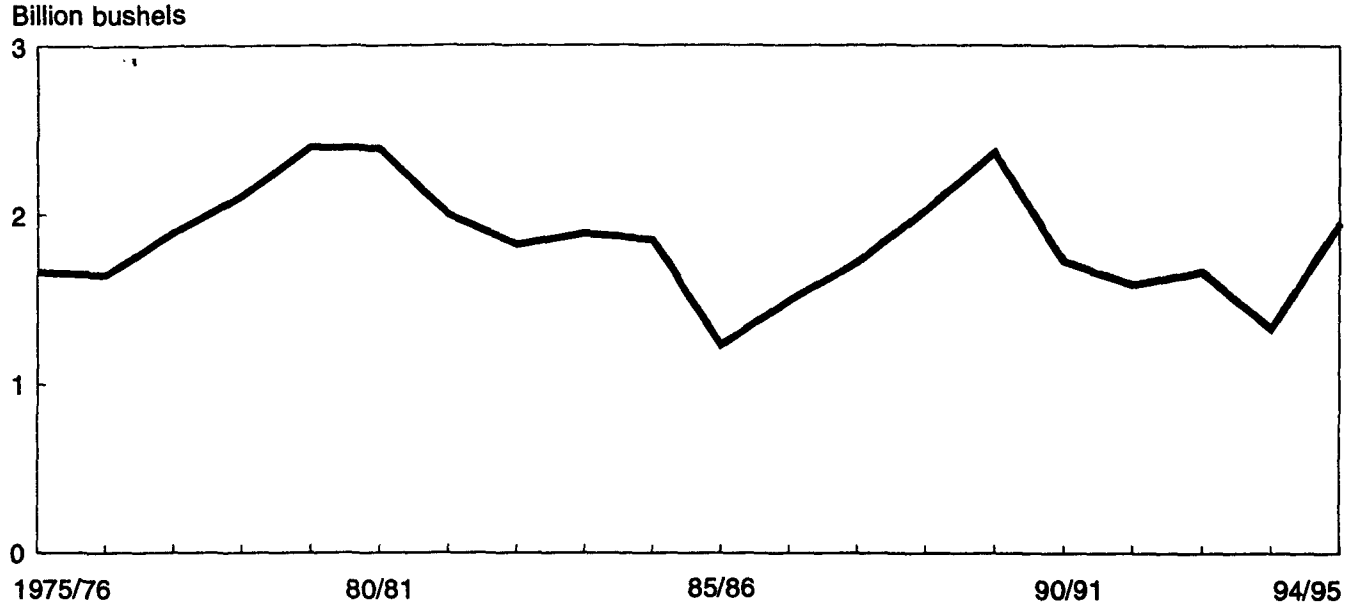
[1]Excludes intra-EU trade.
[2]1993/94 preliminary.
[3]1994/95 forecast.

Table 12—Corn, sorghum, and barley: Global trade, U.S. exports, and U.S. market share[1]

	Corn			Sorghum			Barley		
Year	World trade	U.S. exports	U.S. share	World trade	U.S. exports	U.S. share	World trade	U.S. exports	U.S. share
	-----Million tons-----		*Percent*	*-----Million tons-----*		*Percent*	*-----Million tons-----*		*Percent*
1985/86	54.5	31.5	57.8	8.5	4.1	48.2	18.5	0.8	4.3
1986/87	56.6	39.4	69.6	7.8	5.1	65.4	18.6	3.0	16.1
1987/88	56.7	44.5	78.5	8.3	6.1	73.5	16.0	2.9	18.1
1988/89	65.5	50.5	77.1	10.8	8.1	75.0	15.9	1.7	10.8
1989/90	74.4	60.0	80.6	8.9	7.3	82.0	17.7	1.8	10.2
1990/91	59.1	44.5	75.3	7.8	5.8	74.6	18.5	1.5	8.1
1991/92	62.6	40.6	64.8	9.4	7.5	79.6	18.6	2.1	11.2
1992/93	62.0	41.8	67.4	8.7	6.6	76.7	15.3	1.6	10.5
1993/94[2]	55.5	33.1	59.8	6.7	5.3	79.6	18.5	1.6	8.4
1994/95[3]	64.1	50.0	77.9	6.4	5.6	87.5	15.5	1.3	8.4

[1]Excludes intra-EU trade; based on Oct.-Sept. trade year.
[2]1993/94 preliminary.
[3]1994/95 forecast.

Figure 14
U.S. Corn Exports



1994/95 forecast.

in international markets also contribute to price formation. While the former Soviet Union's recent retreat from the corn market has removed a large source of price volatility, China has appeared as a new source. In 1994/95, China's corn exports are projected to decline to 4 million tons, a dramatic drop from its 11.5 million tons in 1993/94; China will also import corn in 1994/95 for the first time since 1989/90.

Although international prices for barley are influenced by the corn price, the EU, as the leading barley exporter, generally sets this price. Since 1985/86, most U.S. barley exports have been subsidized under the Export Enhancement Program, largely in competition with EC barley subsidies.

U.S. credit guarantees are used for a portion of U.S. coarse grain exports, typically around 10 percent but as high as 20 percent in some years. Food aid and concessional sales of coarse grains also account for some U.S. exports, but typically a very small portion. Food aid became much more important in 1992/93, because of the large amount, which included corn, provided to Russia and other republics of the former Soviet Union (FSU). These sales had historically been cash sales.

Importing Countries: Potential Demand

Global coarse grain trade in the early 1990's could be best described as depressed. The volume of trade in 1993/94 was the lowest since 1986/87 (table 11). One of the major factors depressing trade was a sharp decline in imports by the FSU (tables 13 and 14). Unusually large trade in wheat for feed also contributed to lower imports of coarse grains, mainly by South Korea, along with gains in self-sufficiency in a number of countries, such as Mexico.

World import demand for coarse grains is projected to grow steadily over the next decade after declining in the 1980's. In the next few years, potential import increases are expected to be bolstered by a reduction in the availability of competitively priced feed wheat. The annual rate of growth in coarse grain imports is expected to pick up after 2000, as the impact of GATT on income growth leads to higher demand for feed grains. Increased access commitments and reductions in subsidized exports under GATT will also provide trade opportunities. As the dominant exporter in world coarse grain trade, the United States will be the principal direct beneficiary.

A key issue is how fast growth in China and the developing countries will offset the recent sharp drop in imports by the former Soviet Union. Given the contraction in its livestock sector, there is little chance for the FSU to rebound as a huge importer in the next few years. Growth in imports will be concentrated in developing countries (and possibly China) because of large population and increases in income.

Table 13—World coarse grain imports, 1989/90-1994/95[1]

Country/region	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
			Million tons			
EU[2]	4.8	3.6	2.0	2.0	2.7	2.6
FSU[3]	26.3	17.4	17.1	10.2	4.4	4.3
China	1.0	0.9	1.0	0.6	1.2	4.2
East Europe	2.9	2.7	0.6	3.8	2.3	1.1
Latin America[4]	12.0	9.3	11.0	10.3	11.4	13.1
North Africa[5]	4.3	4.9	3.4	5.4	6.4	6.6
Sub-Saharan Africa[6]	0.6	1.0	5.3	4.8	2.2	1.1
Middle East	11.4	9.1	11.8	10.1	9.5	10.8
East Asia[7]	33.9	33.6	34.3	35.2	32.7	35.9
Other	6.6	5.8	8.0	7.6	11.8	9.7
Total[2]	103.9	88.3	94.4	90.0	84.6	89.4

[1]1993/94 preliminary. 1994/95 forecast. [2]Excludes intra-EU trade. [3]Former Soviet Union. Includes intra-FSU trade. [4]Includes Mexico. [5]Algeria, Egypt, Libya, Morocco, and Tunisia. [6]Includes South Africa. [7]Japan, Taiwan, South Korea, and Hong Kong.

Where incomes have grown rapidly in recent years, in the newly industrializing countries of Asia, such as Taiwan and South Korea, there has been tremendous growth in coarse grain demand. Slow growth in Taiwan's feed grain imports is likely in the next few years, since this growth is linked to growth in its pork exports. However, significant gains are expected in other areas, such as Latin America and parts of Southeast Asia. More moderate growth is expected in North Africa and the Middle East, while Sub-Saharan Africa's import prospects are weak.

Over the next decade, Japan's imports are expected to be flat, at best, and could possibly shrink. Still, it will easily remain the world's largest importer. Rising imports of coarse grains for industrial use are likely to partially offset declines in Japan's feed demand stemming from higher imports of meat and poultry. No growth is expected in EU imports. Eastern Europe is likely to become a net coarse grain exporter, with only sporadic imports due to weather-related shortfalls.

The greatest uncertainty concerns China. While strong growth in its malting barley imports is fairly certain, the likelihood that China will begin to import large amounts of corn consistently is more difficult to assess. In 1994/95, China began to import corn for the first time since 1989/90. Over time, China is projected to reduce corn exports and rely more on imports due to strong growth in internal corn demand, but the amount and timing of trade changes are very uncertain. Even though its imports are forecast to be relatively large in 1994/95, that does not necessarily mean that China will consistently import in the next few years.

Exporting Countries: Potential Competition

In the early 1990's, competing corn exporters captured a much larger share of the world market at the expense of the United States. The recent increase in foreign corn exports was largely in response to internal country developments and not stimulated by high U.S. prices, unlike the early 1980's. (The rise in U.S. corn prices in 1993/94 was a temporary spike, related to bad weather, rather than a sustained incentive to competitor expansion.) For sorghum and barley, aggregate competitor exports have not increased or shown any consistent pattern so far in the 1990's.

Recent competitor gains have been led by China which increased its corn exports dramatically in the 1990's—despite low international prices—because of sustained growth in domestic production that outpaced growth in domestic use. There has also been a strong interest in increasing foreign exchange earnings. Most of China's increased exports have gone to nearby Asian markets, where it can offer a lower delivered price than U.S. corn, as well as smaller shipments and shorter leadtime that also enhance its competitive edge. Quality problems in China's exports are common, however. China's corn is often perceived to have lower test weight than U.S. corn.[4] In addition, some Asian mar-

[4]Test weight is pounds of grain per bushel. Lower test weight corn has a lower feed value and, if used as a feedstuff, requires more corn to meet certain energy requirements for animal feeding.

Table 14—World corn, barley, and sorghum imports, 1989/90-1994/95[1]

Country/region	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
			Million tons			
Corn						
EU[2]	3.9	3.1	1.8	1.6	2.4	2.2
FSU[3]	19.4	11.5	10.4	6.4	2.8	2.5
China	0.4	0.0	0.0	0.0	0.0	3.0
East Europe	2.3	1.3	0.2	1.6	0.6	0.4
Latin America[4]	8.3	5.6	5.3	5.9	7.6	10.1
North Africa[5]	3.1	3.7	2.8	3.8	4.2	4.3
Sub-Saharan Africa[6]	0.6	0.7	5.0	4.6	2.0	1.1
Middle East	4.2	2.8	3.2	3.8	3.1	4.2
East Asia[7]	27.9	27.7	28.6	29.4	27.1	30.3
Other	4.3	2.8	5.4	5.0	5.7	6.0
Total[2]	74.4	59.1	62.6	62.0	55.5	64.1
Barley						
EU[2]	0.5	0.1	0.0	0.0	0.0	0.1
FSU[3]	5.8	5.7	5.3	2.6	1.1	1.1
China	0.6	0.9	1.0	0.6	1.2	1.2
East Europe	0.3	1.2	0.2	1.5	1.6	0.8
Latin America[4]	0.5	0.5	0.6	0.3	0.5	0.5
North Africa[5]	1.2	1.0	0.6	1.6	2.3	2.3
Sub-Saharan Africa[6]	0.0	0.0	0.1	0.0	0.0	0.0
Middle East	6.5	6.0	8.1	5.6	6.3	6.3
East Asia[7]	1.6	1.8	1.8	1.9	2.2	1.9
Other	0.8	1.3	1.0	1.2	3.3	1.4
Total[2]	17.7	18.5	18.6	15.3	18.5	15.5
Sorghum						
EU[2]	0.4	0.2	0.2	0.4	0.3	0.3
FSU[3]	0.4	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	0.0	0.0	0.0	0.0
East Europe	0.0	0.0	0.0	0.0	0.0	0.0
Latin America	3.2	3.1	5.1	4.0	3.2	2.4
North Africa	0.1	0.1	0.0	0.0	0.0	0.0
Sub-Saharan Africa[6]	0.0	0.3	0.2	0.2	0.2	0.0
Middle East	0.7	0.3	0.4	0.7	0.1	0.3
East Asia	4.1	3.7	3.4	3.4	2.9	3.0
Other	0.2	0.0	0.0	0.0	0.0	0.4
Total	9.0	7.8	9.4	8.7	6.7	6.4

[1]1993/94 preliminary. 1994/95 forecast

[2]Excludes intra-EU trade.

[3]Former Soviet Union. Includes intra-FSU trade.

[4]Includes Mexico.

[5]Algeria, Egypt, Libya, Morocco, and Tunisia.

[6]Includes South Africa.

[7]Japan, Taiwan, South Korea, and Hong Kong.

kets also commonly reported high moisture content in Chinese corn, especially the 1993/94 crop.[5]

In addition to China, exports by Argentina rebounded somewhat in the 1990's, based on improved yields and a modest recovery in acreage. Gains in yields apparently reflect greater input use. The stimulus for increases in production has been more internally directed, to maintain crop rotations and perhaps in response to a more stable investment climate, rather than export driven. The largest export gains by Argentina have come in Brazil, although Argentine exports are quite diversified across many regions.

Aggregate competitor exports of coarse grains are not expected to expand substantially over the next decade. It is difficult to generalize about foreign exporters because of their diverse nature.

Corn. In the corn market, reductions in exports by China and most smaller exporters are likely, while gains are expected for Argentina and Eastern Europe. China, the largest competitor, is expected to reduce exports over the next decade as its exportable surplus shrinks due to sharp growth in internal demand. In 1994/95, China's domestic corn use is forecast to reach 100 million tons, up from 81 million in 1990/91. Corn exports by the EU, which fluctuate considerably, are expected to remain fairly small as lower internal prices are expected to raise internal EU demand.

South Africa is likely to be a significant exporter only occasionally, after large crops. As it tries to reduce expenditures on export subsidies, South Africa is aiming toward self-sufficiency and possibly just small exports to neighboring countries. Because of large increases in domestic feed use, Thailand is not expected to rebound to its previous status as a major corn exporter and more likely will be a net importer.

This leaves most potential gains in competitor corn exports in Argentina and Eastern Europe. As a low-cost producer, Argentina is well placed to increase its corn exports. However, it will have to rely more on yield gains than growth in area to increase corn production because of continued competition for land with oilseeds. Economic reforms and privatization efforts are expected to improve Argentina's marketing and reduce its transportation costs in the future. Eastern Europe has good potential to expand corn exports: in the short term from Hungary and over the long term from Romania. Prospects for the former Yugoslavia, an important corn exporter in the past, are less certain because of civil strife.

Sorghum. Foreign exports of sorghum are expected to be flat at best and more likely to decline in the next decade. Argentina accounts for most of these exports. After many years of decline due to more attractive returns from other crops, Argentine sorghum area has recently stabilized. Unless prices rise dramatically above projections relative to other crops, such as oilseeds, the outlook is for little change by Argentina. Exports by Australia will likely shrink because of strong domestic growth for feed by the expansion of cattle feedlots.

Barley. The outlook for aggregate foreign barley exports is for moderate growth over the next decade. Compared with corn and sorghum, this outlook is more heavily influenced by policy adjustments, particularly GATT, and developments in wheat and other commodity markets. In the short run, exports by the EU are projected to increase due to a large amount of subsidized coarse grains allowed under GATT. After a few years, however, EU barley exports are likely to decline slightly and then flatten out as the allowed volume of subsidized exports is reduced.

Australia's exports of feed barley are likely to trend downward in the next decade because barley is a preferred feed for Australia's rapidly growing fed beef sector. Most of Australia's future exports will be malting barley due to stronger malting barley demand in Asia.

Canada's future barley exports are expected to increase, despite competition for land from oilseeds and wheat. However, larger barley crops will have to come from improvements in yields. Canada is likely to fill any opportunities to export malting barley to China if Australia is unable to supply this growing market.

U.S. Trade Outlook

U.S. Imports

In recent years, the United States has become a significant importer of barley and oats. Since 1983, the United States has been the world's largest importer of oats. These imports have increased fairly steadily over the last decade and reached a record in 1993/94. Canada has been the largest single supplier over this period, followed by Sweden and Finland. In the late 1980's, the Canadian Wheat Board relinquished control of oats marketing and exports to the private sector.

Scandinavia's oats are generally of high quality and are largely destined for milling into food products and

[5]Moisture content is the amount of water in grain. Corn with moisture above 15 percent is more susceptible to mold and other problems in storage.

the premium feed market for horses. Scandinavia's oats have also been heavily subsidized. Accession into the EU in January 1995 by both Finland and Sweden is not expected to disrupt these exports, assuming the oats are exported under EU export programs. If future Scandinavian exports are cut back due to adjustments in production or other reasons, Canada will likely continue to have large surplus supplies. Thus, U.S. oats imports are likely to remain large.

Barley imports have surged more recently. After a drought-induced shortfall in the late 1980's, imports of malting barley began to increase significantly. In 1993/94, however, large amounts of feed barley were imported in addition to malting barley, resulting in a record total. Virtually all U.S. barley imports come from Canada. The tremendous surge in barley imports from Canada in 1993/94 reflected tight U.S. supplies of feed grains after a poor corn crop. In fact, the supplies were so tight that unusually large volumes of wheat for feeding were also imported from Canada.

The weak Canadian currency and poor export prospects in other barley markets, notably the former Soviet Union, also provided greater incentives for Canadian sales to the United States, an attractive cash market. U.S. barley imports are expected to drop in 1994/95 as domestic demand for feeding in Canada is strong, and drought in Australia provides opportunities to export to countries other than the United States. For the future, Canada's exports of barley to the United States will depend on U.S. prices relative to domestic demand in Canada and prices available in other export markets.

U.S. Export Prospects

U.S. export prospects for corn and other feed grains are expected to improve over the next decade. The United States will benefit from both expansion in world import demand and gains in market share. The U.S. share of the world coarse grains market is projected to rebound from the unusually low 47 percent of 1993/94 and approach the 64-percent share of 1975-80, when the U.S. market share peaked. However, U.S. barley exports will face some restrictions due to implementation of GATT limits on export subsidies.

Changes in the pattern of world import demand will continue to reshape the direction of U.S. exports in the next decade (table 15). Import growth will be increasingly fueled by developing countries, driven by strong population growth, increasing incomes, and higher consumption of meat and livestock products. This implies that export credits will remain useful and perhaps grow in importance. Assuming the EU continues to subsidize its barley exports to the extent allowed by GATT, the Export Enhancement Program would be needed if the United States wants to maintain its current competitiveness. Trade agreements are likely to gain importance, perhaps with some expansion of NAFTA to include other countries.

The most promising U.S. export opportunities among the coarse grains are expected for corn. In part, this reflects most importers' preference of corn for their poultry sectors, which are projected to increase more than other meats. In addition, it reflects expectations that China's corn exports will drop.

U.S. exports may become less volatile than in the past, to the extent that the FSU no longer makes sudden large purchases that shock the market. Swings in China's trade, however, could increase volatility. In addition, periodic weather shocks can still be expected to spur demand or threaten U.S. supplies. The degree of potential market disruption will largely remain a function of the level of stocks.

Trade Issues and Uncertainties

Many uncertainties could contribute to changes in the export outlook. Some events would tend to reduce coarse grain trade, while others could expand it.

Developments in Meat Trade. Coarse grain demand in many countries will hinge on the price and availability of meat, poultry, and livestock products in the world market, competing with domestic production of meat. Even if some countries choose to import meat rather than feed grains, this can still benefit the United States. For example, Japan's market liberalization has brought significant increases in its meat imports, slightly reducing Japan's feed grain imports. Nevertheless, the United States still gains: increases in U.S. meat exports to Japan mean higher value-added exports; gains in corn exports to Taiwan, which exports pork to Japan; and reduced competition from Thailand's corn exports, as it uses more corn domestically and increases poultry exports to Japan.

Changes in Feed Wheat Trade. Global trade in wheat for feeding is expected to decline from the high level of the early 1990's. This prognosis mainly reflects expectations of tighter wheat markets, contributing to rising prices relative to coarse grains. In any given year, however, poor weather in an exporting country can damage the quality of milling wheat enough to push it into trade for feed. Australia has recently expressed interest in selling feed wheat to Asian feed grain markets on a more regular basis. To do that, however, Australia would probably have to develop

Table 15—U.S. exports by leading destinations, 1988/89-1993/94[1]

Country/region	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
			1,000 tons			
Corn						
Japan	13,133	14,166	13,378	13,411	14,138	12,214
Taiwan	3,812	5,083	4,939	4,955	5,333	5,077
Former Soviet Union	16,013	16,396	8,289	7,270	4,721	2,909
EU	2,303	3,241	2,974	1,571	1,378	1,765
Mexico	3,011	4,826	2,016	915	506	1,468
Egypt	1,201	1,145	1,683	1,067	1,397	1,553
Algeria	917	1,214	1,226	1,008	1,076	1,176
Caribbean	760	730	789	805	953	917
Saudi Arabia	564	805	657	622	752	916
Venezuela	0	415	448	534	718	809
Central America	314	543	542	563	686	790
Canada	880	578	395	212	1,247	603
S. Korea	4,578	5,663	2,161	1,558	991	508
Sub-Saharan Africa	162	165	216	1,080	1,601	394
East Europe	1,743	1,883	1,417	120	1,103	48
South Africa	--	0	14	1,757	2,354	12
Others	2,226	3,238	2,583	2,760	3,196	2,491
Total	51,617	60,091	43,727	40,208	42,150	33,649
Sorghum						
Mexico	2,138	3,009	2,981	4,881	4,147	2,942
Japan	2,518	3,225	1,949	1,669	1,922	1,640
Israel	399	363	166	75	230	83
EU	227	233	199	175	190	172
Turkey	--	52	115	85	147	0
Sub-Saharan Africa	55	21	217	173	98	136
Venezuela	1,175	104	0	0	13	0
Former Soviet Union	972	0	0	0	0	0
Others	381	622	241	172	131	41
Total	7,865	7,629	5,868	7,230	6,878	5,014
Barley						
Saudi Arabia	902	532	1,147	1,108	579	344
Israel	50	147	124	320	263	335
Former Soviet Union	0	7	0	161	235	0
Jordan	0	187	150	196	195	205
Algeria	250	124	103	92	115	222
Cyprus	46	22	50	77	101	110
Japan	126	104	39	52	50	49
Mexico	71	149	130	42	82	62
Others	273	558	12	9	128	107
Total	1,718	1,830	1,755	2,057	1,748	1,433

-- is greater than zero but less than 1,000 tons.

[1]September-August for corn and sorghum; June-May for barley.

varieties capable of generating sufficient returns to be attractive to farmers.

China's Future Trade Status. A major issue is whether China will sustain its corn exports at relatively high levels in the face of projected growth in domestic demand. The outcome will be affected by policy decisions, availability of alternative feeds, income growth, the ability to sustain yield increases, and improvements to internal distribution channels. If China begins large imports of corn or reduces exports more suddenly than expected, then U.S. exports could increase accordingly.

Government Programs for Feed Grains

The United States has implemented programs to support incomes of grain producers and stabilize grain prices since the 1930's. These programs have undergone substantial changes over time as Congress has sought to maintain the original purpose of the programs but adapt them to changing economic conditions and shifting government spending priorities.

The basic instruments of modern feed grain programs include target prices to support incomes, loan and storage programs to support prices, and acreage reduction programs to constrain production and limit Federal budget outlays. The 1991-95 crops of feed grains are affected by the Food, Agriculture, Conservation, and Trade Act (FACTA) of 1990 and the Omnibus Budget Reconciliation Acts (OBRA) of 1990 and 1993. The 1990 legislation made some important changes in program provisions for feed grains.

Target Prices

Target prices for corn, sorghum, and barley were established in the Agriculture and Consumer Protection Act of 1973 (1973 Act); a target price for oats was established in the Food and Agriculture Act of 1981 (1981 Act). Feed grain producers receive deficiency payments whenever the target price for the commodity exceeds its U.S. average market price during a specified time period. To be eligible for deficiency payments and other program benefits, a producer must participate in any acreage reduction program (ARP) in effect for the commodity.

In simplest terms, the deficiency payment to a producer equals the deficiency payment rate for the commodity (target price minus the higher of the loan rate or average market price) multiplied by the farm's program production of the commodity (payment acres times program yield per acre). Under current law, payment acres generally equal 85 percent of the farm's established acreage base for the commodity, less base acres that must be idled to comply with an ARP.

In recent years, deficiency payments for corn have accounted for 85-90 percent of total feed grain deficiency payments. This was not the case under the 1973 Act and the Food and Agriculture Act of 1977 (1977 Act). During the 8-year period covered by those two acts, payments were made on corn in only 1978/79, and the rate was just 3 cents a bushel. Payments on sorghum were made in 3 of the 8 years, and barley payments were made in 4 years. The reason for more frequent payments on barley and sorghum was that target prices, which were based on per bushel costs of production, were higher for barley and sorghum than for corn. However, market prices, which generally reflect relative feed values, were lower for barley and sorghum.

The 1981 Act made important changes in the target price provisions. The 1981 Act was debated during a period of rapid inflation and expectations of continued high rates of inflation. The cost-of-production formula was abandoned, and target prices for other feed grains were set in relation to corn, taking feed value into account. Thus, corn was to have the highest per bushel target price among the four feed grains.

Congress raised the corn target price from $2.40 per bushel in 1981/82 to $2.70 in 1982/83, the first year under the 1981 Act (table 16). Thereafter, annual increases of around 6 percent in the minimum corn target price were mandated, largely because of an expectation of continued high inflation rates. The corn target price was slated to reach $3.18 in 1985/86, the last year under the 1981 Act. However, by 1984, grain prices had weakened and the potential budget exposure from rising target prices had become an issue. The Agricultural Programs Adjustment Act froze the corn target price for 1985/86 at $3.03, the 1984/85 level.

Federal budget outlays for feed grain deficiency payments ballooned under the 1981 Act. Prior to the 1981 Act, deficiency payments on corn had totaled only $88 million, all on the 1978 crop. By contrast, deficiency payments totaled $4.1 billion for the 1984 and 1985 corn crops combined. This total would have been larger except for the $2.55 loan rate, which limited the maximum deficiency payment rate to 48 cents per bushel ($3.03 minus $2.55). Although high loan rates supported market prices and limited deficiency payments, they caused large-scale accumulation of stocks and loss of export markets. These developments set the stage for the Food Security Act of 1985 (FSA).

Table 16—Feed grain target prices, loan rates, and deficiency payment rates, 1982-95 marketing years

Crop	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
							Dollars per bushel							
Target price														
Corn	2.70	2.86	3.03	3.03	3.03	3.03	2.93	2.84	2.75	2.75	2.75	2.75	2.75	2.75
Sorghum	2.60	2.72	2.88	2.88	2.88	2.88	2.78	2.70	2.61	2.61	2.61	2.61	2.61	2.61
Barley	2.60	2.60	2.60	2.60	2.60	2.60	2.51	2.43	2.36	2.36	2.36	2.36	2.36	2.36
Oats	1.50	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.45	1.45	1.45	1.45	1.45	1.45
Basic loan rate														
Corn	---	---	---	---	2.40	2.28	2.21	2.06	1.96	1.89	2.01	1.99	1.99	1.94
Sorghum	---	---	---	---	2.28	2.17	2.10	1.96	1.86	1.80	1.91	1.89	1.89	1.84
Barley	---	---	---	---	1.95	1.86	1.80	1.68	1.60	1.54	1.64	1.62	1.62	1.58
Oats	---	---	---	---	1.23	1.17	1.14	1.06	1.01	0.97	1.03	1.02	1.02	1.00
Announced loan rate														
Corn	2.55	2.65	2.55	2.55	1.92	1.82	1.77	1.65	1.57	1.62	1.72	1.72	1.89	1.89
Sorghum	2.42	2.52	2.42	2.42	1.82	1.74	1.68	1.57	1.49	1.54	1.63	1.63	1.80	1.80
Barley	2.08	2.16	2.08	2.08	1.56	1.49	1.44	1.34	1.28	1.32	1.40	1.40	1.54	1.54
Oats	1.31	1.36	1.31	1.31	0.99	0.94	0.90	0.85	0.81	0.83	0.88	0.88	0.97	0.97
Deficiency payment rate														
Corn	0.15	0.00	0.43	0.48	1.11	1.09	0.36	0.58	0.51	0.41	0.73	0.28	0.57	---
Sorghum	0.18	0.00	0.46	0.46	1.06	1.14	0.48	0.66	0.56	0.37	0.72	0.25	0.59	---
Barley	0.40	0.21	0.26	0.52	0.99	0.79	0.00	0.00	0.20	0.62	0.56	0.67	0.52	---
Oats	0.00	0.11	0.00	0.29	0.39	0.20	0.00	0.00	0.32	0.35	0.17	0.11	0.19	---

--- means not available or not applicable.

Deficiency payment rates for 1994/95 are minimums based on the 5-month adjusted price.

The FSA of 1985 was developed under agricultural economic conditions that demanded a change in direction for U.S. farm programs. Outcomes under the 1981 Act—mounting grain surpluses, escalating program costs, and declining exports—illustrated the dangers in policies that were too rigid to allow U.S. producers and exporters to adjust to changing worldwide grain market conditions.

The goal of the FSA was "market orientation." For the first time, legislation provided for future, planned reductions in annual target price minimums. To lessen the impact on farm income during the transition to a more market-oriented agriculture, target prices for the 1986 and 1987 feed grain crops were frozen at 1985/86 levels. Target price reductions began in 1988/89 and by 1990/91, the last year covered by the FSA, target prices were down nearly 10 percent from 1987/88 levels.

Budget outlays for feed grain deficiency payments rose sharply under the FSA, particularly in 1986/87-1987/88. Loan rates for grains were reduced substantially in order to allow U.S. market prices to fall to market-clearing levels. Maximum permitted deficiency payment rates (target price minus loan rate) more than doubled. Payment rates exceeded $1.00 per bushel for both corn and sorghum in 1986/87-1987/88. However, the combination of severe drought in 1988 and lower target prices reduced corn and sorghum payment rates to 50-60 cents per bushel by 1989/90 through 1990/91.

The FACTA of 1990 was debated during a time of intense concern over the Federal budget deficit. A further reduction in target prices was one option to cut farm program spending. Congress chose instead to limit deficiency payments by reducing the acreage covered by target prices (see Acreage Reduction Programs section). Minimum target prices for the 1991/92-1995/96 crop years covered by the FACTA were frozen at 1990/91 levels ($2.75 per bushel for corn).

The FACTA made changes in deficiency payment rate calculations for the 1994-95 feed grain crops. Payment rates for the 1991-93 crops were to be calculated according to the 1985 FSA, namely: when the 12-month (season average) price is above the basic loan rate, the payment rate is the target price minus the higher of the basic loan rate and the average market price for the first 5 months of the marketing year; and when the 12-month price is less than the basic loan rate, the deficiency payment rate is the target price minus the higher of the announced loan rate and the 12-month average price (see the next section of this report for loan rate definitions). For the 1994-95 crops, the 5-month market price is replaced by the lesser of (1) the 12-month average price and (2) the 5-month price plus 7 cents per bushel. The new procedure for the 1994-95 crops likely will yield a smaller payment rate than the one for 1991-93 crops when the 12-month price is above the basic loan rate; the maximum reduction cannot exceed 7 cents per bushel.

Feed grain deficiency payments under the 1990 legislation have ranged from less than $2 billion in 1993/94 to more than $4 billion for 1992/93. Record corn yields in 1992 led to lower market prices and higher deficiency payments. A new record yield in 1994 may push feed grain deficiency payments toward $4 billion.

Loan and Storage Programs

Government loan programs have been in effect for corn since the 1930's and for the other feed grains since the 1950's. Under the program, producers pledge all or part of their production of a commodity as collateral and, in return, receive a loan equal to the product of the per bushel loan rate and the number of bushels placed under loan. Generally, the loan must be repaid with interest within 9 months. However, the loans are "nonrecourse," which means that the Government must accept the commodity under loan as repayment of the loan principal plus interest, if the producer so desires.

The nonrecourse feature of the loan program and the fact that the bulk of production is usually eligible (producers must participate in the ARP for the commodity to be eligible for loans) tend to make the loan rate a market price "floor." If the price floor is near or above market-clearing prices, producers have no incentive to repay loans with cash. This was the case in 1984 and 1985 for grains. As a result, the Government became owner of a massive amount of grain that had been placed under loan.

Congress reacted to the 1984-85 experience by making important changes in loan programs in the FSA of 1985. The FSA permitted the Secretary of Agriculture to set the "basic" loan rate for corn at 75-85 percent of past market prices. The announced or actual loan rate for the crop (the "reduced" or "Findley" rate) could be up to 20 percent lower than the basic rate, at the Secretary's discretion. Loan rates for sorghum, barley, and oats were to be based on corn, taking relative feed values into account. During 1986-90, loan rates for feed grains were reduced the maximum allowed by law. The loan rate for corn dropped from $2.55 per bushel in 1985/86, the last year under the 1981 Act, to $1.92 in 1986/87, and eventually to $1.57 in 1990/91.

Congress continued the market-oriented approach of the FSA in developing the FACTA. Under FACTA, the basic loan rate for corn is set at 85 percent of the average farm price for the previous 5 marketing years, excluding the years with the highest and lowest price. The basic loan rate may not be reduced more than 5 percent from the previous year's basic rate. Loan rates for the other feed grains continue to be set in relation to corn.

Under the 1985 FSA, the Secretary of Agriculture had discretionary authority to announce a loan rate up to 20 percent below the basic rate. The FACTA weakened this authority by linking permitted reductions in the loan rate to the projected ending stocks-to-use ratio for corn for the current marketing year. When projected ending stocks are excessive, more than 25 percent of use, the reduction from the basic rate may be up to 10 percent; when the projected ratio is 12.5-25 percent, the reduction may be up to 5 percent; and when the projected ratio is less than 12.5 percent, there may be no reduction. However, the reduction from the basic loan rate based on stocks-to-use may be limited under certain price conditions by a statutory minimum loan of $1.76 per bushel for corn.

The Secretary has discretion under FACTA to further reduce the loan rate by up to 10 percent on top of any reduction based on stocks-to-use. Loan rates for feed grains were reduced the maximum allowed in 1991/92 and 1992/93. Still, loan rates were higher than in 1990/91, the last year under the FSA. Maximum permitted reductions were not made in 1993/94 and 1994/95. By 1994/95, the announced corn loan rate had risen to $1.89, the highest since 1986/87, and 32 cents above the rate in 1990/91.

The Omnibus Budget Reconciliation Act (OBRA) of 1990 required USDA to implement *marketing loans* for the 1993-95 crops of feed grains and wheat if the United States had not entered into a GATT agreement by June 30, 1992. Because no agreement was entered into by that date, USDA implemented marketing loans for feed grains in 1993/94 and 1994/95.

Marketing loan provisions allow producers to repay loans at the lower of the announced loan rate or the prevailing world market price. The objective is to prevent the loan rate from becoming an artificial price floor which would cause stocks under loan to accumulate and U.S. grains to be less competitive in world markets. To administer the program, USDA uses daily posted county prices (PCP's) to represent the prevailing world market price. Generally, the PCP for a commodity is a terminal market price less transportation costs between the terminal market and the county.

Producers may benefit from the marketing loan either by repaying a loan at the PCP if the PCP is less than the loan rate plus accrued interest, or by receiving a loan deficiency payment (LDP). The LDP is the difference between the county loan rate and the PCP. In order to receive an LDP, the producer must agree not to put the grain under loan. Grain brought out of loan also cannot receive an LDP. In addition to these direct benefits, producers may also benefit if they use the marketing loan and then sell the grain at a price higher than the marketing loan repayment rate.

Federal budget exposure to marketing loan gains and LDP's is substantial because a large quantity of grain usually is eligible for the program. Producers who participate in the ARP for the commodity are eligible. Unlike the case for target price deficiency payments, however, which are paid on relatively fixed program production, a participant's entire production is eligible for the loan program. Marketing loan benefits (costs) are more likely when U.S. production is large, as in 1994/95 for corn. As the 1994 crop was harvested, PCP's at times were less than county loan rates in some areas of the Corn Belt. The combination of a 0-percent ARP, 82 percent program participation, and a record yield boosted loan-eligible corn production to around 8 billion bushels.

The *Farmer-Owned Reserve* (FOR) program offers producers an additional storage option when specified market price and supply triggers are met. Under the 1990 FACTA, the Secretary of Agriculture may authorize feed grains to enter the FOR when one of the following is met: 1) the projected ending stocks-to-use ratio for corn for the current marketing year is greater than 22.5 percent, or 2) the market price for corn is less than 120 percent of the announced loan rate for 90 consecutive calendar days. The Secretary may announce the opening of the FOR any time the conditions are met, but the Secretary is not required to do so. The exception is that an announcement must be made by March 15 in the year following corn harvest, and the Secretary must declare the FOR open only if both triggers are met at that time.

The maximum quantity of feed grains that may enter the FOR must be specified when the FOR is opened. This quantity must be between 600 million and 900 million bushels for feed grains. Producers must report the quantity they intend to place in the FOR to the local USDA office. If aggregate intentions ex-

ceed the maximum quantity specified, USDA determines a prorated amount for each producer.

Producers cannot enter grain directly into the FOR, but must first place it under the 9-month loan. When the 9-month loan matures, the grain, subject to the approved quantity limit, may be "rolled over" into the FOR. The FOR loan matures 27 months after the original 9-month loan matures. The producer receives quarterly storage payments at an annual rate of 26.5 cents per bushel. Storage payments cease for at least 90 days if market prices rise to 95 percent of the target price. Producers can redeem all or part of their FOR loans at any time over the 27-month term without penalty. Grain in the FOR not redeemed by the end of the 27-month period is forfeited to the government.

The FACTA provisions for the FOR have lessened its influence on grain marketing decisions. In the past (the 1977 Act established the FOR), the FOR was often a remunerative option for farmers and an expensive program for the government. At various times the FOR loan rate was set higher than the 9-month loan rate, and grain could be entered directly into the FOR during harvest. The FACTA made FOR less attractive to producers in the absence of a higher loan rate and direct entry after harvest.

The FOR was opened for the 1992/93 crops of corn, sorghum, and barley. About 300 million bushels of grain entered the FOR, and, as of December 1994, about 120 million bushels remained in the reserve. The FOR has also been opened for the 1994/95 crops, with the maximum quantity set at 900 million bushels. These quantities are small in comparison to earlier years, 1982/83 for example, when more than 2 billion bushels of feed grains were in the FOR at the close of the season.

Acreage Reduction Programs

Because government-set target prices for feed grains and other program crops exceed market prices, acreage reduction programs (ARP's) are needed to limit Federal budget outlays and to prevent the buildup of surplus stocks. ARP's limit planted area by requiring program participants to set aside, for conserving uses, a portion of their crop base (table 17). This reduces production from program participants, which raises market prices. Thus, ARP's control deficiency payment outlays by cutting the acreage eligible for payments and by raising market prices.

The precedent for idling acreage was set in the 1930's and was heavily used in the late 1950's, the 1960's, and sporadically in the 1970's. Programs in the 1980's-90's have their roots in the 1981 Act which replaced general acreage "set-asides" with commodity-specific programs. The Food and Agriculture Act of 1977 had defined the acreage base for program purposes as the sum of crops normally planted on the farm ("normal crop acres" or NCA). Under the NCA, as administered under the 1977 Act, acres required to be set aside were expressed as a percentage of acres of the set-aside crop planted in the current year. There were no restrictions on planting the set-aside crop, or any other approved NCA crop, except that total plantings plus set-aside acres could not exceed the NCA for the farm.

The 1977 Act defined deficiency payment acres as "current plantings" of the target price crop. This provision increased the role of target prices in planting decisions and permitted individual producers to decide how many acres of each commodity to plant for deficiency payments (subject to the NCA constraint on plantings). Substantial increases in target prices were called for in the 1981 Act. As a result, budget exposure became a primary concern, and the Act authorized crop-specific acreage bases (CAB's), based on recent plantings, and ARP's to replace the more general NCA and set-asides. ARP's permit USDA to limit plantings of a target price crop to a specified percentage of its CAB, as a condition for a producer to receive deficiency payments for the commodity.

The 1985 FSA continued the use of ARP's to limit acreages of feed grains and other program crops. Important changes included the establishment of the Conservation Reserve Program (CRP). Under CRP, producers bid to enroll environmentally sensitive land in the program. The contracts are for 10 years. Producers receive annual rental payments in return for keeping the land in conservation uses, but they forgo the opportunity to receive deficiency payments on these acres. Producers with program crop acreage bases had their bases reduced on a pro-rata basis when their bids were accepted. By 1994, 11 million acres of feed grain base were enrolled in the CRP.

The 1985 Act included a provision to allow producers to receive 92 percent of their expected deficiency payments while planting as little as 50 percent of permitted acreage (base less ARP acres) of the feed grain. The underplanted acres had to be put into conservation uses. This program provision, known as 50-92, was later changed to 0-92 and is now 0/85-92. This provision allows a producer to devote all the permitted acreage for a commodity to conservation uses and receive 85-92 percent of projected deficiency payments.

Table 17—Feed grain annual acreage reduction programs, program participation, and acres idled, 1982-95

Crop	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
							Percent							
Acreage Reduction Program (ARP)														
Corn	10	10*	10	10	20*	20*	20*	10	10	7.5	5	10	0	7.5
Sorghum	10	10*	10	10	20*	20*	20*	10	10	7.5	5	5	0	0
Barley	10	10*	10	10	20*	20*	20*	10	10	7.5	5	0	0	0
Oats	10	10*	10	10	20*	20*	5	5	5	0	0	0	0	0
Participation														
Corn	29	71	54	69	86	91	87	80	77	77	76	81	82	--
Sorghum	47	72	42	55	74	85	82	71	70	77	79	82	81	--
Barley	46	55	44	57	72	85	79	67	68	76	75	83	84	--
Oats	14	20	14	14	38	45	30	18	9	38	40	46	40	--
							Million acres							
ARP idled														
Corn	2.1	32.2	3.9	5.4	13.7	21.8	17.6	6.3	6.1	4.7	3.1	6.6	0	--
Sorghum	0.7	5.7	0.6	0.9	2.4	3.6	2.8	1.1	1.0	0.8	0.5	0.6	0	--
Barley	0.4	1.1	0.5	0.7	1.8	2.7	2.2	0.8	0.7	0.6	0.4	0	0	--
Oats	0.1	0.3	0.1	0.1	0.4	0.7	0.1	0.1	0	0	0	0	0	--
0-50/92 idled														
Corn	--	--	--	--	0.6	1.4	2.9	4.5	4.6	2.7	2.2	4.3	2.4	--
Sorghum	--	--	--	--	0.4	0.5	1.1	2.2	2.3	1.7	1.5	1.7	1.6	--
Barley	--	--	--	--	0.2	0.3	0.6	1.5	2.2	1.5	1.9	2.5	2.7	--
Oats	--	--	--	--	0.1	0.1	0.2	0.3	0.2	0.6	0.7	0.8	0.6	--
Idled annual programs														
Feed grains	3.3	39.4	5.0	7.1	19.6	31.0	27.5	16.7	17.2	12.7	10.4	16.5	7.2	--

*Programs had provision for additional paid diversion; the 20-percent reduction in 1986 included a 2.5-percent diversion.

Source: Consolidated Farm Service Agency (formerly Agricultural Stabilization and Conservation Service), USDA.

Even with the changes noted above, feed grain ARP's remained at high levels during 1986-88. During this period, deficiency payment rates soared following reductions in loan rates and, thus, market prices. The sharp increase in budget exposure intensified the need for ARP's. Following the 1988 drought, feed grain market prices rose and ARP's were reduced to half their earlier levels.

The 1990 farm program legislation made important changes in acreage programs. The most significant change was the planting flexibility provision in the 1990 Omnibus Budget Reconciliation Act (OBRA). The OBRA specified that deficiency payments not be made on 15 percent of base acres in addition to base acres idled under the ARP. Thus, even with a 0-percent ARP, payments are made on a maximum of 85 percent of the acreage base (see box). The 15-percent unpaid portion of base is known as "normal flex acres" or NFA. The farmer may plant the base crop, other program crops, soybeans and other oilseeds, or any other approved non-program crop on NFA without loss of base. Because deficiency payments are not made on NFA, producers' planting decisions on NFA are likely based on market returns and/or rotation needs.

Farmers wanting greater planting flexibility than the 15-percent NFA may use up to an additional 10 percent of the crop acreage base to grow crops other than the base crop ("optional flex acres" or OFA). Although base is protected if the farmer plants approved alternative crops on OFA, deficiency payments are forgone by not planting the base crop. Thus, deficiency payments influence planting decisions on OFA.

Feed grain producers have used the flexibility provisions, primarily NFA, to shift acres into alternative crops. During 1991-94, the shift from feed grains to other crops ranged from 3.3 to 5.0 million acres annually. Most of this shift is accounted for by a shift from corn to soybeans on corn base NFA.

The 1990 FACTA links permitted ARP levels to stocks-to-use ratios. This was a change from the 1985 FSA which tied ARP levels to the quantity of corn in ending stocks. The exception to the stocks-to-use provision is that the ARP for oats must be 0-percent for the 1991-95 crops. Under FACTA, the corn ARP may be 0 to 12.5 percent if the previous year's stocks-to-use ratio is less than or equal to 25 percent; the ARP may be 10 to 20 percent if the stocks-to-use ratio is greater than 25 percent. The Agricultural Reconciliation Act (ARA) of 1990 requires that ARP be set at not less than 7.5 percent for 1992-95 corn, sorghum, and barley if the stocks-to-use ratio is less than 20 percent. The so-called "GATT trigger" in the 1990 ARA, however, authorized the Secretary to waive minimum ARP requirements for 1993-95 feed grains if by June 30, 1992, the United States had not entered into a GATT agreement (Uruguay Round). The OBRA of 1993, however, struck out the minimum ARP level for barley and sorghum as established by the 1990 ARA, but retained it for corn. In addition, the OBRA of 1993 rescinded the ARP waiver under the "GATT trigger" provision for the 7.5-percent corn ARP as set out in the 1990 ARA.

The FACTA continued many of the 1985 FSA provisions for acreage programs. The legislation defines CAB as the 5-year moving average of acreage planted and "considered planted" to the program crop, but expands the definition of "considered planted"; the 0-92 program is continued, but the 1993 OBRA changed the program to 0-85 under certain circumstances to reduce budget outlays; the CRP is continued, but the pace of enrollment has dropped sharply from the initial years of the program; and program yields used to calculate production eligible for deficiency payments remain frozen at their 1985 levels.

The 1990 FACTA maintains the 1985 FSA provision for combining the permitted acreage for corn and sorghum. Under this provision, producers have the flexi-

Production eligible for deficiency payments: 1985 and 1990 farm acts

Assume:
100-acre corn base
ARP is 10 percent
Deficiency payment rate is $0.50 per bushel

	Item	1985 FSA	1990 FACTA
	Base acres	100	100
-	ARP acres	10	10
-	Normal flex acres	0	15
=	Maximum payment acres	90	75
x	Program yield, bu.	100	100
=	Maximum production for payment, bu.	9,000	7,500
x	Payment rate	$.50	$.50
=	Maximum def. payments	$4,500	$3,750

bility to plant any combination of corn and sorghum on the combined permitted acreage. Producers maintain the respective crop bases and receive the same total deficiency payment regardless of what combination of the two crops is planted on permitted acreage.

Feed grain ARP's have been smaller under the 1990 FACTA than under the 1985 FSA. For the first time since they were instituted in 1982/83, ARP's for all four feed grains were 0 percent in 1994/95. However, 7.2 million feed grain base acres were idled under the 0/85-92 provision. The record large 1994 corn crop and forecast 1.7-billion-bushel ending stocks have led to a 7.5-percent ARP for 1995/96 corn; ARP's for other feed grains will remain at 0 percent.

Payment Limitations

The 1990 FACTA changed rules governing per person payment limitations. The annual limit on the total of regular deficiency payments and diversion payments remains at $50,000. Marketing loan gains and loan deficiency payments are now subject to a limit of $75,000 per person, rather than $200,000 as under the 1985 FSA. These limits apply to combined payments from all program crops.

Crop Insurance Reform

The Federal Crop Insurance Reform Act of 1994 makes participation in at least the catastrophic coverage level of the crop insurance program a requirement in order to be eligible for price support or production adjustment programs, certain loans offered by USDA's Consolidated Farm Service Agency (formerly Farmers Home Administration), and CRP. Each crop that accounts for 10 percent or more of the total expected value of all crops grown by the producer must be insured.

The new catastrophic coverage level is available to farmers for a nominal processing fee of $50 per crop, with a cap of $200 per farmer per county, and $600 per farmer total. This fee will be waived for limited-resource farmers. Catastrophic coverage will compensate farmers for crop yield losses greater than 50 percent at a payment rate of 60 percent of the expected market price. The coverage levels are comparable to disaster relief programs in recent years. The Federal Crop Insurance Reform Act repeals current authorities for ad hoc disaster relief.

Effects of the 1990 FACTA

Farmers

Direct government payments continue to be an important source of income for feed grain producers (table 18). During 1991-93, direct payments as a percentage of annual gross income for all producers ranged from 12-17 percent for corn production, 19-22 percent for sorghum, 24-31 percent for barley, and 18-25 percent for oats. These percentages are well under those for the mid-1980's. During 1986-88, for example, direct payments were 25-37 percent of annual gross income from corn production.

Participation rates in ARP's remain high because producer returns for program participants remain above those for nonparticipants. Relatively low or 0-percent ARP's have maintained participation, even though overall support has been reduced by the 15-percent unpaid flex acres provision. In addition, average payment yields are now about 85 percent of trend yields. The flex acres provision and frozen payment yields have combined to cut deficiency payment coverage to 70-75 percent of a participant's expected corn production. When production from nonparticipants is added, deficiency payment coverage is around 50-55 percent of total production.

Taxpayers

The 1990 legislation reduced budget exposure to deficiency payments by cutting payment acres. Nevertheless, exposure remains large due to the sheer volume of feed grain production. With a 0-percent ARP, a 1-cent per bushel change in the average farm price for corn changes annual deficiency payments by $50-$60 million.

Changes in the FOR program have made that program less costly for taxpayers. Storage subsidies have been less than $10 million for the 1991-93 crops, compared with nearly $550 million as recently as 1987/88.

The sum of deficiency, disaster, FOR storage, and CRP rental payments has ranged from $3.1 to $4.8 billion for the 1991-93 feed grain crops versus $4.9 to $9.4 billion for the 1986-90 crops, the years covered by the 1985 FSA.

Consumers

Changes made in the 1985 FSA and in the 1990 FACTA have reduced the effects of feed grain programs on consumer prices for meat, dairy, and grain-based food and beverage products. These changes include lowered loan rates, provisions for marketing loans, and a smaller FOR program.

The effects of the program on market prices, compared with having no program, are difficult to evaluate. However, programs that idle productive feed grain

Table 18—Feed grain deficiency payments and FOR storage payments, 1982-93 crop years

Commodity	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
						Million dollars						
Deficiency payments												
Corn	291	0	1,653	2,480	6,195	5,910	2,163	3,504	3,014	2,080	3,625	1,502
Sorghum	64	0	158	227	557	576	266	390	317	175	328	150
Barley	60	43	50	159	345	320	40	23	59	173	153	204
Oats	0	5	0	8	30	19	4	0	8	30	15	12
Total	415	48	1,862	2,874	7,128	6,824	2,473	3,918	3,398	2,457	4,121	1,869
FOR storage payments												
Corn	684	(22)	79	205	519	480	275	155	(2)	0	0	8
Sorghum	118	39	34	21	32	28	11	5	0	0	0	--
Barley	27	25	25	23	33	38	8	0	0	0	0	1
Oats	1	--	0	1	1	1	--	0	0	0	0	0
Total	830	43	138	249	586	546	295	160	(2)	0	0	9

Source: Consolidated Farm Service Agency (formerly Agricultural Stabilization and Conservation Service), USDA

Numbers may not add due to rounding.

( ) denotes negative amount due to refunds.

-- denotes less than $0.5 million.