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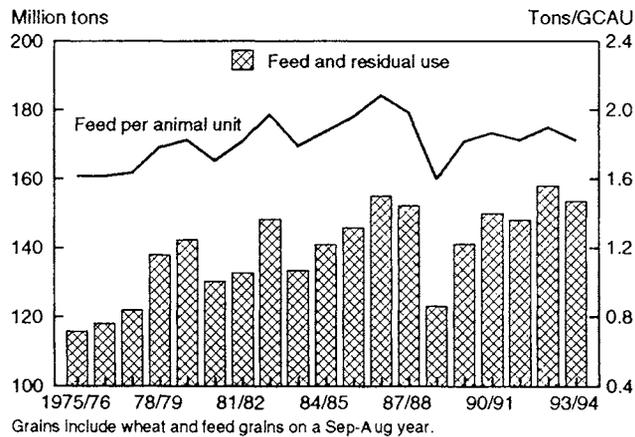
# Feed

## Situation and Outlook Report

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**Feed and Residual Use of Grains To Fall**



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# Summary

## Feed Grain Supplied Lowest Since 1983 Drought

U.S. feed grain production for 1993/94 is forecast at 193 million tons, 30 percent below last year's record. Although carryin stocks were up 85 percent to 63 million tons and larger imports are expected, feed grain supplies of 258 million are 17 percent below a year ago and the lowest since the 1983/84 drought reduced supplies to 246 million.

Crop losses this year stand in sharp contrast to record yields a year ago. Wet weather in the spring delayed--and in some cases--prevented plantings. In addition, flooding in the Midwest and Northern Plains during the summer destroyed crops and retarded crop development. Drought in the Southeast also contributed to the smaller crop. As a result, feed grain yields are forecast to average 2.3 tons per acre, down 20 percent from last year and the lowest since 1988/89. While plantings declined 7 percent, harvested area of 83.7 million acres is off 13 percent. Only 83 percent of the crop is expected to be harvested for grain, compared with 89 percent last year.

Corn supplies in 1993/94 are forecast at 8.6 billion bushels, nearly 2 billion below a year ago and only slightly higher than total disappearance a year ago. Lower supplies and higher prices will reduce disappearance in 1993/94. Feed and residual use of corn is forecast to drop 450 million bushels to 4.85 billion, which will be partially offset by an expected increase in feed and residual use of wheat, especially next summer. Weak global import demand and increased export competition are largely responsible for the expected drop in U.S. corn exports, down 313 million to 1.35 billion bushels. In contrast, food, seed, and industrial uses are forecast to reach 1.55 million in 1993/94, up almost 40 million from last year.

With total corn disappearance 1993/94 much larger than the 1993 crop, ending stocks are forecast to drop to 881 million bushels. This would be the lowest since 1975/76 and equal to 11.4 percent of projected 1993/94 use. As a result, corn

prices received by farmers are forecast to average between \$2.35 and \$2.75 per bushel, up from \$2.07 last year.

Hay supplies for 1993/94 are forecast at 175.2 million short tons, down 2.5 million from last year. A 7.4-million-ton reduction in carryin stocks more than offsets a 4.9-million-ton increase in production. Quality of this year's crop has been reduced by flooding and wet conditions in the Midwest and Northern Plains, but should be adequate for herd maintenance.

Global coarse grain supplies in 1993/94 are forecast to decline almost 55 million

tons because of the lower U.S. crop. However, foreign consumption is not expected to decline due to higher foreign production and some drawdown in stocks. Although world barley trade is forecast to rise significantly, corn trade will be down sharply, and coarse grain trade is expected to decline about 3 percent to 85.7 million tons. World coarse grain ending stocks are forecast to fall 43 million tons, with most of the decline occurring in the United States. This would be the lowest carryout stocks since 1983/84, while the ratio of global stocks-to-use is forecast at 13.9 percent, the lowest since 1973/74.

### U.S. Feed Grain Summary

Year 1/	89/90	90/91	91/92	92/93	93/94	Record prod. 2/ 92/93	Lowest stocks 2/ 75/76	
<b>TOTAL FEED GRAINS</b>								
	Million acres					Million acres		
Planted	106.1	103.4	104.6	108.4	100.3	108.4	122.6	
Harvested	91.0	89.5	91.9	96.1	83.7	96.1	104.7	
Yield (ton/ac)	2.43	2.57	2.38	2.89	2.31	2.89	1.77	
	Million tons					Million tons		
Beg. stocks	65.9	45.5	47.7	34.0	63.0	34.0	21.1	
Production	221.0	230.5	218.4	277.5	193.0	277.5	185.1	
Supply	288.2	277.3	268.2	312.7	258.2	312.7	206.5	
Dom. Disp.	173.0	178.1	184.5	198.5	187.4	198.5	133.7	
FSI	40.3	40.7	42.7	44.0	45.0	44.0	17.9	
Feed/res.	132.7	137.5	141.8	154.5	142.4	154.5	115.8	
Exports	69.7	51.5	49.7	51.1	42.6	51.1	48.8	
End. stocks	45.5	47.7	34.0	63.0	28.2	63.0	23.9	
<b>SECTOR</b>								
	Corn		Sorghum		Barley		Oats	
Year 1/	92/93	93/94	92/93	93/94	92/93	93/94	92/93	93/94
	Million acres							
Planted	79.3	73.7	13.3	10.7	7.8	7.9	8.0	7.9
Harvested	72.1	63.1	12.2	9.7	7.3	7.1	4.5	3.8
Yield, bu/ac	131.4	103.1	72.8	63.6	62.5	58.9	65.6	54.6
	Million bushels							
Beg. stocks	1,100	2,113	53	175	129	151	128	113
Production	9,479	6,503	884	620	458	416	295	208
Supply	10,586	8,631	937	795	598	592	477	401
Dom. disp.	6,810	6,400	485	468	366	390	358	305
FSI	1,511	1,550	8	8	167	165	125	125
Feed/res.	5,299	4,850	478	460	200	225	233	180
Exports	1,663	1,350	277	250	80	85	6	5
End. stocks	2,113	881	175	78	151	117	113	91
Stks/use, %	24.9	11.4	23.0	10.9	33.8	24.6	31.1	29.5
Avg. farm price, \$/bu	2.07	2.35-2.75	1.89	2.15-2.55	2.05	1.95-2.15	1.32	1.35-1.45

1/ Corn and sorghum, September/August; barley and oats, June/May.  
2/ Based on data since 1975/76.

## Feed Grain Supplies Lowest Since 1983/84

Feed grain supplies for 1993/94 are forecast at 258.2 million tons, the lowest since 1983/84 when supplies were 245.5 million. Although total use of feed grains is forecast to decline nearly 20 million tons, carryout stocks are forecast at only 28.2 million, the lowest since 1975/76.

### Larger 1993/94 Carryin Stocks Soften Impact of Smaller Crop

The 1993 feed grain crop of 193 million tons is 30 percent smaller than last year's record and the lowest since drought reduced production to 149.3 million in 1988. This year's crop was reduced by a wet, cool spring, summer flooding in the Midwest and Northern Plains, and drought in eastern and southeastern States. As a result, feed grain yields are forecast to average 2.31 tons per acre, down 20 percent from last year's record. Average corn yields of 103.1 bushels per acre are down nearly 22 percent from last year's record.

Feed grain carryin stocks of 63 million tons for 1993/94 were up 85 percent from a year earlier. The gain helps soften the impact of lower production, but supplies are nevertheless forecast down 17 percent to 258.2 million tons.

### Lower Supplies, Higher Prices To Restrict Use

The sharp decline in feed grain supplies in 1993/94 will result in lower use. The largest adjustment in utilization will be to feed and residual use, which is forecast to decline 12 million tons to 142.6 million on a September-August year.

Higher feed and residual use of wheat next summer will help offset the large reduction in feed grain use. However, the September-August feed and residual use of total grains is still expected to decline to 153 million tons, or 2.8 percent below a year ago. This represents 1.82 tons per grain consuming animal unit, which is down from 1.90 tons last year, but well above the post-1975/76 low of 1.60 tons experienced in 1988/89.

Weak global import demand and increased competition are also expected to contribute to lower demand for U.S. feed grains in 1993/94. Strong imports of wheat for livestock feeding in Korea and larger foreign crops, especially in southern Africa, are major reasons for weaker import demand. Exports of U.S. feed grains are forecast to decline to 42.6 million tons, off 8.5 million from last year.

### Feed Grain Program Announcements for 1994/95

On September 30, Secretary Espy announced the preliminary set-aside requirements for the 1994/95 feed grain program. Acreage reduction percentages (ARPs) for the 1994/95 feed grain programs were set at 5 percent for corn and zero percent for sorghum and barley. The corn and sorghum ARPs are down 5 percentage points from the 1993/94 program. A 0 percent set-aside rate was legislated throughout the 5-year coverage of the 1990 farm bill for oats.

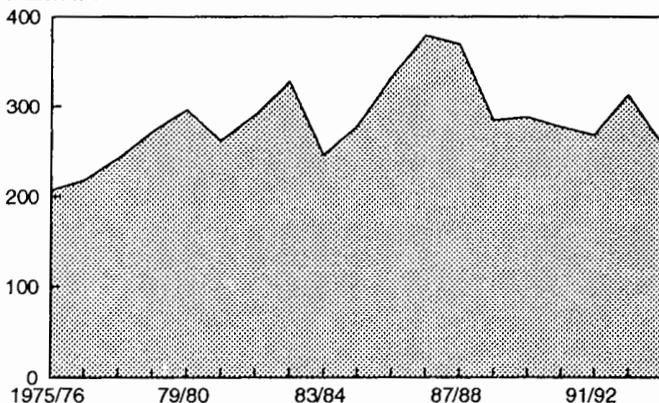
On November 15, Secretary Espy announced revisions to the 1994/95 corn program that will encourage larger planted area in 1994/95. The Secretary used discretionary authority to further reduce the corn ARP to zero percent in response to revised forecasts of 1993/94 supply, demand, and carryout stocks. Thus, producers are not required to set aside any feed grain base acreage in 1994/95 to receive program benefits, the first time since 1981. However, unlike the 1981 program, in 1993/94: 1) over 4 million acres of corn base will remain idled under the Conservation Reserve Program; 2) additional base acreage will likely be idled under the 0/92-85 provisions; and 3) participant plantings are limited to their base acreage plus flexible acres (up to 25 percent of other crop acreage bases) available on the farm.

[Thomas F. Tice, (202) 219-0840]

Figure 1

### Feed Grain Supplies Lowest Since 1983/84

Million tons



# Corn Supplies Fall to 10-Year Low

*Corn supplies are forecast at 8.6 billion bushels, down 18.5 percent from last year and the lowest since 1983/84. Although total disappearance is forecast to decline, use will still be well above the 1993 crop, and carryout stocks are forecast to fall below 900 million bushels, the lowest since 1975/76.*

## Corn Crop Hit Hard by Unfavorable Weather

U.S. corn production is forecast at 6.5 billion bushels, down 31 percent from the record 1992 crop. The lower output is the result of lower forecast yields and harvested area.

Corn yields in 1993/94 are forecast to average 103.1 bushels per acre, 21.5 percent below the 1992 record. Many factors contributed to the lowest yield since the 1988 drought. Most are a result of weather maladies. A cool, wet spring delayed planting progress as only 40 percent of the crop was planted by mid-May, which is considered the optimum planting date in the Corn Belt. Normally, about three-fourths of the crop is planted by this time. Yield models indicate that given normal weather, plantings beyond this date generally result in lower yields.

Flooding in the Midwest and Northern Plains States during the summer retarded crop development, contributing to further loss in potential yield. As the normal first frost dates approached in the Northern Plains and northern Corn Belt States this fall, the corn crop was considerably behind its normal development. On October 3, only 62 percent of the U.S. crop was rated mature, compared with an average rate of 83 percent during the previous 5 years. In Iowa, 50 percent of the corn crop was rated mature, 46 percent behind normal. Maturity of the corn crop was 67 percentage points behind normal in Minnesota, 50 percent in South Dakota, 12 percent in Nebraska, and 44 percent in Wisconsin.

Killing frosts by early October brought the growing season to an abrupt halt in the northern corn growing regions, while a strong cold front brought subfreezing temperatures to all but the southernmost regions of the Corn Belt on October 10. Corn yields in Iowa are forecast to average just 85 bushels per acre, 20 bushels below the October forecast and 62 bushels per acre below the 1992 record. Lower yields are also forecast for Illinois, down 20 bushels from a year ago; Indiana, down 19 bushels; Missouri, down 42 bushels; Nebraska, down 27 bushels; and Wisconsin, down 7 bushels.

Drought in eastern and southeastern States also contributed to lower corn yields in 1993. Forecast yields in Alabama, Delaware, Georgia, Maryland, North Carolina, Pennsylvania, South Carolina, Tennessee, and Virginia declined between 22 and 57 percent from a year earlier.

The weather problems experienced in 1993 have also contributed to lower harvested-to-planting ratios. Corn area harvested is forecast at 63.1 million acres, 85.7 percent of planted area, compared with ratios of 90.9 and 90.5 percent the previous 2 years. Flooding in the Midwest and Northern Plains destroyed crops there, while drought in the eastern and southeastern States increased abandonment or harvesting for silage.

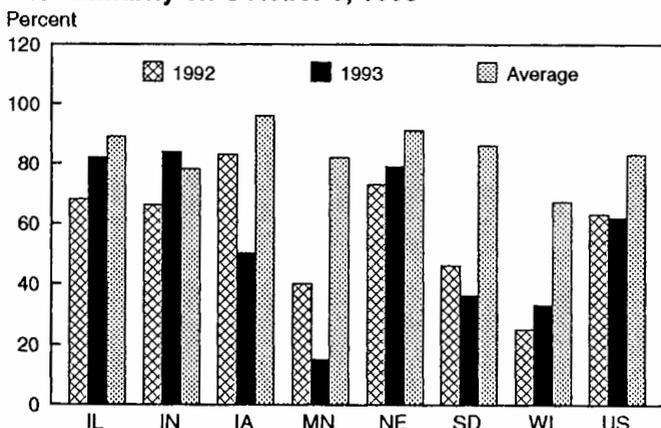
## Corn Supplies in 1993/94 Supported by Larger Carryin Stocks

The small 1993 corn crop is being supplemented by carryin stocks that were in excess of 2.1 billion bushels as of September 1, 1993, and over 1 billion above a year earlier. As a result, corn supplies for 1993/94 are forecast at 8.6 billion bushels, down 18.5 percent from last year. These corn supplies are only slightly larger than last year's total disappearance. Therefore, use of corn in 1993/94 is forecast to decline as higher prices allocate the small supplies.

## Corn Use To Decline in 1993/94

Historically, major shortfalls in corn output are accompanied by smaller use. This year will be no different as total corn use is forecast to decline about 9 percent to 7.75 billion bushels. In the past, feed and residual use generally absorbed much of the decline in total uses. While lower feed and residual use is expected to account for almost two-third of the reduction in total use, exports are also forecast down sharply. Lower corn imports by southern Africa, Canada, and Eastern Europe, as well as increased corn exports by China, South Africa, and the EC are major factors contributing to lower U.S. exports.

Figure 2  
**Corn Maturity on October 3, 1993**



Food, seed, and industrial uses have not experienced a year-to-year decline since 1975/76. FSI use is forecast to increase again in 1993/94 to 1.55 billion bushels, up 2.6 percent. Higher sugar, starch, and fuel alcohol production is expected to boost corn milling.

Feed and residual use of corn is expected to decline substantially due to the small 1993/94 supplies. Feed and residual use is forecast to decline nearly 450 million bushels to 4.85 billion. Larger feed and residual use of wheat, particularly next summer, will partially offset the lower corn use.

### Stocks Decline; Prices Rise in 1993/94

Although corn disappearance is forecast to decline in 1993/94, use will still exceed 1993 production, and ending stocks are expected to be the lowest since 1975/76. Carry-out stocks are forecast at 881 million bushels, representing only 11.4 percent of use. The tight U.S. corn supplies will cause corn prices to rise in 1993/94. Prices in Central Illinois reached \$2.36 a bushel on October 21, 1993, surpassing 1992/93's peak of \$2.33 on July 6, 1993. Prices rose further during the first half of November, reaching \$2.75 per bushel on November 17. For the entire 1993/94 marketing year, prices received by farmers are expected to average between \$2.35 and \$2.75 per bushel, up from \$2.07 in 1992/93.

### June-August 1993 Corn Use Declines

Disappearance of corn during June-August 1993 totaled 1.60 billion bushels, down slightly from the record 1.64 billion of a year earlier. Extremely weak export demand plus closure of most of the Mississippi and Missouri river system to barge traffic in July and August limited exports to 301 million bushels, down 128 million from a year earlier. However, strong demand from the livestock and food and industrial sectors nearly offset the weaker exports. FSI uses were estimated at 399 million bushels, up 26 million from a year earlier. Feed and residual use, estimated at 900 million bushels, was 60 million higher than a year earlier and set a June-August record.

Corn stocks were 2.1 billion as of September 1, 1993, almost double year-earlier levels. The higher stocks softened the price response to unfavorable summer weather. Corn prices received by farmers rose during the quarter from \$2.09 per bushel in July to \$2.25 in August to average \$2.19 per bushel, down from \$2.32 during June-August 1992.

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Figure 3

### Corn Price and Stocks-to-Use Ratio

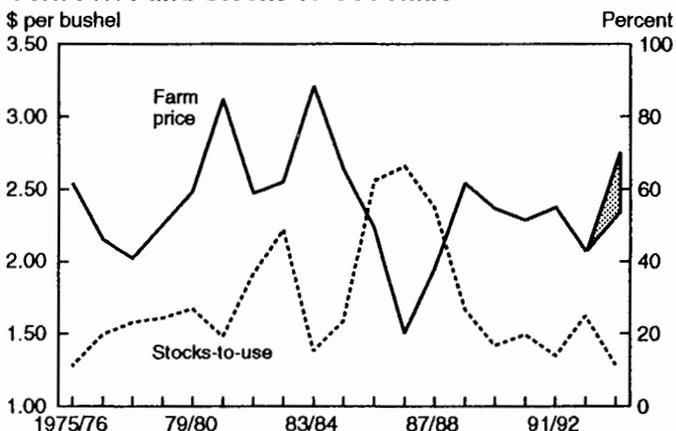


Table 1--Corn supply, disappearance, and stocks, Jun.-Aug.

Item	1991/92	1992/93
Million bushels		
<b>Supply:</b>		
Beginning stocks, June 1:	2,738.6	2,738.6
CCC	147.2	64.4
FOR	0.2	0.0
Loan	589.3	1,170.2
Uncommitted	2,001.9	1,504.0
Imports (Jun.-Aug.)	3.3	2.8
<b>Total supply</b>	<b>2,741.9</b>	<b>3,712.2</b>
<b>Disappearance:</b>		
Food, seed, & industrial	372.5	398.6
Exports	429.7	301.4
Feed and residual	839.4	899.5
<b>Total use</b>	<b>1,641.6</b>	<b>1,599.5</b>
<b>Ending stocks, Sept. 1:</b>		
CCC	112.5	55.5
FOR	0.0	13.3
Loan	198.4	696.4
Uncommitted	789.4	1,347.5
<b>Total</b>	<b>1,100.3</b>	<b>2,112.7</b>

Totals might not add because of rounding.

# Sorghum Supplies To Fall 15 Percent in 1993/94

Harvested sorghum acreage is forecast to decline 20 percent and average yields are forecast to decline 13 percent, reducing sorghum production 30 percent in 1993/94. Although larger beginning stocks will partially offset the lower production, sorghum supplies are forecast to fall 15 percent to below 800 million bushels.

Like corn, the 1993 sorghum crop was planted later than normal, particularly in the Great Plains. In addition, cool, wet weather during the summer caused the crop to develop slower than normal. On October 3, 1993, sorghum was rated 36 percent mature in South Dakota, 47 percent in Nebraska, and 50 percent in Kansas, compared with normal maturity of 84, 81, and 60 percent, respectively. The first killing frost occurred during the week of October 4-10, and reduced expected yields, particularly in South Dakota and Nebraska.

Average U.S. sorghum yields are forecast at 63.6 bushels per acre, down 2 bushels from the October forecast and 9.2 bushels below last year's record. Average yields are forecast at 48 bushels per acre in South Dakota, 64 bushels in Nebraska, and 70 bushels in Kansas. Compared with last year, these yields are up 11 bushels in South Dakota, but down 30 bushels in Nebraska and 10 bushels in Kansas.

Sorghum production in 1993/94 is forecast at 620.4 million bushels, down 30 percent from a year ago. Production in Kansas is forecast at 196 million bushels, down almost 50 million from last year, but enough to make Kansas the largest producing State this year. In Texas, the largest producer the last 2 years, much lower harvested area and a 3-bushel-per-acre drop in forecast yields caused production to drop nearly 85 million bushels to 194.7 million.

September 1, 1993, sorghum stocks were estimated at 175 million bushels, up more than 125 million bushels from the record low of a year ago. The large increase is limiting the decline in 1993 sorghum supplies. Sorghum supplies are forecast at 795 million bushels, 142 million below last year.

## Lower Supplies To Limit Use

Lower sorghum supplies will restrict disappearance in 1993/94. Feed and residual use is forecast at 460 million bushels, down slightly from a year ago. Sorghum exports are also expected to decline due to lower imports by Mexico. U.S. sorghum exports are forecast at 250 million bushels, down 10 percent from a year ago. FSI uses, however, are forecast to remain unchanged at 7.5 million bushels.

Based on the preceding forecasts, total disappearance of sorghum would reach 718 million bushels, about 45 million below last year. As a result, ending sorghum stocks on August 31, 1994, are projected to decline almost 100

million bushels to only 78 million. This would be the second lowest stocks since 1975/76, representing just 10.9 percent of use.

Low carryout stocks relative to use indicate higher sorghum prices in 1993/94. Following corn prices, sorghum

Figure 4

## Sorghum Prices Relative to Corn

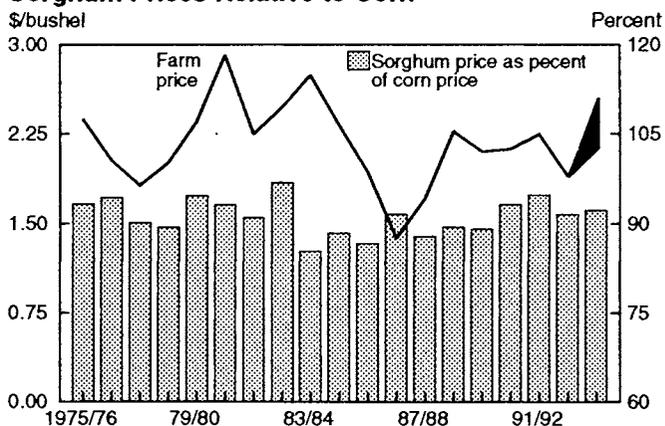


Table 2--Sorghum supply, disappearance, and stocks, Jun.-Aug.

Item	1991/92	1992/93
Million bushels		
<b>Supply:</b>		
Beginning stocks, June 1:	110.4	264.8
CCC	14.3	3.9
FOR	0.0	0.0
Loan	5.7	32.1
Uncommitted	90.4	228.8
<b>Total supply</b>	<b>110.4</b>	<b>264.8</b>
<b>Disappearance:</b>		
Food, seed, & industrial	1.8	2.1
Exports	32.0	31.9
Feed and residual	23.4	55.8
<b>Total use</b>	<b>57.2</b>	<b>89.8</b>
<b>Ending stocks, Sept. 1:</b>		
CCC	8.2	3.9
FOR	0.0	1.3
Loan	7.4	22.0
Uncommitted	37.6	147.8
<b>Total</b>	<b>53.2</b>	<b>175.0</b>

Totals might not add because of rounding.

prices received by farmers are forecast to average between \$2.15 and \$2.55 per bushel, up from \$1.89 in 1992/93.

### **June-August 1993 Sorghum Use Increases**

Sorghum use in June-August 1993 reached 90 million bushels, substantially above the previous 2 years. Strong demand from the livestock sector and lower prices boosted feed and residual use to 55.8 million bushels, accounting for nearly all the larger quarterly disappearance. Sorghum exports were 31.9 million bushels, little changed from the June-August 1992 period. FSI uses, estimated at 2.1 million, were up 0.3 million from a year earlier.

The seasonal price decline that normally occurs during the June-August quarter was interrupted this year when flooding in the Midwest and Northern Plains raised concern about tight feed grain supplies for 1993/94. Sorghum prices received by farmers increased through the quarter from \$1.90 per bushel in June to \$2.11 in August to average \$2.03 for the quarter, compared with \$2.20 per bushel for June-August 1992.

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## **Lower Barley Yields and Harvested Acres Lead to Production Decline**

*Excessively wet conditions led to major harvest delays and the quality of the crop suffered.*

Barley production for 1993/94 is estimated at only 416 million bushels, down 9 percent from the previous year. Harvested acreage, at only 7.1 million acres, is the lowest since 1934 (6.6 million acres). Yields, at 58.9 bushels per acre, are down from last year's record of 62.5 bushels per acre, and are the second highest on record.

This year's yield was bolstered by improved growing conditions in several key States, particularly in the Mountain and Pacific Northwest. In Washington (despite dry conditions that ranged to severe in the far western portion) and Montana (with generally moist conditions) yields were up 49 and 30 percent respectively. Idaho yields, at 80 bushels per acre, are estimated 5 bushels higher than in 1992/93. However, prolonged wet, cool conditions in Minnesota and North Dakota caused disease problems and led to one of the latest harvests on record in those States. As a result, yields in the two States are estimated down 23 percent.

Delayed plantings, slow crop development, and wet conditions during harvesting caused discoloration and diseased kernels in the 1993/94 malting barley crop, particularly in North Dakota, South Dakota, and Minnesota, causing problems for brewers. Scab, vomitoxin, and rust occurred in some areas in those States as well. Farther west, malting barley matured well, but reports indicate much of the crop finished with light test weights. In much of Washington, good weather aided the harvest.

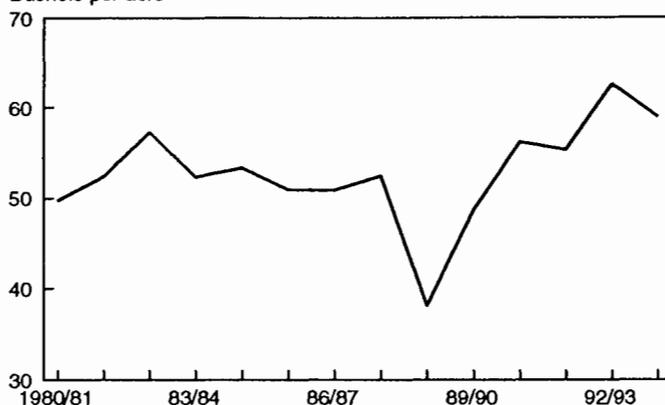
### **Lower Production Reduces Supplies for 1993/94; Ending Stocks To Decline**

Barley stored in all positions on September 1, 1993, was 409.0 million bushels, down more than 9 million bushels from the previous year. On-farm storage (which included unharvested production) surged to 284.9 billion bushels, up almost 24 million. However, off-farm storage, at 124.1 million bushels, was more than 33 million bushels lower.

Figure 5

### **Barley Yields Remain Historically High**

Bushels per acre



It is not surprising that with U.S. production declining by over 40 million bushels in 1993/94 and the extremely late harvest that off-farm storage fell. The late harvest meant a higher percentage of the barley crop was still in the field instead of marketed and in stocks at mills, elevators, and other processors.

Barley supplies for the 1993/94 crop year are forecast at 592 million bushels, a slight decline from 1992/93, and the lowest since 1980/81.

Supplies will be boosted somewhat by an increase in imports, forecast for the year to reach 25 million bushels, and by carryin stocks that are up 22 million bushels from a year earlier. Much of the growth in imports is expected to come from Canada, where increased production is expected, while prices are expected to be down for the 1993 crop. The Government of Canada's removal of exports to the United States from the authority of the Canadian Wheat Board prompted what many called a Canadian continental marketing system. This went into effect on August

1, 1993. Reportedly, a large number of contracts were made to sell barley directly to the United States. However, a Canadian judge ruled that the Canadian Government had exceeded its authority, which effectively means that the Board is once again the only one with authority to export to the United States. While the recently-elected Agriculture Minister has indicated that the Government will not appeal the ruling, other parties have indicated that they will.

Because of the reduced corn supplies and large quantities of disease-damaged U.S. barley, feed and residual use of barley in 1993/94 is forecast at 225 million bushels, a 13-percent increase from last year, and 5 million bushels below 1991/92. During the first quarter (June-August) of the current year, feed and residual use was 104 million bushels, down 10 million from the same period in 1992/93. Since 1988/89, first-quarter feed and residual use has accounted for around half of the annual total. However, feed and residual use this year is expected to be strong for the remainder of the year.

Food, seed, and industrial (FSI) use is forecast to continue to fall modestly in 1993/94. At only 165 million bushels, FSI use is forecast down slightly due to declining demand from brewers of distilled spirits and beer that began in 1992/93, following years of fairly steady demand. In recent years, beer sales have fallen in part because of pressure from tougher State drinking laws and higher Federal taxes. Compounding that is a further decline in brewers' demand for barley coming from increased emphasis on light beer and nonalcoholic beer production. Both require less barley malt than regular beer, and are continuing to gain consumer acceptance. However, last year's cool summer temperatures may have played a role in slowing beer sales. First-quarter 1993/94 data, not yet available, may indicate a reversal of last year's below-average demand.

U.S. barley exports in 1993/94 are forecast at 85 million bushels, up 5 million from 1992/93. Some of the expected

increase is due to growth in global trade. Excluding intra-EC trade, the U.S. market share of world trade is expected to reach 10 percent--down slightly from where it has been since 1991/92. Canadian exports are expected to be up; EC-12 exports are forecast to exceed their 1992/93 level, but remain well below other recent years.

Because of increased feed and residual use, total barley use in 1993/94 is forecast at 475 million bushels, up 6 percent from the previous year. Ending stocks on May 31, 1994, are forecast at 117 million bushels, 34 million bushels fewer than last year and 12 million below 1991/92. The last time ending stocks were this low was 1974/75. In 1986/87, ending stocks were more than 2.8 times larger. The projected stocks-to-use ratio for 1993/94 of 25 percent is down from 34 percent in 1992/93, and about the same as 1991/92.

### **National Malting Barley Prices Mirror Midwest Harvest Concerns**

While feed barley prices remained below the year-earlier figures in September, malting barley prices rose beyond the 1992/93 levels. This was probably largely the result of marketings of contract malting barley in the western States. At \$2.36 per bushel for malting barley, the September 1993 figure was \$0.25 per bushel higher than the year-earlier figure.

North Dakota and Minnesota combined production for all barley is forecast down 55 million bushels in 1993/94. As a result, higher-priced barley from the Pacific Northwest has probably taken a greater share of new-crop sales. Quality concerns, particularly scab and vomitoxin, will likely result in more of the 1993 crop being fed. During the first 5 months of the crop year, monthly feed barley prices have been consistently below those of a year earlier, as increased supplies of lower-quality barley have become available.

[Jim Cole, (202) 219-0840]

## **Oats Production on Downward Spiral**

*In spite of higher prices, relatively low returns continue to reduce producer interest in oats. Poor weather this year has reduced the size of the crop.*

Oats outturn for 1993/94 reversed last year's gain and fell to only 208 million bushels, the lowest production on record. Even the 1988/89 drought-reduced oats crop was 10 million bushels larger. Harvested acres and yields were both down in 1993/94.

The number of harvested acres for 1993/94 is estimated at the lowest level since records have been kept, only 3.8 million, down from 4.5 million last year. The decline stems from relatively low farm prices and weather problems that caused a smaller percentage of the crop to be harvested for

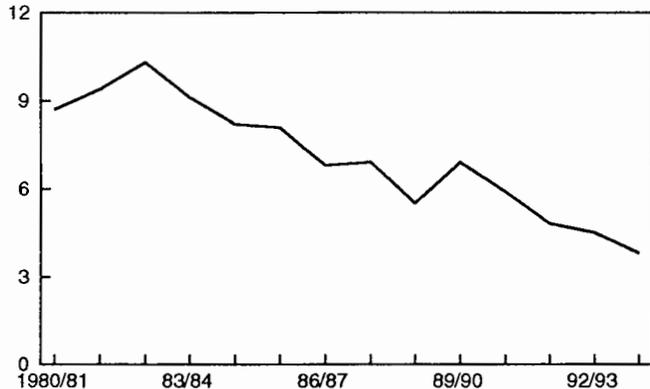
grain. For example, Iowa harvested oats on only 225,000 acres in 1993/94, compared with 375,000 last year and 425,000 the year before. Plantings were up 100,000 in 1993, following a 50,000-acre gain in 1992.

Weather problems reduced yields as well. Although nationally yields fell to 54.6 bushels per acre (down from the record of 65.6 bushels per acre in 1992/93), Iowa yields fell 40 percent to only 40.0 bushels per acre. Minnesota yields fell 29 percent, Wisconsin slipped 26 percent, and South Dakota 21 percent.

Figure 6

**Oats Harvested Area Continues Decline**

Million acres



Although conditions from mid-June through early July were quite favorable for oats, the following cool and excessively wet weather was not. Forecast yields dropped and quality was adversely affected.

The cool, wet conditions in Iowa, South Dakota, and southwestern Minnesota brought about crown rust and reduced oats' test weights. This year, according to trade sources, test weights of 25 pounds per bushel and lower have occurred, more than 20 percent below standard test weights. These weights are too low for food use and will end up being fed to livestock.

**Oats Supplies Plummet**

Increased imports are not enough to offset the 1993/94 forecast production shortfall and lower beginning stocks. At only 401 million bushels, supplies are sharply down from the 477 million bushels in 1992/93, and the lowest since 1988/89. Beginning stocks (June 1) were only 113 million bushels, the smallest ever except for 1988/89 and 1989/90.

Imports are forecast to expand to a record 80 million bushels in 1993/94, up from only 55 million last year. As in re-

cent years, the United States' imports largely come from Sweden, Finland, and Canada, all of which are forecast to have larger production and increased exports. Finland's policy that limits export subsidies may delay some exports into the 1994 calendar year, when additional subsidy funds become available. During the first 3 months (June-August) of the 1993/94 crop year, the United States imported 17 million bushels of oats, up from just over 15 million a year earlier.

September 1, 1993 oats stocks in all positions were 220.9 million bushels, down from 294.6 million a year earlier. About 36 percent of the total was in North Dakota and Minnesota, up from about 30 percent a year ago.

Reflecting tight supplies, the average 1993/94 farm price is forecast at \$1.35-\$1.45 per bushel, compared with only \$1.32 and \$1.21 the previous 2 years. During June-October, the farm price averaged \$1.36 per bushel, about 4 cents more than the same time last year. Due to reduced availability of milling quality oats, high-quality oats prices reflected in the Minneapolis cash market are up significantly from a year ago. With supplies forecast sharply lower, domestic use is forecast to fall as well. Total use in 1993/94 is projected to fall to only 310 million bushels, compared with 1992/93's 364 million. This year's use is the second lowest on record, with the lowest being 1988/89's 294 million bushels. The reduction is largely due to an expected decline in feed and residual use, which is forecast at a record low of 180 million bushels, down significantly from 233 million in 1992/93. In the long term, livestock producers will continue to rely less and less on oats as a source of feed. In the short term, very low-quality oats will find their way into the livestock feed mix. Feed and residual use during first-quarter 1993/94 was under 85 million bushels, compared with 111 million a year earlier. Food, seed, and industrial use (FSI), at 125 million bushels, has been constant since 1991/92, but remains relatively high.

[Jim Cole, (202) 219-0840]

## Hay Supplies Decline in 1993/94; Quality Questioned

*Excessively wet conditions slowed development and continued precipitation at harvest time led to further delays, causing the quality of the alfalfa crop to suffer. However, yields were above last year.*

For the 1993/94 (May-April) hay year, supplies are forecast at 175.2 million tons, down about 2.5 million tons from last year. This year's supplies were bolstered by production gains of about 5 million tons, as both harvested acreage and crop yields rose. Carryin stocks on May 1, 1993, however, were only 21.1 million tons, down about one-fourth from the previous year. The forecast yield for all hay is a record 2.53 tons per acre, up from 2.50 tons in 1992/93. This is the fifth consecutive year of yield gains.

North Dakota yields rose an estimated 52 percent and significant yield gains were registered in several other major hay producing States, including Idaho, Montana, and South Dakota. Adverse weather caused lower yields in a number of States. For example, Iowa yields are down more than 20 percent from last year, and Minnesota's are down 4 percent. However, in many cases, hay output has turned out higher than earlier expected. Some of the increase in harvested acres was the result of permitted harvesting of conservation acres in North Central States where flooding caused serious problems.

### Quality of 1993/94 Hay Crop Poor

Across much of the north central Plains and Pacific Northwest, cool temperatures and unusually wet weather prevailed during the summer and fall. As a result, much of the Nation's hay crop was slow to develop and harvesting was late and delayed even more by continued precipitation. Several States in the West and North Central portion of the country had areas that missed a late-season cutting completely. Because of weather-related problems, haying and grazing restrictions were relaxed earlier this year on Conservation Reserve Program (CRP) and Acreage Conser-

vation Reserve (ACR) acres in States in disaster-affected areas.

Late harvesting in 1993/94 led to protein losses, and excessively wet fields prevented the crop from drying and brought on further quality losses. In Oregon, much of the harvest was delayed so long that hay was cut only four times instead of five. Portions of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin suffered similarly as fields, drying out from floods, had light precipitation that hindered the process. The cut hay in these fields was turned to improve drying, but ash content and leaf shattering increased as a result. Leaf shattering is a major cause of protein loss.

Crude protein content as low as 13-14 percent has been reported in the West. The content is low, but supplies should be adequate for beef herd maintenance. High-quality alfalfa hay for dairy cattle is generally 22- to 23-percent crude protein. Lower-quality hay for cubes is around 18 percent.

### Alfalfa Acres and Yields Grow; Acres of All Other Expand As Yields Are Marginally Off

In 1993/94, alfalfa hay was harvested on 24.3 million acres, up slightly from 24.2 million a year ago. Alfalfa's share of total hay acres barely declined to 40 percent. Alfalfa yields for 1993/94 rose to 3.46 tons per acre, up from 3.30 tons for last year's crop.

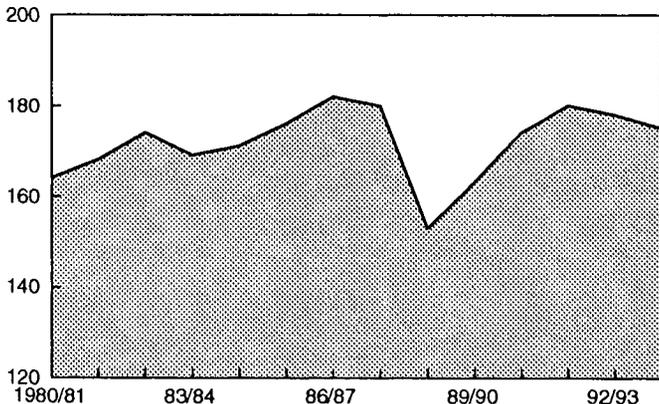
Outturn of alfalfa hay and alfalfa hay mixtures in 1993/94 is forecast at 84.0 million tons, up from 79.7 million a year earlier and slightly above 1991/92. This year's production is low in many dairy States, compounding quality concerns. Minnesota alfalfa production is estimated at 5.3 million tons, about the same as 1992/93, but 1 million tons below 1991/92. Wisconsin's crop is only slightly larger than last year's, but is almost 3 million tons below 1991/92. California's alfalfa crop is likewise down, but not as significantly. California is the Nation's second largest milk producer, and its share of total milk output is increasing. Alfalfa production in 1993/94 is up from last year in other key States, including South Dakota (up 52 percent), and Idaho (up 30 percent).

Outturn of all other hays is estimated up as well. In 1993/94, production is estimated at 70.0 million tons, up from 69.5 million tons in the 2 previous years. Production increases stem from area gains nationwide, with harvested acreage rising from 35.4 million acres last year to 36.7 million acres in the current year.

Figure 7

### Hay Supplies Fall Again in 1993/94

Million short tons



Texas continues to lead the Nation in all-other-hay production, although dry conditions caused outturn to fall to 7.4 million tons, down from 9.2 million in each of the previous 2 years. Production rose, however, in other States including Missouri (the second largest producer) and North Dakota.

### ***Hay Prices Strengthen in 1992/93***

The average hay price received by farmers in 1992/93 rose to \$73.20 per ton, up \$2.00 from the previous year. However, prices remained below the peak of \$85.40 reached in 1989/90. The 1992/93 increase snapped 2 consecutive years of price declines. Prices received for all hay during the first quarter of 1993/94 (May-April crop year) were well above a year earlier. About 35-40 percent of the crop is usually marketed during the first quarter. The higher prices are due to supply concerns stemming from low carryin stocks and production difficulties.

While prices for alfalfa hay rose, the average farm price for all other hay fell in 1992/93. Alfalfa hay prices received for the year increased 5 percent to \$78.40 per ton. Record alfalfa prices were set in 1988/89 at \$93.83 per ton. Because supplies of all other hays were supported by improved production, prices fell almost \$3 to only \$57.60 per ton in 1992/93, the lowest since 1987/88. First-quarter (May-July) 1993/94 alfalfa prices were up, and averaged \$88.00 per ton, compared with \$78.60 during the same period last year. The simple first-quarter average price received by farmers for all other hay was also up, increasing from \$56.20 per ton in 1992/93 to \$59.53 per ton this year.

### ***Demand for Roughage Increases***

The number of roughage consuming animal units (RCAU's) in 1993/94 is estimated at 77.4 million units, up almost 600,000 from 1992/93, indicating increased demand for roughage. The number of beef cattle not on feed rose over 800,000 units, while dairy cattle numbers, including both cows and heifers, declined 250,000. The gain in beef cattle not on feed is attributable to increased numbers of cows--the result of higher returns over the past several years. The gain in cattle numbers, coupled with a decline in hay supplies, has lowered the hay supply per RCAU for 1993/94 to only 2.26 tons, a drop of 2 percent. This figure has now fallen for 2 years in a row, following 3 years of increases.

The number of RCAU's forecast for 1993/94 is the largest since 1986/87. This many animal units indicate relatively large hay disappearance for the year, likely approaching 155 million tons, leaving only about 20 million tons in carryout stocks. If so, ending inventories would be the lowest since 1988/89, when they fell to 17.5 million tons.

### ***Range and Pasture Conditions***

On November 1, range and pasture conditions for 1993 averaged 82 percent of normal. This is 4 percentage points higher than the same time last year and 9 percentage points above the 1982-91 average for this date. A rating of 80 or better is considered good to excellent. [Jim Cole, (202) 219-0840]

## Feed and Residual Use To Be Off 3 Percent in 1993/94

*Feed per GCAU in 1993/94 is expected to be down from last year, but near the 1991/92 level.*

Feed and residual use of the four feed grains (corn, sorghum, barley, and oats) on a September-August basis totaled 154 million metric tons in 1992/93, up from 142 million in 1991/92. Use in 1993/94 is expected to decrease 7 percent because of reduced grain supplies. Feed and residual use of feed grains and wheat in 1992/93 (September-August) totaled 158 million metric tons, up nearly 10 million metric tons from 1991/92. Higher prices for feed grains, especially in the June-August quarter, are expected to boost wheat feeding in 1993/94 to more than 2.5 times that of a year earlier. Even so, feed and residual use of feed grains and wheat in 1993/94 may total 153 million metric tons, down nearly 3 percent from 1992/93.

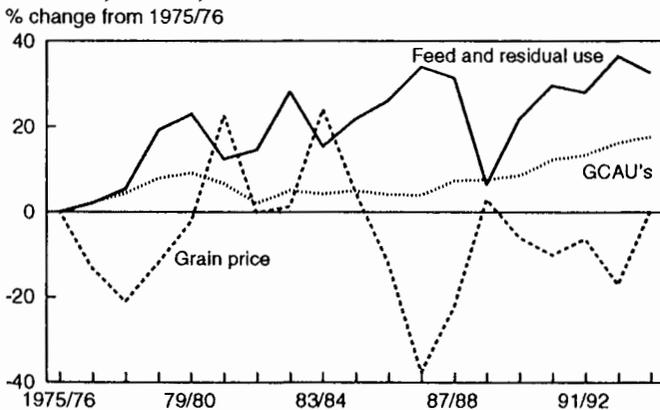
The index of grain consuming animal units (GCAU's) in 1993/94 is expected to be up 1 percent from 1992/93, because of increases in cattle and poultry numbers. During late summer and early fall, feed grain prices were slow to rise. Livestock producers who buy feed have only recently seen a substantial rise in their costs. Even with the increase in GCAU's and the short crops, grain per GCAU is expected to be well above the lows in 1988/89 and 1983/84, and close to the 1991/92 level. Objective yield survey data reported by USDA's National Agricultural Statistics Service in November 1993 indicate harvested ear weights were slightly below average in Illinois and Indiana, but at or below weights recorded in the drought years of 1983 and 1988 in Iowa, Minnesota, and Nebraska. Low test weights mean more may need to be fed to obtain the same performance and could result in grain per GCAU being near the 1988 and 1983 levels.

The latest hogs and pigs survey on September 1, 1993, gave mixed signals for the future direction of hog production. The December 1992-May 1993 pig crop was down 4 percent from a year earlier and the June-August 1993 pig

crop was down 8 percent. Farrowing intentions for September-November were down 3 percent from last year, but December 1993-February 1994 intentions were up 2 percent. These pig crops and farrowing intentions suggest a reduction in pork production in first-half 1994, and a moderate increase in the second half. Feed demand by the hog sector in 1993/94 is likely to be below last year.

Dairy cow numbers continue to decline, but feed use may not be reduced. The number of dairy cows on farms during July-September 1993 was 1 percent less than a year ago. Milk per cow was up from a year earlier, and milk production for the quarter was nearly the same as a year earlier. The pounds of grain and other concentrates fed per cow on October 1 were up nearly 2 percent from last

Figure 8  
**GCAU's, Prices, and Feed & Res. Use of Grains**



Grain price is weighted by feed & residual use.

Figure 9  
**GCAU's and RCAU's**

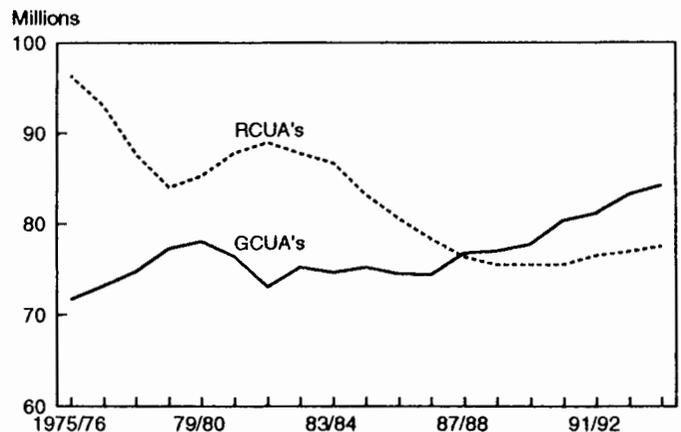


Figure 10  
**Dairy Cow Feeding Rate**

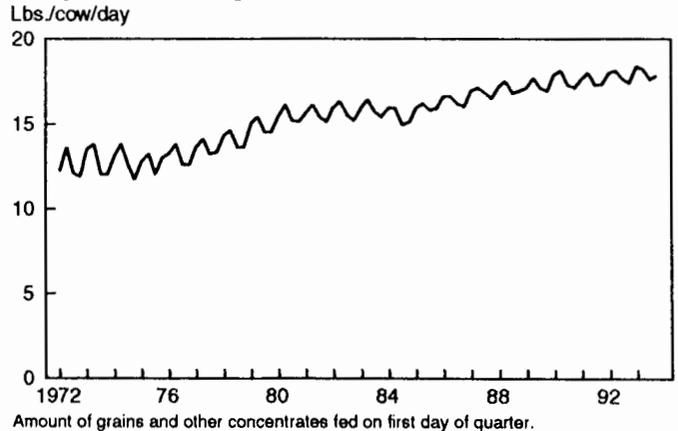


Table 3--Corn: Food, seed, and industrial use, 1980/81-1993/94 1/

Year	HFCS	Glucose and dextrose	Starch	-----Alcohol-----		Cereals & other products	Seed	Total
				Fuel	Beverage			
Million bushels								
1980/81	165	156	151	35	78	54	20	659
1981/82	183	160	146	86	86	53	19	733
1982/83	214	165	150	140	110	60	15	854
1983/84	265	167	161	160	88	70	19	930
1984/85	310	167	172	232	84	81	21	1,067
1985/86	327	169	190	271	83	93	19	1,152
1986/87	338	171	214	290	85	109	16	1,223
1987/88	358	173	226	279	77	113	17	1,243
1988/89	361	182	223	287	107	114	19	1,293
1989/90	368	193	230	321	109	115	19	1,355
1990/91	379	200	232	349	80	114	19	1,373
1991/92	392	210	237	398	81	116	20	1,454
1992/93	414	215	238	426	83	117	19	1,511
1993/94	420	220	240	450	83	118	19	1,550

1/ Marketing year beginning September 1.

year. The value per 100 pounds of grain and other concentrates was \$7.92, compared with \$7.65 in September 1992.

Milk production in 1993/94 is expected to be up less than 1 percent, even with reduced cow numbers. Higher prices for concentrates are expected to moderate concentrate feeding, limiting increases in milk production per cow, given potential quality problems in roughage supplies.

Feed demand from the beef sector in 1993/94 is expected to stay strong, as the number of cattle on feed is expected to continue above a year earlier. Cattle on feed October 1, 1993 in the 13 quarterly reporting States, were 9 percent higher than last year. Feedlot placements during the summer were large, and the marketing pace of fed cattle was slow. Yearling feeder cattle supplies outside feedlots on October 1 were down 12 percent from a year earlier. Feeder calf supplies continue to show a slow modest increase, with calves outside feedlots up 1 percent from last year. Thus, the number available to go into feedlots appears to be up from last year. However, higher prices for feed and good grazing conditions going into winter, may mean calves will be held on pasture for more weight gain before being placed on feed, reducing grain feed needs. Still the larger numbers of cattle are expected to keep feed use higher than last year.

Feed use by the poultry sector will increase in 1993/94 as more birds are raised. Broiler producers continue to increase the number of eggs set and chicks hatched. In 1993/94, broiler production may increase 5 to 6 percent from 1992/93, as producers respond to favorable returns in 1992/93. Higher feed prices will lower returns for broiler producers, but because broilers are very efficient in converting feed to meat, other sectors of the meat industry usually are affected more by high feed prices. Turkey production in 1993/94 may be up 1 to 2 percent from the year earlier, as producers respond to current favorable returns.

Egg producers in 1992/93 expanded production 1 percent from 1991/92 and prices increased. With relatively low feed costs, returns have been favorable and the egg-type chick hatch has been up. In 1993/94, egg production may be up 1 to 2 percent from a year earlier, as these pullets begin to lay, and as production of broiler hatching eggs to supply the broiler industry increases. With higher feed prices in 1993/94, producers are likely to sell old flocks, but feed demand by the egg industry should remain above 1992/93.

Allen Baker 219-0840]

## FSI To Claim Increasing Share of Corn Use in 1993/94

*While complete data for 1992/93 are not yet available, total FSI use of corn appears to have grown 4 percent from the year earlier.*

Corn use for food, seed, and industrial (FSI) uses has been growing over time. After remaining at about 18 percent of total use since 1990/91, the sharp decline in total use expected in 1993/94 may cause FSI use to account for 20 percent of total use. In 1993/94 FSI uses of corn are expected to be up nearly 3 percent from the 1.5 billion bushels used in 1992/93. FSI uses of corn are not expected to be as price sensitive as other uses and will not respond as much to the higher prices expected this year. In 1992/93, FSI use rose 4 percent from the year earlier, led by sharp increases in high fructose corn syrup (HFCS) and fuel alcohol.

Corn sweeteners' use of corn in 1992/93 totaled 629 million bushels, up 5 percent from 1991/92's 601 million bushels. The growth was largest in HFCS, which rose nearly 6 percent from the year earlier. Sales of HFCS, which is mainly used in soft drinks, were helped by hot weather in the South, East Coast, and West this year. Rain and flooding in the Midwest may have slowed sales in that region until late summer when the weather warmed. Corn used to make glucose and dextrose was up 2 percent from the 210 million bushels used in 1991/92. Glucose and dextrose are used to make confectionery products, light beer, drugs and pharmaceutical products. Slow economic growth may have slowed increases in some of these products, but use of glucose and dextrose still outpaced population growth.

In 1993/94, corn use in corn sweeteners is expected to total 640 million bushels, up 2 percent from last year. Continued slow economic growth is likely to result in only moderate growth in sweetener use. Also, per capita use of sugar and sweeteners continues to increase to record levels and additional growth may be more difficult. HFCS use is

expected to increase more slowly than use of other corn sweeteners. In 1993/94, HFCS may increase 1 percent from the year earlier in line with population increases. Glucose and dextrose are expected to rise 2 to 3 percent from last year because they are not as sweet as other sweeteners.

Corn used in starch production in 1992/93 was up less than 1 percent from 1991/92's 237 million bushels. Industrial starch is used in the manufacture of paper, paper products, textiles, and building materials. Starch use in pharmaceuticals and building materials was weaker than in 1991/92. With continued slow economic growth in 1993/94, corn used to make starch is expected to increase 1 percent from 1992/93.

Corn used to produce fuel alcohol has increased because of the enactment of the Clean Air Act Amendments of 1990 and the resulting use of alcohol in fuels in 39 metropolitan areas and counties that failed to meet carbon monoxide air quality standards. In those locations, the gasoline sold for at least the 4 winter months must contain 2.7 percent oxygen by weight. The requirements of the act took effect last year. The gasoline industry and the public have 1 year's experience with the program. Many areas have petitioned to be excluded from the requirements because they are now in compliance. State officials in these areas are not enforcing the requirement until the EPA rules on their petition. Motorists in the affected areas saw gasoline prices jump significantly last year increasing driving costs.

In 1992/93, corn used to produce fuel alcohol was 7 percent above the 398 million bushels used in 1991/92. Use might have been higher if contract prices of alcohol had

Figure 11  
**FSI and Corn Price: Growth Rates**

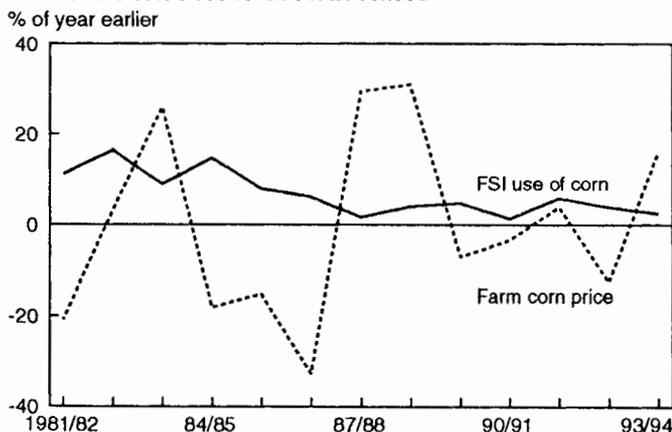
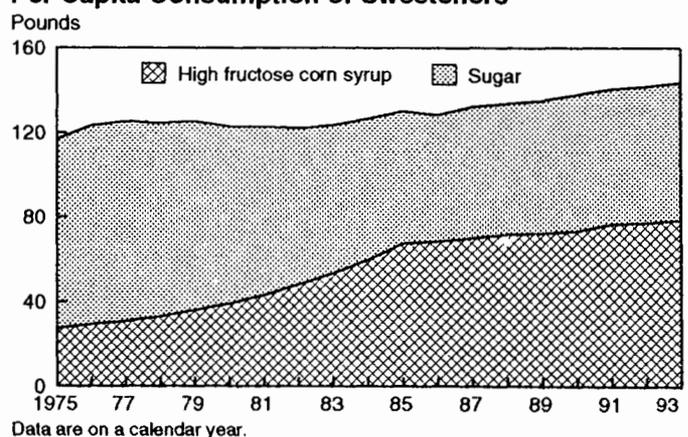


Figure 12  
**Per Capita Consumption of Sweeteners**



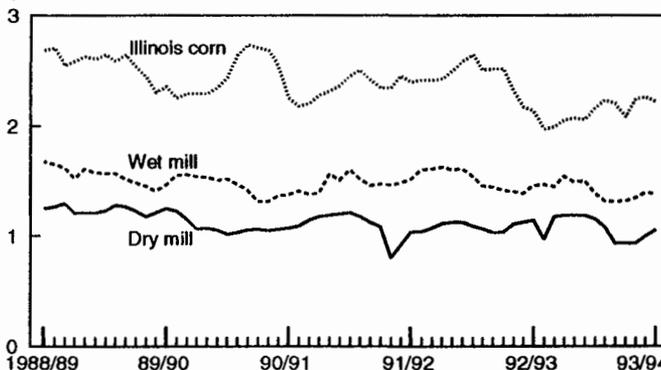
been lower. The strong prices encouraged gasoline blenders to purchase the minimum amount of alcohol the contract called for as prices of other oxygenates declined. Also some cities used procedures to avoid participating, which lowered the use of oxygenates. After a year's experience, the petroleum industry was able to smoothly move into the oxygenate program and gasoline costs, while up, were not up as much as the previous year. This is because of large capacity and plentiful supplies of methyl tertiary butyl ether (MTBE), that are keeping prices of oxygenates relatively constant. Alcohol use in the oxygenate program depends upon the various incentives by States and the Federal tax credit as gasoline producers and blenders go with the most economical oxygenate for a particular market. In addition, firms have been very good at only using oxygenates where needed.

In 1993/94, corn used to make fuel alcohol is expected to be up 6 percent from the 426 million bushels used in 1992/93. Production in September was not at a monthly maximum as might be expected in anticipation of the winter oxygenate season. In addition, higher corn prices will tighten returns to alcohol producers, especially if oxygenate prices stay steady as expected. Normally, alcohol production might be trimmed as corn prices increase, but the trade press has reported a major producer has made a sale of 80 to 100 million gallons to Brazil, suggesting increased production.

Figure 13

### Corn and Milling Byproduct Values

\$/bushel



Byproduct values converted to corn equivalent based on byproduct yields.

Corn used to produce beverage alcohol in 1992/93 is expected to total 83 million bushels, up from 81 million a year earlier. Little change is expected for 1993/94 because use of corn in distilled spirits has been slowing recently.

In 1992/93, corn used in cereals and related products is expected to total 117 million bushels, up 1 percent and about the same as the growth in population. A similar increase is expected for 1993/94.

[Allen Baker 219-0840]

## Reduced Demand for Grain To Lower Rail and Barge Shipments

*The supply of transportation equipment will be adequate for harvest needs.*

### Demand for Transportation Services Projected Down

Exports and domestic consumption of total grains and soybeans are projected at 350.55 million metric tons, 28 million below 1992/93. Most of the reduction stems from a projected 18.4-million-metric-ton decline in corn disappearance. Corn exports are projected to fall 8 million metric tons from 1992/93 and domestic consumption is projected down 10.4 million. As a result, demand for grain and barge service is expected to decline sharply during 1993/94.

The projected decreases in wheat exports, 6 million metric tons, and soybean exports, 3.9 million metric tons, further shrinks anticipated demand for transportation services.

### Rail Grain Shipments Up Slightly, But Expected To Fall

During September-October 1993, rail shipments of grain averaged 27,885 cars per week, 1 percent below the same months of 1992. Rail loadings of grain are expected to average well below 1992/93 levels over the remainder of the year as total disappearance for grains and oilseeds declines.

Rail deliveries to ports in September-October averaged up 4 percent, 246 cars per week, from the same months of the previous year. Increased rail shipments to Texas ports, up 444 cars per week, and Pacific Coast ports, up 221 cars per week, more than offset declines at North Atlantic and Mississippi River ports. Corn exports are not expected to continue at September-October levels. Rail shipments for export are, therefore, projected to decline somewhat.

Increased shipments of corn into the Southeastern States for use by poultry and livestock feeders will be partially

offsetting. Corn production in 10 Southeastern States was 218 million bushels below 1992. Shipments of feed grains to make up for this shortfall are now moving from surplus production areas. These shipments, together with a 4-percent increase in rail deliveries of grain to ports, caused rail shipments of grain to remain near 1992 levels during September-October 1993.

Over the prior 10 years, railcar loadings of grain were lowest in 1985/86, averaging 22,878 cars per week. In that year, total corn disappearance was 206.2 million metric tons, 4 percent larger than projected for 1993/94. Although a 66-percent reduction in corn production in 10 Southeastern States will temper the decline in demand for rail service, loadings are expected to average only near 23,000 cars per week during 1993/94.

### Railcar Supply Up

On November 1, 1993, the number of jumbo covered hopper cars (4,000 cubic feet capacity or more) in active service increased to 255,975, 3 percent above a year earlier. Privately owned rail cars accounted for the largest share of the growth, 7,884 cars. Railroad-owned cars increased 3,167 cars in the period.

Jumbo covered hopper cars are used for a variety of dry bulk commodities in addition to grain. The growth in available cars, however, suggests that grain shippers will have an adequate supply of railcars in the coming months.

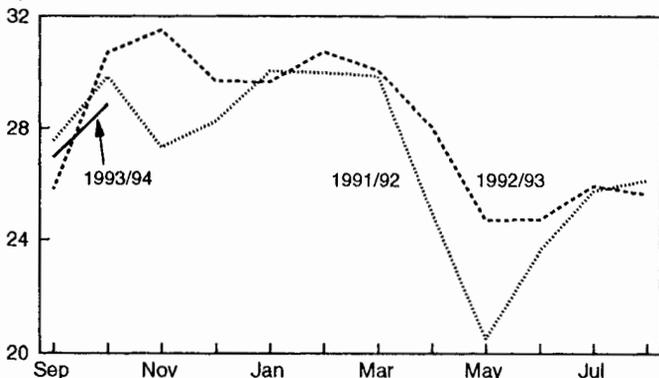
### Barge Shipments Up In September-October, But Expected To Fall

Shipments of grain by barge on the Illinois and Mississippi rivers during September-October averaged 3.5 mil-

Figure 14

### Railcar Loadings of Grain and Soybeans

1,000 cars/week

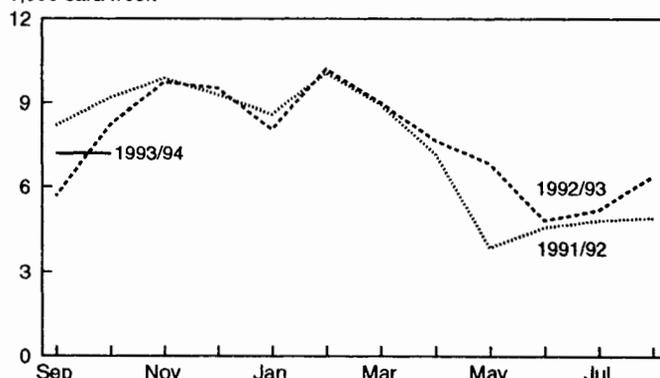


Weekly data averaged to get monthly observation.

Figure 15

### Railcar Unloadings of Grain

1,000 cars/week



At Atlantic, Gulf, and Pacific ports.

lion tons per month, 21 percent above 1992. September-October grain traffic on the Ohio River averaged 744,000 tons per month, 25 percent above 1992. Preliminary data indicate that traffic on both rivers in November remained above 1992 levels.

Barge shipments on the Mississippi and Illinois Rivers usually peak during November, averaging 4.5 million tons over the past 10 years. With total 1993/94 corn and soybean exports projected down nearly 12 million metric tons from a year earlier, barge shipments are likely to be well below the long-term November average. As in 1985/86, when corn exports amounted to 36.1 million metric tons, 5 percent above those projected for 1993/94, barge shipments are expected to average below 3 million tons per month during the rest of 1993/94.

**Rail Rates Up in October, But Expected To Level Off**

Although rail shipments of grain during 1992/93 averaged 7 percent above the prior year, rail rates for grain increased less than 3 percent. The Bureau of Labor Statistics' Freight Rate Index for Grain averaged 113.8 during

1992/93. In October 1993, the index showed rates increasing 2 percent from August to 116.0. Rail rates are expected to remain nearly constant during fourth-quarter 1993. The Association of American Railroads projects operating cost up 1.3 percent during this period. The largest component of the increase, fuel, is projected to rise 7.5 percent due to a deficit reduction tax of 4.3 cents per gallon.

**Clean Fuel and Taxes Lift Diesel Fuel Prices**

On October 1, 1993, requirements for reduced sulfur diesel fuel and the 4.3-cents-per-gallon increase in Federal taxes caused diesel prices to increase 6.6 cents per gallon nationwide. Prices continued to rise through the third week of October, peaking at \$1.28 per gallon. Still, diesel prices averaged well below \$1.56 per gallon for October 1990. Diesel prices began to fall in November, averaging \$1.24 per gallon at midmonth.

**Truck Costs Up**

Increased fuel costs in October caused truck operating costs to rise 3 percent above the prior month to \$1.29 per mile. Operating costs were 4 cents per mile above Octo-

Figure 16  
**Barge Shipments of Grain and Soybeans**

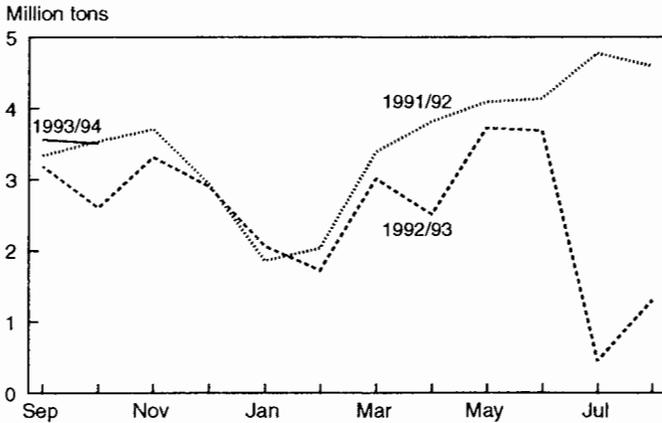


Figure 18  
**Monthly Average Diesel Fuel Price**

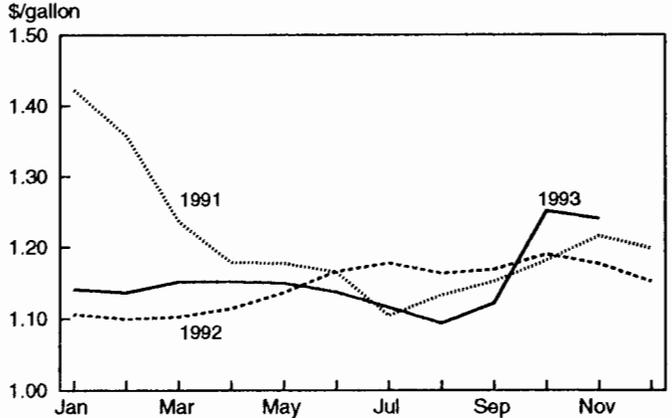
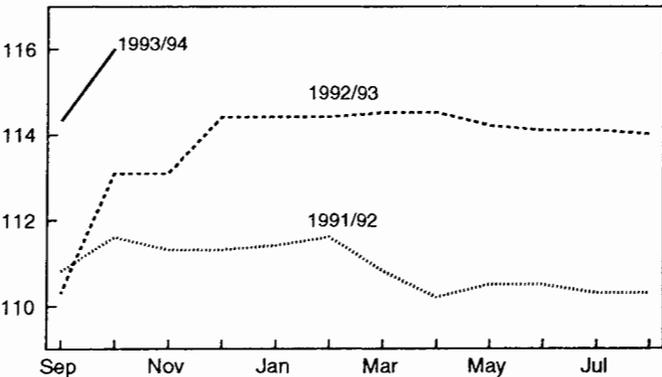
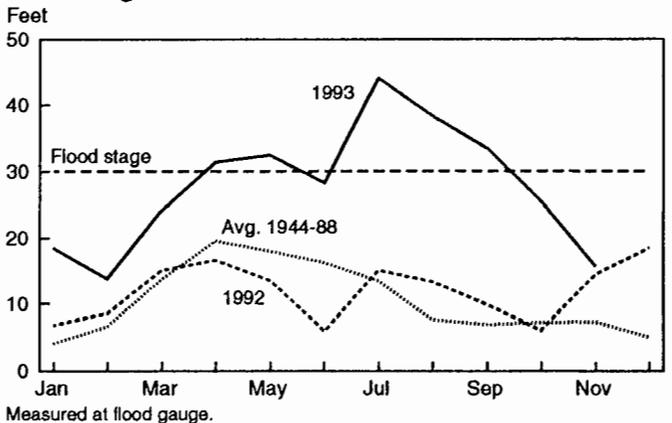


Figure 17  
**Rail Rate Index for Grain**  
% of December 1984



Source: Bureau of Labor Statistics.

Figure 19  
**River Stages at St. Louis**



ber 1992, but more than 8 cents per mile below October 1990, when international tensions caused fuel prices to soar.

**Mississippi Flood Waters Recede, But Remain High**

The flood gauge at St. Louis, Missouri, showed average water levels falling from July's peak of 44.1 feet to 18.2 feet through mid-November. Receding waters uncovered newly formed sand bars, but navigation interruptions were short lived. River levels are expected to decline seasonally through February and no major barriers to navigation are in view.

Usually, ice closes the upper Mississippi River in late November or early December. This year the U.S. Army Corps of Engineers has announced scheduled closings of some locks and dams to accomplish major rehabilitation and modernization. Closings will begin on November 29, with lock and dam 2 near Hastings, Minnesota. These scheduled closings will move down stream, ending on December 13 with lock and dam 13 near Rock Island, Illinois.

**Normal Shipping Season in Prospect for Missouri River**

At mid-November, the flood gauge at Sioux City, Iowa averaged 15.8 feet, 48 percent above November 1992. Water levels were also up at Kansas City, Missouri, averaging 13.7 feet, 10 percent above 1992. Availability of water has allowed the U.S. Army Corps of Engineers to extend navigation on the Missouri River by 2 weeks. The Missouri was expected to close on November 22 at Sioux City and December 1 at St. Louis, the normal closing dates. The Corps has announced that a normal navigation season is expected for 1994, the first in several years. In a normal year, the Missouri opens on April 1 and closes December 1.

[T. Q. Hutchinson 219-0840]

Figure 20  
**River Stages at Sioux City**

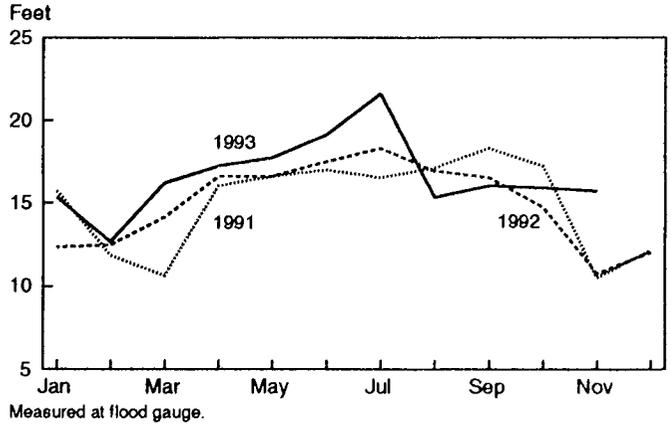
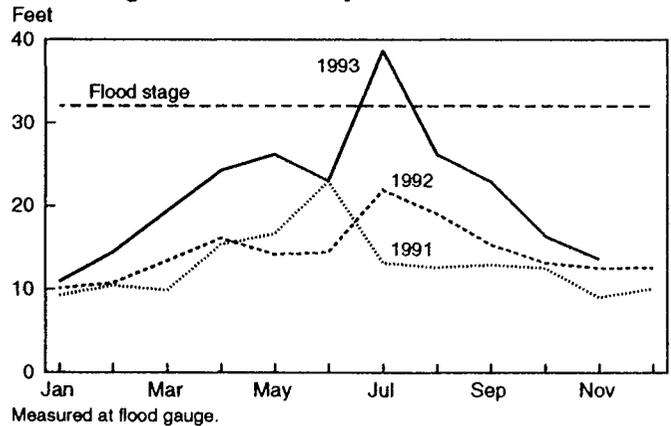


Figure 21  
**River Stages at Kansas City**



## Sharply Lower U.S. Crop To Pull Down World Coarse Grain Production and Stocks

*Foreign coarse grain production is forecast up 1 percent in 1993/94, while foreign consumption is expected to be largely unchanged.*

---

World coarse grain production in 1993/94 is forecast to fall 9 percent to 779 million tons, the lowest since 1988/89. Even with relatively large carryin stocks, global coarse grain supplies are expected to shrink 5.5 percent, also to the lowest level since 1988/89. The year-to-year decline in global production is forecast at 78 million tons, the second largest drop ever, with the United States accounting for most of the decline.

Global consumption in 1993/94 is forecast to drop 1.3 percent to 822 million tons, but will still be second to the record of 1992/93. The impact of this crop shortfall will be substantial in the United States, where tight supplies will result in lower use, as well as in the world market for coarse grains, wheat, and other feed ingredients. However, the reduction in U.S. supplies is not expected to result in a decline in foreign use because of higher foreign production and a drawdown in stocks. Foreign coarse grain use is forecast virtually unchanged from 1992/93 at 635 million tons.

No significant change in the volume of world trade is likely in response to the U.S. production drop, although other suppliers will gain additional market share at the expense of the United States. While corn and sorghum supplies tighten in world markets due to the impact of the U.S. situation, barley supplies will remain relatively abundant. In addition, global wheat supplies are forecast to increase in 1993/94, and will include a large amount of lower quality wheat.

Global coarse grain ending stocks are forecast to fall 43 million tons, with most of the decline occurring in the United States. These would be the lowest global ending stocks since 1983/84. The global stocks-to-use ratio is forecast at 13.9 percent, the lowest since 1973/74.

### **Foreign Production Up**

Coarse grain production outside of the United States is forecast at 586 million tons in 1993/94, up 1 percent from the previous year. Growing conditions have been generally favorable in most producing areas, with the major exception being parts of North Africa and Eastern Europe. Production for Eastern Europe is forecast to be down

slightly from last year's drought-reduced crop and at a very low level. Coarse grain production for the former Soviet Union (FSU) is expected to be up marginally. However, cold, wet weather in key areas late in the season cut the forecast from earlier expectations.

Among major competing exporters, production is forecast up in China, Canada, Australia, and the EC. Small drops are forecast in Thailand, South Africa, and Argentina. However, planting in South Africa and Argentina is not completed yet, and much can happen, both good and bad, to these crops in coming months.

The largest gain is expected in Canada as better growing conditions supported higher yields and harvesting of a larger area. Canada's barley crop is forecast up 21 percent and corn up 39 percent. China's corn production is forecast to rise nearly 2 percent to 97 million tons, the second highest ever, largely due to favorable weather. In Australia, the barley crop, now being harvested, is forecast to increase 8 percent. A larger gain is likely for Australia's sorghum crop, assuming normal weather. However, it is still largely unplanted and subsoil moisture is extremely short in Queensland, one of the major sorghum producing regions.

Despite a 7-percent cut in area, EC coarse grain production is forecast up slightly on the basis of higher yields. Much of the gain in yields was due to a rebound from drought in Spain, Denmark, and Germany. The reduction in area resulted from the set-aside program and lower guaranteed prices under reform of the Common Agricultural Policy (CAP). The largest loss of area in the EC was in barley.

In Argentina, corn area and production are expected to be about the same as in 1992/93, while a small drop in sorghum area and production is forecast. It is unclear whether farmers will further increase plantings in response to recent increases in U.S. prices, in part because it is late for corn to be planted. Corn planted this late would reach its critical flowering stage at the peak of Argentina's summer, when temperatures are usually very high. It appears more likely that area planted to soybeans will gain more because of a shorter growing season and similar incentives of higher prices.

# U.S. Coarse Grain Exports and Market Share Forecast To Drop Sharply in 1993/94

*Corn will account for most of the export decline. Weak import demand, tight U.S. supplies, and sharp competition all contribute to the poor outlook for U.S. exports.*

## World Trade To Slip Again in 1993/94 Because of Drop in Corn

Global coarse grain trade is forecast to drop 3 percent to 85.7 million tons in 1993/94, the third consecutive decline.<sup>1</sup> This outlook is primarily shaped by a prospective drop in corn imports, with some decline in rye also likely. Significant increases are expected in trade of barley and oats, while a small gain is forecast for sorghum. Larger domestic supplies of coarse grains in a number of countries, such as Canada, Poland, South Africa, and other countries in southern Africa account for most of the anticipated fall in import demand for corn. Imports of feed-quality wheat are expected to continue high in South Korea, keeping corn imports flat there.

Coarse grain imports by the FSU are expected to remain low, showing little change from 1992/93. Similarly, Mexico's imports are forecast to stay flat at relatively low levels because of a very large domestic corn crop and some slowing in economic growth and consumption. However, a recent change announced in Mexico's agricultural policies (Procampo) is likely to increase import demand beyond 1993/94. The very high guaranteed prices for corn are to be reduced, in conjunction with direct income payments to producers. This will probably reduce corn area and production, raising import demand over time. Because some acreage is likely to shift back to sorghum, sorghum imports may drop, at least in the short run.

## Barley and Oats Trade To Grow

In contrast to corn, global imports of barley are forecast up 16 percent. The biggest gains are expected to take place in Algeria, where drought has reduced production, and Romania, where output is also down. U.S. imports are forecast to rise due to lower U.S. supplies and a rebound in the size and quality of Canada's crop. Considerable uncertainty surrounds Saudi Arabia's import intentions, forecast equal to the 4 million tons estimated for 1992/93, because of the apparent carryover of large stocks and prospects for an increase in the domestic barley crop.

Global oats trade is forecast to increase by about a third in 1993/94, in response to higher U.S. import demand and

<sup>1</sup> All trade years referred to in this section are October-September and exclude intra-EC trade unless otherwise specified.

(Note: This analysis for Mexico was made prior to the passage of the North American Free Trade Agreement (NAFTA), and does not include any potential effects.)

larger exporter supplies. As usual, imports by the United States will dominate the world market, with imports by other countries forecast to be small.

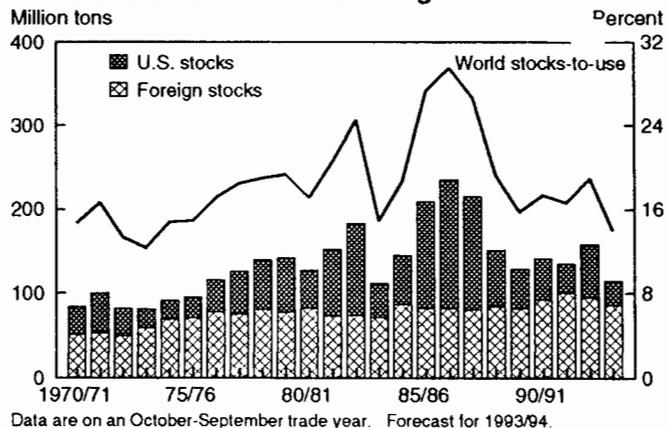
Oats supplies in each of the three major exporters--Canada, Finland, and Sweden--are forecast up in 1993/94, supporting higher exports. Canada's oat crop is forecast to rise 20 percent and, for the first time, will be larger than the U.S. crop. The quality is reported generally improved over 1992/93. Canada's supplies are expected to be the largest since 1982/83 and exports are forecast at a record 850,000 tons.

A strong recovery from drought in Sweden has led to a sharp increase in the production forecast, up 67 percent. Exports are forecast at 300,000 tons, compared with little or none in 1992/93. A production gain of 11 percent is expected in Finland, which was less affected by drought in 1992/93. Finland's exports are forecast at 450,000 tons, up 50 percent. Although both their economies are currently mired in recession, Finland and Sweden are each expected to provide the subsidies needed to export oats, at least for this year.

## Export Competition Remains Intense

China's corn exports in 1993/94 are expected to increase 4 percent to 12 million tons and reach a record for the fourth consecutive year. Another large crop is expected and tighter U.S. supplies will mean increased import demand and higher export prices. While South Korea, Japan, Russia, and Malaysia have been the major destinations for China's corn, in recent years China has exported to an increasingly large number of markets.

Figure 22  
World Coarse Grain Stocks To Tighten in 1993/94



Higher corn exports are also expected from Argentina and the EC. Argentina's exports are forecast up nearly 30 percent in 1993/94 to 5.5 million tons after falling unexpectedly low in 1992/93, apparently due to more domestic consumption and flood damage in some producing areas. Although a relatively small corn exporter, the EC is forecast to raise corn exports to 1.5 million tons, the highest in 5 years. Carryin intervention stocks of corn are at record levels, while an increase in prices on world markets will reduce subsidies needed for its exports.

In addition, South Africa has reentered the corn export market after importing last year, as a better than expected 1992/93 crop (mainly harvested in May-August 1993) raised exportable supplies in the last few months. South Africa is exploiting a niche in the world market for high-quality corn and has reportedly sold around 400,000 tons to date, with much of it expected to go to Japan for starch production. Exports are forecast at 1 million tons for the year, but the final result will depend on prospects for the new crop now being planted.

Ironically, after facing similar large shortfalls in 1992/93, Zambia and Zimbabwe, other southern Africa countries

Table 4--World coarse grain trade: Major exporters and importers, by commodity, 1990/91-1993/94 1/

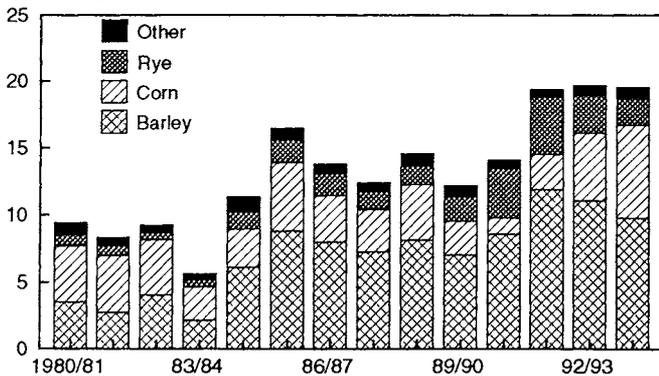
Item	1990/91	1991/92	1992/93	1993/94
			2/	3/
Million metric tons				
<b>CORN</b>				
<b>Exporters:</b>				
U.S.	44.5	40.6	42.0	34.5
Argentina	3.6	5.9	4.3	5.5
China	6.6	9.3	11.5	12.0
Thailand	1.2	0.4	0.2	0.1
South Africa	0.7	0.8	0.0	1.0
Others	2.2	4.6	2.3	2.5
<b>Total</b>	<b>58.8</b>	<b>61.6</b>	<b>60.3</b>	<b>55.6</b>
<b>Importers:</b>				
Japan	16.3	16.5	16.4	16.2
Former USSR	11.5	10.4	6.3	6.3
EC-12	3.1	1.8	1.8	1.8
Korea, Rep.	5.6	6.2	6.5	6.5
Taiwan	5.3	5.4	5.6	5.4
Mexico	1.9	1.1	0.4	0.5
China	0.0	0.0	0.0	0.0
Eastern Europe	1.3	0.1	1.5	0.7
Brazil	0.9	0.5	1.0	1.0
Egypt	1.9	1.3	1.6	1.3
Others	11.0	18.3	19.2	15.9
<b>Total</b>	<b>58.8</b>	<b>61.6</b>	<b>60.3</b>	<b>55.6</b>
<b>SORGHUM</b>				
<b>Exporters:</b>				
U.S.	5.8	7.5	6.7	6.5
Argentina	1.3	1.3	1.1	1.4
Australia	0.3	0.2	0.1	0.3
Others	0.4	0.4	0.8	0.6
<b>Total</b>	<b>7.8</b>	<b>9.4</b>	<b>8.7</b>	<b>8.8</b>
<b>Importers:</b>				
Japan	3.6	3.3	3.0	3.3
Mexico	3.0	5.0	4.0	4.0
Taiwan	0.1	0.1	0.1	0.1
Venezuela	0.0	0.0	0.0	0.0
Israel	0.2	0.2	0.2	0.3
Former USSR	0.0	0.0	0.0	0.0
Others	0.9	0.8	1.4	1.1
<b>Total</b>	<b>7.8</b>	<b>9.4</b>	<b>8.7</b>	<b>8.8</b>
<b>BARLEY</b>				
<b>Exporters:</b>				
EC-12	7.1	8.3	6.0	6.5
Canada	4.3	3.5	2.8	4.0
Australia	2.8	2.0	2.4	2.5
U.S.	1.5	2.1	1.7	1.8
Others	2.9	2.9	2.2	2.7
<b>Total</b>	<b>18.6</b>	<b>18.8</b>	<b>15.1</b>	<b>17.5</b>
<b>Importers:</b>				
Saudi Arabia	4.2	6.5	4.0	4.0
Former USSR	5.7	5.3	2.8	2.9
Eastern Europe	1.2	0.2	1.5	2.3
Japan	1.5	1.5	1.5	1.5
Others	6.0	5.3	5.3	6.8
<b>Total</b>	<b>18.6</b>	<b>18.8</b>	<b>15.1</b>	<b>17.5</b>
<b>COARSE GRAINS</b>				
<b>TOTAL TRADE</b>	<b>88.1</b>	<b>93.5</b>	<b>88.1</b>	<b>85.7</b>

1/ October-September year, excludes intra-EC trade. Totals might not add because of rounding. 2/ Forecast. 3/ Projected.

Figure 23

### EC Coarse Grain Ending Stocks

Million tons

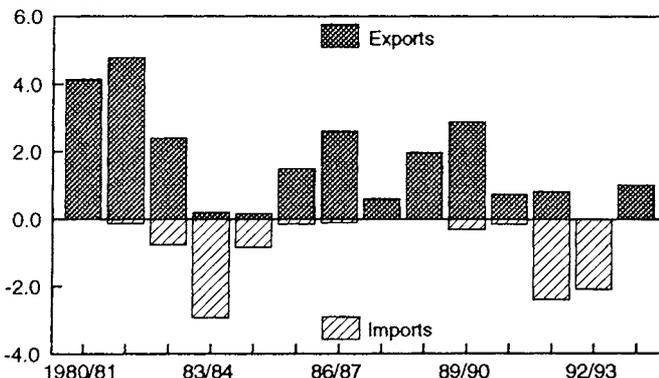


Forecast for 1993/94.

Figure 24

### South Africa Corn Exports Recover from Drought

Million tons



Forecast for 1993/94.

also recovering from drought, have attained small exportable corn surpluses in 1993/94. However, they are likely to experience some difficulties finding markets without support from outside donors. In East Africa, Uganda also has exportable supplies of corn. Neighboring Kenya is a possible market if donors provide financial assistance.

In the barley market, export gains are forecast for all of the major suppliers--the EC, Canada, Australia, and the United States. In addition, some other exporters, including Finland, Sweden, and Turkey are forecast to increase barley shipments. The EC will continue to have abundant supplies of barley for export because of huge stocks, although lower prices under CAP reform are expected to stimulate higher use of barley for feeding within the EC itself in 1993/94.

### U.S. Export Prospects Weaken

U.S. coarse grain exports are forecast at 42.9 million tons in 1993/94, compared with 50.5 million in 1992/93. This will reduce the U.S. market share from 57 percent to 50 percent, the lowest since 1985/86.

Already faced with weak import demand and strong competition, U.S. coarse grain export prospects have further deteriorated in recent weeks because of tight U.S. supplies and rising prices. Most of the impact will be felt in corn, with exports forecast to fall 18 percent from the estimated 1992/93 level to 34.5 million tons, the lowest since 1985/86. Sorghum exports are forecast to decline 3 percent to 6.5 million tons. Barley exports are actually forecast to increase slightly to 1.8 million tons on the strength of aggressive use of the Export Enhancement Program (EEP).

U.S. sales and shipments of corn (for the September-August marketing year) through mid-November are running 23 percent behind the pace of a year earlier, despite significant early season purchases of corn by Russia. Russia, the major corn importer in the former Soviet Union, used long-term, low interest loans provided under the U.S. food aid package first announced last April but not authorized until August. However, Russia's import prospects beyond these early purchases are uncertain. Grain needs are likely to be lower than a year ago because of a increased procurements, and dependence on credit and food aid will continue. Under a recent debt restructuring agreement with the United States, Russia has paid part of its arrears on U.S. credit guarantees, with more payments due in November and December.

Little or no U.S. corn is expected to be sold to southern Africa in 1993/94, in contrast to brisk sales early in 1992/93, reflecting a return to more normal crops in the region. Lower shipments are also expected to Canada and Eastern Europe. Canada's 1992 corn crop was down sharply because of poor weather, but is forecast to return to normal in 1993. U.S. sales to South Korea will remain poor and could even weaken further because of continued corn imports from China and feed wheat imports, mainly from Canada and Australia. South Korea reportedly purchased

Table 5--U.S. exports by leading destinations, 1989/90-1992/93 1/

Country/region	1989/90	1990/91	1991/92	1992/93
----- 1,000 mt -----				
<b>Corn:</b>				
Japan	14,166	13,378	13,411	14,138
Taiwan	5,083	4,939	4,955	5,333
Former USSR	16,396	8,289	7,270	4,721
South Africa	0	14	1,757	2,354
Sub-Saharan Africa	165	216	1,080	1,601
EC	3,241	2,974	1,571	1,378
Egypt	1,145	1,683	1,067	1,397
Canada	578	395	212	1,247
East Europe	1,883	1,417	120	1,103
Algeria	1,214	1,226	1,008	1,076
S. Korea	5,663	2,161	1,558	991
Caribbean	730	789	805	953
Saudi Arabia	805	657	622	752
Venezuela	415	448	534	718
Central America	543	542	563	686
Mexico	4,826	2,016	915	506
Others	3,238	2,583	2,760	3,196
<b>Total</b>	<b>60,091</b>	<b>43,727</b>	<b>40,208</b>	<b>42,150</b>
<b>Sorghum:</b>				
Mexico	3,009	2,981	4,881	4,147
Japan	3,225	1,949	1,669	1,922
Israel	363	166	75	230
EC	233	199	175	190
Turkey	52	115	85	147
Sub-Saharan Africa	21	217	173	98
Jordan	290	51	91	50
Venezuela	104	0	0	13
Former USSR	0	0	0	0
Others	332	190	81	81
<b>Total</b>	<b>7,629</b>	<b>5,868</b>	<b>7,230</b>	<b>6,878</b>
<b>Barley:</b>				
Saudi Arabia	532	1,147	1,108	579
Israel	147	124	320	263
Former USSR	7	0	161	235
Jordan	187	150	196	195
Algeria	124	103	92	115
Cyprus	22	50	77	101
Morocco	0	0	0	96
Japan	104	39	52	50
Mexico	149	130	42	82
Others	558	12	9	32
<b>Total</b>	<b>1,830</b>	<b>1,755</b>	<b>2,057</b>	<b>1,748</b>

--- is greater than zero but less than 1,000 mt.  
1/ September-August for corn and sorghum,  
June-May for barley.

feed wheat at around \$100 per ton recently, about \$15-20 less than corn (both on a delivered basis).

### White Corn Export Situation

U.S. exports of white corn account for a very small portion of total corn exports. The world white corn market is quite thin and import demand by most countries is very sporadic, generally in response to production shortfalls where white corn is a staple food. There was much interest in early 1992 as a result of drought in southern Africa. Accordingly, there was a surge in exports to this region in the latter half of 1991/92 and early months of 1992/93.

Table 6--U.S. white corn exports by leading destinations, 1989/90-1992/93 1/

Country/region	1989/90	1990/91	1991/92	1992/93
1,000 mt				
Mexico	37	46	20	5
Central America	3	5	34	16
Colombia	0	0	6	9
Venezuela	0	0	0	177
Western Europe	3	3	3	0
Kenya	0	0	117	43
South Africa	0	0	100	150
Zimbabwe	0	0	129	0
Other Africa	0	0	28	24
Japan	40	36	53	82
Total	82	90	490	506

1/ Based on inspections data for September-August year.

In 1992/93, Venezuela was the largest U.S. market, followed by South Africa. A small amount traditionally moves to Japan and Mexico, whereas most other destinations, mainly in Latin America and Sub-Saharan Africa, are less regular. Prospects for future imports by Mexico are uncertain. Although Mexico is likely to import more yellow corn from the U.S. for feed use if domestic corn production declines, there is a taste preference for local white corn for food use.

# The Clean Air Act Amendments of 1990 and Agriculture: Effect of Increased Ethanol Production on Grain Producers

Mark Peters<sup>1</sup>

**Abstract:** The Clean Air Act Amendments of 1990 (CAAA), by mandating the blending of oxygenates--such as ethanol--into gasoline, could increase ethanol production in 1997 to 1.5 billion gallons. Model results indicate that as ethanol production increases, corn and other grain prices rise, lowering farm program costs about \$450 million and increasing net income (revenues minus net cash costs) of crop producers by \$270 million. The increase in ethanol production involves some trade-offs within the agricultural sector. While grain prices increase, soybean prices fall. As a result, farmers in the Northern Plains see the greatest gains in net income while farmers in the Southeast may actually see net incomes decline.

**Key words:** Clean Air Act Amendments, ethanol, corn, soybeans, livestock, farm income.

The Clean Air Act Amendments (CAAA) of 1990 mandate the blending of oxygenates--such as ethanol--into gasoline, creating a potentially large market for ethanol. The Congressional Research Service estimates that nearly 4 billion gallons of oxygenate (in ethanol equivalents) will be needed, with ethanol's share between 25 and 30 percent.

Analysis using the U.S. mathematical programming model shows that the increase in ethanol production created by the CAAA will result in a \$437-million increase in crop sector revenues above what are projected for 1997, increasing net income to crop producers by \$270 million.

## **The CAAA Could Affect Up to 65 Percent of Gasoline Sold**

The CAAA sets up two programs to reduce air pollution created by automobiles: the oxygenated gasoline program and the reformulated gasoline program. The oxygenated fuels program aims to reduce the levels of carbon monoxide emissions during the winter, while the reformulated fuel program aims to reduce the rate of ozone formation during the summer.

The oxygenated gasoline program, in effect since November 1, 1992, requires that oxygen be blended into gasoline (at least 2.7 percent by weight) in the four winter months (November through February). It applies to 39 urban areas that failed to meet carbon monoxide air quality standards. The carbon monoxide nonattainment areas represent 29

percent of winter gasoline demand. The Congressional Research Service estimates that 900 million gallons of oxygenates (in ethanol equivalents) will be needed to meet the requirements of the oxygenated fuels program.

The reformulated gasoline (RFG) program, to take effect January 1, 1995, requires that oxygen be blended into gasoline (at least 2 percent by weight) year round. It also requires that the reformulated gasoline meet three performance standards from a base of standard vehicles using standard gasoline. The RFG must 1) reduce ozone-forming hydrocarbon emissions during the summer months 15 percent, 2) reduce toxic air pollutant emissions (benzene, formaldehyde and others) 15 percent, and 3) not increase nitrogen oxides emissions. Furthermore, RFG must reduce hydrocarbon and toxic chemical emissions 25 percent below base by 2000.

The RFG program is currently mandated for nine urban areas with the highest ozone emissions. The mandated cities represent 17 percent of yearly gasoline demand. Other areas not mandated by law to participate in the RFG program, but not meeting ozone air quality standards, can opt in to the RFG program. If all ozone nonattainment areas opt in to the RFG program, nearly 65 percent of gasoline sold would be affected. The Congressional Research Service estimates that 1 billion gallons of oxygenate (in ethanol equivalents) will be needed to supply the mandated areas and 4 billion will be needed if all ozone nonattainment areas opt in to the program.

## **Ethanol Production Likely To Increase to 1.5 Billion Gallons by 1997**

Ethanol's share of the oxygenate market depends on several factors, including ethanol's cost compared with the

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cost of alternative oxygenates and restrictions placed on ethanol's use by the CAAA.

Ethanol's main competitor as an oxygenate is methyl tertiary butyl ether (MTBE). Ethanol is costly to produce relative to MTBE, but because it receives a federal subsidy of \$0.54 per gallon, it costs considerably less to use.

The CAAA may limit ethanol's use as an oxygenate. Blending ethanol into gasoline (above 2 percent oxygen by weight) increases nitrous oxides emissions, violating one of the performance criteria for RFG. A plan requiring gasoline destined to some markets to be lower than normal in volatility would allow ethanol to be added to gasoline and still meet the requirements of the CAAA. Potentially, this plan would support demand for an additional 600 million gallons of ethanol. Thus, by 1997, total ethanol demand could reach 1.5 billion gallons.

### The Modeling Approach

The U.S. Mathematical Programming (USMP) model was used to analyze the economic effects of increased ethanol production on the crop and livestock sectors. The USMP regional model is a comparative static, market equilibrium model that represents U.S. crop and livestock production for the 10 farm production regions.

USMP specifies production of 10 crops: corn, sorghum, oats, barley, wheat, rice, cotton, soybeans, hay, and silage. Some 16 primary livestock products are included, the principal being milk, hogs, poultry, and beef cattle. The model also includes several dozen processed and retail products, including dairy products, pork, fed and nonfed beef, soy-meal and oil, livestock feeds, and corn milling products.

Government commodity acreage reduction, price and income support programs are incorporated in the model. Production, consumption, trade, and prices for crop and livestock commodities and most processed or retail products are endogenously determined, while holding stocks fixed.

To provide a benchmark from which to measure potential impacts of increased ethanol production, USMP is first calibrated to replicate agricultural conditions (projections of supply, use, prices, acreage, livestock product demand, and other indicators) for 1997 without the Clean Air Act. Then a scenario where ethanol production is increased from 900 million gallons to 1.5 billion gallons is analyzed.

While the model uses a base year, the analysis is not time specific. The model assumes that agricultural producers have several years to adjust to a shock, therefore, the results from the model represent medium term adjustments of the agriculture sector.

For this analysis the acreage reduction program (ARP) rates were held constant at 5 percent. Reducing the ARP rates would free up land to produce the additional corn used to produce ethanol, reducing the effects of the increase in ethanol production on corn and other feed grain prices.

The analysis presented here is similar to a recent USDA analysis of the effect of increased ethanol production on the agricultural sector by House and others. The results of the two analyses differ because of different assumptions regarding the size of increase in ethanol production and changes in ARP rates. The full results of the USDA analysis--including complete agricultural sector, environmental, trade, and employment effects--are reported in a series of publications by the USDA's Economic Research Service.

### Crop Effects

The model results indicate that corn and other feed grain (sorghum, barley, and oats) producers will clearly benefit from the increase in ethanol production. As ethanol production increases, it raises the demand for corn, causing production and price of corn to rise. The increase in the price of corn in turn stimulates the demand for other grains, primarily as livestock feed, causing their production and prices to rise too.

Increasing ethanol production from 900 million gallons to 1.5 billion gallons requires 240 million bushels of corn. Of this amount 64 percent comes from increased corn production. The remainder comes from reduced feed and export use. Demand for other feed grains and wheat increases as less corn is used for feed, causing other feed grain prices and production to rise. The increase in demand for wheat is offset by heightened competition from ethanol coproducts (corn gluten meal, corn gluten feed, and distillers' dried grains) in feed markets. In addition, the increase in corn planting slightly intensifies the competition for acreage among crops.

Soybean producers will not fare as well. The increase in ethanol production will expand the supply of ethanol coproducts that compete with soybeans in feed and vegetable oil markets. The increased competition reduces the demand for soybean meal and oil, causing soybean production, prices, and revenues to fall.

Corn acreage rises 1.3 million acres while soybean acreage declines 0.6 million acres. Most of the adjustment occurs in the Corn Belt, where corn acreage gains 0.7 million acres and soybean area falls 0.4 million acres.

Table A1--Change in prices, production, domestic use, and exports of crops as a result of increasing ethanol production from 900 million to 1.5 billion gallons

Crop	Price	Production	Total domestic use 1/	Exports
		Percent		
Corn	2.7	1.7	2.4	-1
Other feed grains 2/	2.5	1.6	3.6	-3.4
Wheat	0.7	-0.3	---	-0.5
Rice	---	---	---	---
Soybeans	-0.4	-1.5	-1.7	0.1
Cotton	0.2	---	---	---

Note: "----" indicates a change of less than 0.05.

1/ Includes food, seed, livestock feed, and industrial uses.

2/ Sorghum, barley, and oats.

Table A2--Changes in area planted due to increase in ethanol production, by crop and region.

Crop	Regions										U.S. Total
	North-east	Lake States	Corn Belt	Northern Plains	Appalachia	South-east	Delta States	Southern Plains	Mountain	Pacific	
Base: 900 million gallons 1997: 1.5 billion gallons											
-----change in million acres-----											
Corn	---	0.2	0.7	0.2	0.1	---	---	---	---	---	1.3
Other feed grains 1/	---	---	---	0.2	---	---	---	0.1	---	---	0.4
Wheat	---	---	-0.1	-0.1	---	---	---	---	---	---	-0.2
Rice	---	---	---	---	---	---	---	---	---	---	---
Soybeans	---	-0.1	-0.4	-0.1	---	---	-0.1	---	---	---	-0.6
Cotton	---	---	---	---	---	---	---	---	---	---	---
8 crops 2/	---	0.1	0.2	0.2	0.1	---	---	0.1	---	---	0.9

Note: Values may not sum to totals due to rounding. "----" indicates a crop not present in region or a change of less than 0.05 million acres.

1/ Sorghum, barley and oats.

2/ Corn, sorghum, barley, oats, wheat, cotton, rice, and soybeans.

Overall, acreage planted to the eight major field crops (corn, sorghum, barley, oats, wheat, cotton, rice and soybeans) increases by 0.9 million acres. In the Delta States, some acreage moves from soybeans to cotton.

### Income Effects

Increased production of ethanol will raise crop producer incomes. Net income (value of production plus deficiency payments and conservation reserve payments less variable costs) from production of the 10 major crops rises \$270 million.<sup>1</sup> Increased feed grain prices and production cause crop revenues to rise. The revenue gain is offset by a \$167-million rise in variable costs caused by the increase in production and a \$454-million decline in deficiency payments caused by the increase in prices.

Net income from livestock production falls \$359 million presuming livestock producers do not decrease output very much in response to higher feed costs. Energy feed costs increase more than protein feed costs decline, leading to a \$462-million increase in variable production costs. A slight decrease in livestock production causes producer prices to rise, causing a \$103 million increase in producer revenues.

The decline in net income in this analysis is caused in part by holding ARP rates constant. Increasing land available for production, by reducing ARP rates, could eliminate the rise in corn and other feed grain prices and the resulting increase in feed costs to livestock producers. In this analysis, reducing the ARP rate for corn, so as to keep the price of corn constant, will cause net farm income to increase by \$17 million.

Farmers' individual income prospects will depend on their mix of crop and livestock enterprises. In the Corn Belt,

<sup>1</sup> Differs from net farm income by value of inventory change, imputed rents, onfarm use, and other factors.

Table A3--Changes in income and expenses from increased ethanol production.

Enterprise	Base: 900 Million gallons 1997: 1.5 billion gallons		Change (million \$)
	1997	1997	
<b>Major crops:</b>			
Value of production			891
Deficiency payments			-454
Variable costs			167
Net income			269
<b>Major livestock:</b>			
Value of production			103
Variable costs			462
Net income			-359
<b>Total</b>			
Revenue			541
Variable costs			629
Net income			-89

Note: Values may not sum to totals due to rounding.

Lake States, and Northern Plains, farmers often combine soybean or livestock production with the production of corn. On average, farmers in these regions could experience a net gain in income: farmers more dependent on corn production would gain the most, while farmers more dependent on soybeans or livestock production would gain the least, or lose income.

Most of the increase in net income occurs in the Northern Plains (\$32 million), Corn Belt (\$11 million), and Lake States (\$1 million). In the South, farmers seldom combine soybean production with corn or other grain production. Soybean producers in this region would probably see a decline in net income. Overall, farmers outside the Northern Plains, Corn Belt, and Lake States could experience a net loss of \$133 million.

## **References**

Anderson, Margot. **Ethanol Production, Corn Gluten Feed, and EC Trade, AIB-677**. U.S. Department of Agriculture, Economic Research Service, July 1993.

Gushee, David E. **Alternative Transportation Fuels: Are They Reducing Oil Imports?** CRS Issue Brief. The Congressional Research Service. April 9, 1993.

Hohman, Neil and C. Matthew Rendelman. **Emerging Technologies in Ethanol Production, AIB-663**. U.S. Department of Agriculture, Economic Research Service, January 1993.

House, Robert, Mark Peters, Harry Baumes, and W. Terry Disney. **Ethanol and Agriculture: Effect of Increased Production on Crop and Livestock Producers, AER-667**. U.S. Department of Agriculture, Economic Research Service, May 1993.

Petrulis, Mindy, Judith Sommer, and Fred Hines. **Ethanol Production and Employment, AIB-678**. U.S. Department of Agriculture, Economic Research Service, July 1993.

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Appendix table 1--Feed grains: Marketing year supply and disappearance, area, and prices, 1986/87-1993/94 1/

Year 2/	Supply				Disappearance					Ending stocks			
	Begin- ning stocks	Produc- tion	Imports	Total	Domestic use			Exports	Total disap- pearance	Govt. owned	Privately owned 3/	Total	
Food, alcohol, and industrial	Seed	Feed and residual	Total	Million metric tons									
1986/87	126.4	251.6	0.7	378.7	35.0	1.4	144.3	180.7	45.9	226.6	48.7	103.4	152.1
1987/88	152.1	216.5	1.0	369.6	35.9	1.3	146.7	183.9	52.1	236.0	34.1	99.5	133.6
1988/89	133.6	149.3	1.2	284.2	37.5	1.2	118.5	157.2	61.1	218.3	18.6	47.3	65.9
1989/90	65.9	221.0	1.3	288.2	39.2	1.1	132.7	173.0	69.7	242.7	10.5	35.0	45.5
1990/91	45.5	230.5	1.3	277.3	39.5	1.1	137.5	178.1	51.5	229.6	11.3	36.4	47.7
1991/92	47.7	218.4	2.1	268.2	41.6	1.1	141.8	184.5	49.7	234.2	3.2	30.7	34.0
1992/93 4/	34.0	277.5	1.2	312.7	43.0	1.1	154.5	198.5	51.1	249.6	1.6	61.4	63.0
1993/94 5/	63.0	193.0	2.1	258.2	----45.0----		142.4	187.4	42.6	229.9			28.2

	Area		Yield per harvested hectare	Average price received by farmers 7/	Government- support program Total payments to participants 8/	
	Set-aside and diverted 6/	Planted				
	Million hectares		Metric tons	1977=100	\$ million	
1986/87	7.4	48.4	41.1	6.12	73	7,281
1987/88	12.5	43.2	35.2	6.16	97	8,447
1988/89	11.1	41.2	32.6	4.59	129	3,111
1989/90	6.7	42.9	36.8	6.00	118	3,918
1990/91	6.9	41.8	36.2	6.36	112	3,400
1991/92	5.1	42.3	37.2	5.87	117	2,458
1992/93	4.2	43.9	38.9	7.13	103	4,116
1993/94 5/		40.6	33.9	5.70		

1/ Aggregated data on corn, sorghum, barley, and oats. 2/ The marketing year for corn and sorghum begins September 1; for oats and barley, June 1. 3/ Includes total government loans (original and resale). 4/ Preliminary. 5/ Projected. 6/ Includes diversion, acreage reduction, 0-92, and 50-92 programs; 0-92 and 50-92 set-asides include idled acreage and acreage planted to minor oilseeds. 7/ Excludes support payments. 8/ Deficiency and diversion payments.

Appendix table 2--Foreign coarse grains: Supply and disappearance, 1981/82-1993/94 1/

Year	Beginning stocks	Production	Feed	Total disappearance	Imports	Adjusted imports 2/	Ending stocks
Million metric tons							
<b>Corn:</b>							
1981/82	50.1	235.2	177.9	291.4	77.9	67.3	44.6
1982/83	44.6	230.6	175.7	281.5	72.9	63.3	39.9
1983/84	39.9	241.8	169.5	288.9	64.2	61.1	40.7
1984/85	40.7	263.4	185.6	302.6	72.5	66.5	48.5
1985/86	48.5	253.1	186.4	290.2	61.6	54.2	42.3
1986/87	42.3	266.3	194.1	307.7	59.6	56.6	38.8
1987/88	38.8	269.3	199.9	313.7	62.8	56.6	40.4
1988/89	40.4	275.4	211.2	326.8	74.1	65.4	40.3
1989/90	40.3	269.3	214.6	331.3	81.5	74.4	38.4
1990/91	38.4	276.5	196.7	317.2	61.8	58.7	41.5
1991/92	41.5	297.4	210.6	327.3	73.5	61.1	51.3
1992/93 3/	51.3	288.3	207.0	333.9	63.1	60.2	47.7
1993/94 4/	47.7	290.3	210.7	330.0	61.1	55.4	42.0
<b>Sorghum:</b>							
1981/82	8.2	48.2	28.3	55.5	14.3	13.7	7.5
1982/83	7.5	43.9	25.0	50.5	12.3	11.6	6.2
1983/84	6.2	46.1	25.5	52.0	13.0	13.0	6.6
1984/85	6.6	43.8	25.8	51.8	12.8	13.1	6.1
1985/86	6.1	41.7	24.5	47.2	9.6	8.8	5.0
1986/87	5.0	40.5	22.9	46.2	7.9	7.8	4.3
1987/88	4.3	37.8	22.3	45.0	8.6	8.3	3.0
1988/89	3.0	39.8	23.1	45.9	11.0	10.6	4.8
1989/90	4.8	39.6	21.7	47.4	9.2	9.0	4.7
1990/91	4.7	37.9	21.1	44.5	8.0	7.8	4.0
1991/92	4.0	36.8	22.2	43.6	9.8	9.4	4.6
1992/93 3/	4.6	41.1	20.8	47.6	8.5	8.7	5.2
1993/94 4/	5.2	40.5	20.8	46.8	8.6	8.8	5.2
<b>Barley:</b>							
1981/82	16.2	139.2	105.4	143.8	20.3	13.9	13.6
1982/83	13.6	150.0	108.4	147.1	17.2	13.1	17.2
1983/84	17.2	147.2	115.9	154.2	20.2	16.4	12.0
1984/85	12.0	157.4	115.9	152.4	22.9	17.9	18.4
1985/86	18.4	159.9	120.5	156.3	22.1	18.2	22.3
1986/87	22.3	163.5	125.8	162.6	24.1	18.4	26.0
1987/88	26.0	162.5	124.6	166.1	23.7	15.7	24.8
1988/89	24.8	156.5	116.4	155.6	21.2	15.6	27.2
1989/90	27.2	156.0	120.7	159.4	21.9	17.5	25.3
1990/91	25.3	168.8	123.3	166.7	22.9	18.2	28.8
1991/92	28.8	159.0	113.9	160.3	22.6	18.3	29.1
1992/93 3/	29.1	155.5	115.6	158.2	19.9	14.9	27.8
1993/94 4/	27.8	157.7	119.0	160.7	21.1	16.9	26.1
<b>Total coarse grains: 5/</b>							
1981/82	82.1	512.2	353.7	580.4	114.7	97.1	73.1
1982/83	73.1	524.5	359.1	576.2	103.7	89.3	73.6
1983/84	73.6	540.4	366.0	598.3	99.0	92.5	71.2
1984/85	71.2	568.2	379.3	608.1	110.8	99.3	86.7
1985/86	86.7	557.5	387.7	597.2	95.1	81.8	82.3
1986/87	82.3	570.3	395.4	615.2	93.3	82.1	82.6
1987/88	82.6	567.3	403.5	622.8	97.1	87.2	80.9
1988/89	80.9	571.4	403.9	627.3	108.1	93.7	84.9
1989/90	84.9	569.6	412.1	640.6	114.5	102.5	82.3
1990/91	82.3	590.2	396.6	630.1	94.2	86.3	92.5
1991/92	92.5	584.8	396.8	624.6	108.2	91.3	100.2
1992/93 3/	100.2	579.1	391.3	634.5	95.5	86.7	94.7
1993/94 4/	94.7	585.6	396.9	634.7	93.2	83.7	86.0

1/ Aggregated on basis of local marketing years, except for adjusted imports. 2/ Based on Oct./Sept. trade year and excludes intra-EC trade. 3/ Forecast. 4/ Projected. 5/ Includes oats, rye, millet, and mixed grains.

Source: Compiled from World Grain Situation and Outlook, Foreign Agricultural Service, and USDA data.

Appendix table 3--Corn: Marketing year supply and disappearance, area, and prices, 1986/87-1993/94

Year beginning September 1	Supply				Disappearance					Ending stocks Aug. 31			
	Beginning stocks	Production	Imports	Total	Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
-----Million bushels-----													
1986/87	4,039.5	8,225.8	1.8	12,267.0	1,206.8	16.7	4,669.4	5,892.9	1,492.5	7,385.3	1,443.2	3,438.5	4,881.7
1987/88	4,881.7	7,131.3	3.4	12,016.4	1,226.0	17.2	4,797.7	6,040.9	1,716.4	7,757.3	835.0	3,424.1	4,259.1
1988/89	4,259.1	4,928.7	2.8	9,190.6	1,275.0	18.4	3,941.0	5,234.4	2,025.8	7,260.1	362.5	1,567.9	1,930.4
1989/90	1,930.4	7,525.5	1.9	9,457.8	1,337.0	18.9	4,389.2	5,745.1	2,368.2	8,113.4	233.0	1,111.5	1,344.5
1990/91	1,344.5	7,934.0	3.4	9,281.9	1,353.7	19.3	4,663.0	6,036.1	1,724.6	7,760.7	371.1	1,150.1	1,521.2
1991/92	1,521.2	7,475.5	19.6	9,016.4	1,433.8	20.2	4,877.9	6,331.9	1,584.1	7,916.1	112.5	987.8	1,100.3
1992/93 2/	1,100.3	9,478.9	7.1	10,586.3	1,492.7	18.7	5,298.9	6,810.3	1,663.3	8,473.6	55.5	2,057.2	2,112.7
1993/94 3/	2,112.7	6,503.2	15.0	8,631.0	----1,550.0----		4,850.0	6,400.0	1,350.0	7,750.0			881.0

	Area			Yield per harvested acre	Average prices				Government-support program					
	Set-aside and diverted 4/	Planted	Harvested for grain		Received by farmers 5/	St. Louis No. 2 yellow	Omaha No. 2 yellow	Gulf Ports No. 2 yellow	National average loan rate	Target price	Total payments to participants 6/			
-----Million acres-----											Bushels	-----\$/bu.-----		\$ million
1986/87	12.7	76.6	68.9	119.4	1.50	1.68	1.53	1.83	1.92	3.03	6,328			
1987/88	23.2	66.2	59.5	119.8	1.94	2.19	1.98	2.39	1.82	3.03	7,378			
1988/89	20.5	67.7	58.3	84.6	2.54	2.72	2.49	2.93	1.77	2.93	2,728			
1989/90	10.8	72.2	64.7	116.3	2.36	2.58	2.41	2.79	1.65	2.84	3,504			
1990/91	10.7	74.2	67.0	118.5	2.28	2.49	2.28	2.67	1.57	2.75	3,015			
1991/92	7.5	76.0	68.8	108.6	2.37	2.53	2.36	2.74	1.63	2.75	2,080			
1992/93	5.3	79.3	72.1	131.4	2.07	2.25	2.10	2.46	1.72	2.75	3,621			
1993/94 3/		73.7	63.1	103.1	2.35-2.75				1.72	2.75				

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected. 4/ Includes diversion, acreage reduction, 0-92, and 50-92 programs; 0-92 and 50-92 set-asides include idled acreage and acreage planted to minor oilseeds. 5/ Excludes support payments. 6/ Deficiency and diversion payments.

Appendix table 4--Sorghum: Marketing year supply and disappearance, area, and prices, 1986/87-1993/94

Year beginning September 1	Supply				Disappearance					Ending stocks Aug. 31			
	Beginning stocks	Production	Imports	Total	Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
Million bushels													
1986/87	551.0	938.9	0.0	1,489.9	10.4	1.6	536.2	548.2	198.3	746.5	408.9	334.4	743.3
1987/88	743.3	730.8	0.0	1,474.1	23.5	1.3	555.1	579.9	231.6	811.5	463.6	199.1	662.7
1988/89	662.7	576.7	0.0	1,239.3	20.5	1.5	466.3	488.3	311.5	799.8	340.9	98.6	439.5
1989/90	439.5	615.4	0.2	1,055.2	13.6	1.3	517.3	532.2	303.2	835.4	162.5	57.3	219.8
1990/91	219.8	573.3	0.1	793.1	7.3	1.4	409.6	418.4	232.2	650.5	64.7	77.9	142.6
1991/92	142.6	584.9	0.0	727.5	6.8	1.7	374.0	382.5	291.7	674.3	8.2	45.0	53.2
1992/93 2/	53.2	884.0	0.0	937.2	6.1	1.4	477.6	485.1	277.1	762.2	3.9	171.1	175.0
1993/94 3/	175.0	620.4	0.0	795.4	---7.5---		460.0	467.5	250.0	717.5			77.9

	Area			Yield per harvested acre	Average prices				Government-support program		
	Set-aside and diverted 4/	Planted	Harvested for grain		Received by farmers 5/	Kansas City No. 2 yellow	Texas No. 2 yellow	Gulf Ports No. 2 yellow	National average loan rate	Target price	Total payments to participants 6/
	Million acres			Bushels	\$/cwt				\$ million		
1986/87	2.9	15.3	13.9	67.7	2.45	2.73	3.24	3.22	3.25	5.14	570
1987/88	4.1	11.8	10.5	69.4	3.04	3.40	3.81	3.96	3.11	5.14	708
1988/89	3.9	10.3	9.0	63.8	4.05	4.17	4.66	4.81	3.00	4.96	325
1989/90	3.3	12.6	11.1	55.4	3.75	4.21	4.38	4.76	2.80	4.82	391
1990/91	3.3	10.5	9.1	63.1	3.79	4.08	4.48	4.65	2.66	4.66	317
1991/92	2.4	11.1	9.9	59.3	4.01	4.36	4.78	4.86	2.75	4.66	175
1992/93	2.0	13.3	12.2	72.8	3.38	3.74	4.02	4.27	2.91	4.66	327
1993/94 3/		10.7	9.7	63.6	3.84-4.55				2.91	4.66	

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected. 4/ Includes diversion, acreage reduction, 0-92, and 50-92 programs; 0-92 and 50-92 set-asides include idled acreage and acreage planted to minor oilseeds. 5/ Excludes support payments. 6/ Deficiency and diversion payments.

Appendix table 5--Barley: Marketing year supply and disappearance, area, and prices, 1986/87-1993/94

Year beginning June 1	Supply				Disappearance					Ending stocks May 31			
	Beginning stocks	Production	Imports	Total	Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
Million bushels													
1986/87	327.2	608.5	6.7	942.4	156.9	17.9	297.7	472.5	133.6	606.1	75.5	260.8	336.3
1987/88	336.3	521.5	11.3	869.1	158.1	15.7	253.2	427.0	121.0	548.0	50.1	271.0	321.1
1988/89	321.1	290.0	10.5	621.6	160.4	15.0	170.9	346.3	78.9	425.2	30.4	166.0	196.4
1989/90	196.4	404.2	13.1	613.7	162.0	13.5	193.3	368.8	84.0	452.9	19.3	141.5	160.8
1990/91	160.8	422.2	13.5	596.5	161.1	14.6	204.8	380.5	80.6	461.1	8.4	127.0	135.4
1991/92	135.4	464.3	24.5	624.2	158.0	12.9	230.2	401.1	94.5	495.6	6.5	122.1	128.6
1992/93 2/	128.6	457.9	11.4	597.9	153.3	13.2	199.9	366.4	80.3	446.7	5.0	146.2	151.2
1993/94 3/	151.2	415.8	25.0	591.9	----165.0----		225.0	390.0	85.0	475.0			116.9

	Area			Yield per harvested acre	Average prices				Government-support program					
	Set-aside and diverted 4/	Planted	Harvested for grain		Received by farmers 5/	-----Minneapolis-----			National average loan rate	Target price	Total payments to participants 7/			
						No. 2 or better feed 6/	No. 3 or better malting	Portland No. 2						
-----Million acres-----											Bushels	-----\$/bu.-----		\$ million
1986/87	2.0	13.0	12.0	50.8	1.61	1.44	1.89	1.96	1.56	2.60	352			
1987/88	3.0	10.9	10.0	52.4	1.81	1.78	2.04	2.09	1.49	2.60	336			
1988/89	2.8	9.8	7.6	38.0	2.80	2.32	4.11	2.74	1.44	2.51	54			
1989/90	2.3	9.1	8.3	48.6	2.42	2.20	3.28	2.61	1.34	2.43	23			
1990/91	2.9	8.2	7.5	56.1	2.14	2.13	2.42	2.65	1.28	2.36	59			
1991/92	2.2	8.9	8.4	55.2	2.10	2.17	2.38	2.66	1.32	2.36	173			
1992/93	2.4	7.8	7.3	62.5	2.05	2.11	2.37	2.57	1.40	2.36	153			
1993/94		7.9	7.1	58.9	1.95-2.15				1.40	2.36				

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected. 4/ Includes diversion, acreage reduction, 0-92, and 50-92 programs; 0-92 and 50-92 set-asides include idled acreage and acreage planted to minor oilseeds. 5/ Excludes support payments. 6/ Starting March 1987, shifted to Duluth. 7/ Deficiency and diversion payments.

Appendix table 6--Oats: Marketing year supply and disappearance, area, and prices, 1986/87-1993/94

Year beginning June 1	Supply				Disappearance					Ending stocks May 31			
	Begin-ning stocks	Produc-tion	Imports	Total	Domestic use		Exports	Total disap-pearance	Govt. owned	Privately owned		Total	
					Food, alcohol, and industrial	Seed				Feed and residual	1/		
Million bushels													
1986/87	183.7	385.0	32.4	601.0	45.0	38.0	384.5	467.5	0.9	468.4	3.5	129.1	132.6
1987/88	132.6	373.7	45.7	552.0	49.8	31.6	358.2	439.6	0.5	440.1	3.5	108.4	111.9
1988/89	111.9	217.6	62.9	392.4	72.7	27.1	193.8	293.6	0.6	294.2	2.4	95.9	98.3
1989/90	98.3	373.6	66.4	538.3	91.6	23.4	265.6	380.6	0.8	381.4	0.7	156.2	156.9
1990/91	156.9	357.5	63.4	577.8	100.9	19.1	286.0	406.0	0.6	406.6	0.3	170.9	171.2
1991/92	171.2	243.5	74.8	489.4	107.2	17.8	234.8	359.8	1.9	361.7	0.2	127.5	127.7
1992/93 2/	127.7	294.8	55.0	477.5	107.2	17.8	233.3	358.3	6.0	364.3	0.0	113.2	113.2
1993/94 3/	113.2	208.1	80.0	401.3	----125.0----		180.0	305.0	5.0	310.0			91.3

	Area			Yield per harvested acre	Average prices				Government-support program		
	Set-aside and diverted 4/	Planted	Harvested for grain		Received by farmers 5/	Minneapolis	Portland	Toledo	National average loan rate	Target price	Total payments to participants 6/
						No. 2 white, heavy	No. 2 white, heavy	No. 2			
-----Million acres-----											
-----Bushels-----											
-----\$/bu.-----											
----- \$ million-----											
1986/87	0.5	14.7	6.8	56.3	1.21	1.46	1.53	1.20	0.99	1.60	32
1987/88	0.8	17.9	6.9	54.3	1.56	1.92	1.76	1.68	0.94	1.60	26
1988/89	0.3	13.9	5.5	39.3	2.61	2.80	2.23	2.26	0.90	1.55	4
1989/90	0.3	12.1	6.9	54.3	1.49	1.65	1.63	1.40	0.85	1.50	0
1990/91	0.2	10.4	5.9	60.1	1.14	1.30	1.57	1.17	0.81	1.45	8
1991/92	0.6	8.7	4.8	50.7	1.21	1.47	1.60	1.37	0.83	1.45	30
1992/93	0.7	8.0	4.5	65.6	1.32	1.58	1.73	1.51	0.88	1.45	15
1993/94		7.9	3.8	54.6	1.35-1.45				0.88	1.45	

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected. 4/ Includes diversion, acreage reduction, 0-92, and 50-92 programs; 0-92 and 50-92 set-asides include idled acreage and acreage planted to minor oilseeds. 5/ Excludes support payments. 6/ Deficiency and diversion payments.

Appendix table 7--Corn: Marketing year supply and disappearance, specified periods, 1986/87-1993/94

Year beginning September 1	Supply				Disappearance					Ending stocks			
	Beginning stocks	Production	Imports	Total	Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
Million bushels													
1986/87:													
Sept.-Nov.	4,039.5	8,225.8	0.7	12,266.0	287.6	0.0	1,354.7	1,642.3	318.2	1,960.5	968.2	9,337.3	10,305.5
Dec.-Feb.	10,305.5	---	0.2	10,305.7	277.3	0.0	1,467.3	1,744.6	312.8	2,057.5	1,362.2	6,886.0	8,248.2
Mar.-May	8,248.2	---	0.4	8,248.6	318.4	16.4	1,085.6	1,420.4	496.1	1,916.4	1,491.5	4,840.7	6,332.2
June-Aug.	6,332.2	---	0.4	6,332.6	323.5	0.3	761.8	1,085.6	365.3	1,450.9	1,443.2	3,438.5	4,881.7
Mkt. year	4,039.5	8,225.8	1.8	12,267.0	1,206.8	16.7	4,669.4	5,892.9	1,492.5	7,385.3	1,443.2	3,438.5	4,881.7
1987/88:													
Sept.-Nov.	4,881.7	7,131.3	0.6	12,013.6	295.4	0.0	1,551.6	1,847.0	395.6	2,242.6	1,683.4	8,087.6	9,771.0
Dec.-Feb.	9,771.0	---	0.7	9,771.7	285.3	0.0	1,446.1	1,731.4	404.7	2,136.1	1,767.7	5,867.9	7,635.6
Mar.-May	7,635.6	---	1.4	7,637.0	318.6	16.7	952.8	1,288.1	509.7	1,797.8	1,304.9	4,534.3	5,839.2
June-Aug.	5,839.2	---	0.8	5,840.0	326.7	0.5	847.2	1,174.4	406.4	1,580.9	835.0	3,424.1	4,259.1
Mkt. year	4,881.7	7,131.3	3.4	12,016.4	1,226.0	17.2	4,797.7	6,040.9	1,716.4	7,757.3	835.0	3,424.1	4,259.1
1988/89:													
Sept.-Nov.	4,259.1	4,928.7	0.6	9,188.4	305.2	0.0	1,340.9	1,646.1	470.8	2,116.8	611.0	6,460.6	7,071.6
Dec.-Feb.	7,071.6	---	0.6	7,072.2	294.9	0.0	1,071.5	1,366.4	501.8	1,868.2	465.0	4,738.9	5,203.9
Mar.-May	5,203.9	---	1.2	5,205.1	333.3	16.7	846.1	1,196.1	589.7	1,785.8	417.7	3,001.6	3,419.3
June-Aug.	3,419.3	---	0.4	3,419.7	341.6	1.7	682.5	1,025.8	463.4	1,489.2	362.5	1,930.4	1,930.4
Mkt. year	4,259.1	4,928.7	2.8	9,190.6	1,275.0	18.4	3,941.0	5,234.4	2,025.8	7,260.1	362.5	1,567.9	1,930.4
1989/90:													
Sept.-Nov.	1,930.4	7,525.5	0.6	9,456.6	295.6	0.0	1,496.6	1,792.2	582.3	2,374.5	628.2	6,453.9	7,082.1
Dec.-Feb.	7,082.1	---	0.4	7,082.5	306.1	0.0	1,282.2	1,588.3	681.8	2,270.1	537.2	4,275.2	4,812.4
Mar.-May	4,812.4	---	0.6	4,813.0	366.1	16.7	986.5	1,369.2	600.6	1,969.8	299.3	2,543.9	2,843.2
June-Aug.	2,843.2	---	0.2	2,843.4	369.2	2.2	623.9	995.4	503.6	1,499.0	233.0	1,111.5	1,344.5
Mkt. year	1,930.4	7,525.5	1.9	9,457.8	1,337.0	18.9	4,389.2	5,745.1	2,368.2	8,113.4	233.0	1,111.5	1,344.5
1990/91:													
Sept.-Nov.	1,344.5	7,934.0	0.9	9,279.4	321.7	0.0	1,636.5	1,958.2	380.9	2,339.1	205.9	6,734.4	6,940.3
Dec.-Feb.	6,940.3	---	0.3	6,940.6	315.7	0.0	1,365.2	1,680.9	470.7	2,151.6	195.6	4,593.4	4,789.0
Mar.-May	4,789.0	---	0.8	4,789.8	351.5	17.6	975.1	1,344.2	453.6	1,797.8	435.9	2,556.1	2,992.0
June-Aug.	2,992.0	---	1.5	2,993.4	364.8	1.7	686.2	1,052.8	419.4	1,472.2	371.1	1,150.1	1,521.2
Mkt. year	1,344.5	7,934.0	3.4	9,281.9	1,353.7	19.3	4,663.0	6,036.1	1,724.6	7,760.7	371.1	1,150.1	1,521.2
1991/92:													
Sept.-Nov.	1,521.2	7,475.5	6.5	9,003.2	348.7	0.0	1,692.1	2,040.8	421.3	2,462.1	249.7	6,291.4	6,541.1
Dec.-Feb.	6,541.1	---	4.4	6,545.5	344.4	0.0	1,278.4	1,622.9	361.7	1,984.5	199.2	4,361.8	4,561.0
Mar.-May	4,561.0	---	5.4	4,566.4	368.5	19.9	1,068.0	1,456.4	371.5	1,827.8	147.2	2,591.4	2,738.6
June-Aug.	2,738.6	---	3.3	2,741.9	372.2	0.3	839.4	1,211.9	429.7	1,641.6	112.5	987.8	1,100.3
Mkt. year	1,521.2	7,475.5	19.6	9,016.4	1,433.8	20.2	4,877.9	6,331.9	1,584.1	7,916.1	112.5	987.8	1,100.3
1992/93:													
Sept.-Nov.	1,100.3	9,478.9	1.3	10,580.5	359.8	0.0	1,826.8	2,186.6	487.5	2,674.1	87.4	7,819.0	7,906.4
Dec.-Feb.	7,906.4	---	1.0	7,907.4	350.1	0.0	1,416.0	1,766.1	463.0	2,229.2	86.8	5,591.4	5,678.2
Mar.-May	5,678.2	---	2.0	5,680.2	386.5	16.4	1,156.6	1,559.5	411.3	1,970.8	64.4	3,645.0	3,709.4
June-Aug.	3,709.4	---	2.8	3,712.2	396.3	2.3	899.5	1,298.1	301.4	1,599.5	55.5	2,057.2	2,112.7
Mkt. year 2/	1,100.3	9,478.9	7.1	10,586.3	1,492.7	18.7	5,298.9	6,810.3	1,663.3	8,473.6	55.5	2,057.2	2,112.7
1993/94:													
Mkt. year 3/	2,112.7	6,503.2	15.0	8,631.0	---	1,550.0	4,850.0	6,400.0	1,350.0	7,750.0	---	---	861.0

--- = Not applicable.

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected.

Appendix table 8--Sorghum: Marketing year supply and disappearance, 1986/87-1993/94

Year beginning September 1	Supply				Disappearance					Ending stocks			
	Begin- ning stocks	Produc- tion	Imports	Total	Domestic use			Exports	Total disap- pearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
Million bushels													
1986/87:													
Sept.-Nov.	551.0	938.9	0.0	1,489.9	2.8	0.0	180.4	183.3	47.5	230.7	292.1	967.1	1,259.2
Dec.-Feb.	1,259.2	---	0.0	1,259.2	2.9	0.0	182.3	185.3	56.2	241.4	364.9	652.8	1,017.7
Mar.-May	1,017.7	---	0.0	1,017.7	2.4	1.0	128.2	131.6	51.2	182.8	400.4	434.6	835.0
June-Aug.	835.0	---	0.0	835.0	2.2	0.6	45.3	48.1	43.5	91.6	408.9	334.4	743.3
Mkt. year	551.0	938.9	0.0	1,489.9	10.4	1.6	536.2	548.2	198.3	746.5	408.9	334.4	743.3
1987/88:													
Sept.-Nov.	743.3	730.8	0.0	1,474.1	4.9	0.0	171.3	176.2	45.5	221.7	465.3	787.1	1,252.4
Dec.-Feb.	1,252.4	---	0.0	1,252.4	5.1	0.0	173.1	178.2	63.1	241.3	545.5	465.6	1,011.1
Mar.-May	1,011.1	---	0.0	1,011.1	4.2	0.8	121.2	126.2	77.1	203.3	511.4	296.4	807.8
June-Aug.	807.8	---	0.0	807.9	9.3	0.5	89.6	99.4	45.8	145.2	463.6	199.1	662.7
Mkt. year	743.3	730.8	0.0	1,474.1	23.5	1.3	555.1	579.9	231.6	811.5	463.6	199.1	662.7
1988/89:													
Sept.-Nov.	662.7	576.7	0.0	1,239.3	5.9	0.0	171.3	177.1	64.5	241.6	432.9	564.8	997.7
Dec.-Feb.	997.7	---	0.0	997.7	6.1	0.0	173.1	179.2	93.5	272.6	396.4	328.7	725.1
Mar.-May	725.1	---	0.0	725.1	5.0	0.8	79.7	85.5	80.6	166.1	363.8	195.2	559.0
June-Aug.	559.0	---	0.0	559.0	3.5	0.7	42.3	46.5	73.0	119.5	340.9	98.6	439.5
Mkt. year	662.7	576.7	0.0	1,239.3	20.5	1.5	466.3	488.3	311.5	799.8	340.9	98.6	439.5
1989/90:													
Sept.-Nov.	439.5	615.4	0.0	1,054.9	3.6	0.0	185.8	189.4	89.9	279.3	314.6	461.0	775.6
Dec.-Feb.	775.6	---	0.0	775.6	4.4	0.0	176.5	180.8	81.2	262.0	223.0	290.6	513.6
Mar.-May	513.6	---	0.1	513.7	2.5	0.7	94.2	97.4	81.3	178.7	190.2	144.8	335.0
June-Aug.	335.0	---	0.1	335.1	3.1	0.6	60.9	64.6	50.8	115.3	162.5	57.3	219.8
Mkt. year	439.5	615.4	0.2	1,055.2	13.6	1.3	517.3	532.2	303.2	835.4	162.5	57.3	219.8
1990/91:													
Sept.-Nov.	219.8	573.3	0.0	793.1	1.8	0.0	222.3	224.1	56.6	280.7	157.7	354.6	512.3
Dec.-Feb.	512.3	---	0.0	512.3	1.9	0.0	116.4	118.3	61.2	179.5	149.6	183.3	332.9
Mar.-May	332.9	---	0.1	332.9	1.8	0.7	32.4	34.9	76.0	110.9	108.4	113.6	222.0
June-Aug.	222.0	---	0.0	222.0	1.8	0.7	38.5	41.0	38.4	79.4	64.7	77.9	142.6
Mkt. year	219.8	573.3	0.1	793.1	7.3	1.4	409.6	418.4	232.2	650.5	64.7	77.9	142.6
1991/92:													
Sept.-Nov.	142.6	584.9	0.0	727.4	2.0	0.0	228.5	230.4	46.5	277.0	34.3	416.2	450.5
Dec.-Feb.	450.5	---	0.0	450.5	1.8	0.0	89.2	91.0	108.2	199.2	19.6	231.6	251.2
Mar.-May	251.2	---	0.0	251.2	1.8	1.1	33.0	35.9	105.0	140.9	14.3	96.1	110.4
June-Aug.	110.4	---	0.0	110.4	1.2	0.6	23.4	25.2	32.0	57.2	8.2	45.0	53.2
Mkt. year	142.6	584.9	0.0	727.5	6.8	1.7	374.0	382.5	291.7	674.3	8.2	45.0	53.2
1992/93:													
Sept.-Nov.	53.2	884.0	0.0	937.2	1.6	0.0	273.8	275.4	56.4	331.9	2.5	602.8	605.3
Dec.-Feb.	605.3	---	0.0	605.3	1.7	0.0	67.7	69.4	101.5	170.9	4.0	430.4	434.4
Mar.-May	434.4	---	0.0	434.4	1.4	0.7	80.2	82.3	87.3	169.6	3.9	260.9	264.8
June-Aug.	264.8	---	0.0	264.8	1.4	0.7	55.8	57.9	31.9	89.8	3.9	171.1	175.0
Mkt. year 2/	53.2	884.0	0.0	937.2	6.1	1.4	477.6	485.1	277.1	762.2	3.9	171.1	175.0
1993/94:													
Mkt. year 3/	175.0	620.4	0.0	795.4	----7.5----		460.0	467.5	250.0	717.5			77.9

--- = Not applicable.

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected.

Appendix table 9--Barley: Marketing year supply and disappearance, specified periods, 1986/87-1993/94

Year beginning June 1	Supply				Disappearance					Ending stocks			
	Beginning stocks	Production	Imports	Total	Domestic use			Exports	Total disappearance	Govt. owned	Privately owned 1/	Total	
					Food, alcohol, and industrial	Seed	Feed and residual						
Million bushels													
1986/87:													
June-Aug.	327.2	608.5	1.3	937.1	42.4	0.0	94.4	136.8	13.5	150.3	56.0	730.8	786.8
Sept.-Nov.	786.8	---	1.0	787.8	36.7	1.3	72.0	110.0	43.5	153.5	66.2	568.1	634.3
Dec.-Feb.	634.3	---	1.2	635.5	36.0	1.4	67.0	104.4	31.8	136.2	75.2	424.1	499.3
Mar.-May	499.3	---	3.1	502.4	41.8	15.2	64.3	121.3	44.8	166.1	75.5	260.8	336.3
Mkt. year	327.2	608.5	6.7	942.4	156.9	17.9	297.7	472.5	133.6	606.1	75.5	260.8	336.3
1987/88:													
June-Aug.	336.3	521.5	1.1	858.9	42.7	0.0	74.3	117.1	16.8	133.9	74.9	650.1	725.0
Sept.-Nov.	725.0	---	2.9	727.9	37.1	1.1	64.8	103.0	42.5	145.5	79.5	502.9	582.4
Dec.-Feb.	582.4	---	4.3	586.7	36.3	1.3	57.6	95.2	33.0	128.2	57.0	401.5	458.5
Mar.-May	458.5	---	3.0	461.5	42.0	13.3	56.5	111.8	28.6	140.4	50.1	271.0	321.1
Mkt. year	336.3	521.5	11.3	869.1	158.1	15.7	253.2	427.0	121.0	548.0	50.1	271.0	321.1
1988/89:													
June-Aug.	321.1	290.0	2.8	613.9	44.0	0.0	93.7	137.7	25.8	163.5	35.9	414.5	450.4
Sept.-Nov.	450.4	---	2.2	452.6	38.4	1.1	28.4	67.8	12.6	80.5	35.9	336.2	372.1
Dec.-Feb.	372.1	---	2.8	374.9	36.2	1.2	41.6	79.1	15.3	94.3	34.1	246.5	280.6
Mar.-May	280.6	---	2.7	283.3	41.8	12.7	7.2	61.7	25.2	86.9	30.4	166.0	196.4
Mkt. year	321.1	290.0	10.5	621.6	160.4	15.0	170.9	346.3	78.9	425.2	30.4	166.0	196.4
1989/90:													
June-Aug.	196.4	404.2	3.6	604.2	45.7	0.0	114.0	159.7	26.5	186.2	36.6	381.3	417.9
Sept.-Nov.	417.9	---	2.0	419.9	39.3	0.9	11.9	52.1	17.2	69.3	36.3	314.3	350.6
Dec.-Feb.	350.6	---	3.3	353.9	37.2	1.1	40.2	78.5	22.7	101.2	32.1	220.6	252.7
Mar.-May	252.7	---	4.2	256.9	39.8	11.5	27.3	78.5	17.6	96.1	19.3	141.5	160.8
Mkt. year	196.4	404.2	13.1	613.7	162.0	13.5	193.3	368.8	84.0	452.9	19.3	141.5	160.8
1990/91:													
June-Aug.	160.8	422.2	1.0	584.0	44.7	0.0	97.6	142.3	30.9	173.2	14.3	396.6	410.9
Sept.-Nov.	410.9	---	1.3	412.1	39.0	1.0	41.2	81.2	25.2	106.4	12.1	293.6	305.7
Dec.-Feb.	305.7	---	4.2	309.9	37.6	1.2	41.6	80.4	18.6	99.0	9.6	201.3	210.9
Mar.-May	210.9	---	7.0	217.9	39.8	12.4	24.3	76.6	6.0	82.5	8.4	127.0	135.4
Mkt. year	160.8	422.2	13.5	596.5	161.1	14.6	204.8	380.5	80.6	461.1	8.4	127.0	135.4
1991/92:													
June-Aug.	135.4	464.3	7.4	607.1	44.7	0.0	109.0	153.7	13.5	167.2	7.7	432.3	440.0
Sept.-Nov.	440.0	---	3.5	443.4	37.8	0.9	39.7	78.4	36.7	115.0	7.0	321.4	328.4
Dec.-Feb.	328.4	---	6.5	334.8	36.5	1.0	56.8	94.3	24.6	119.0	6.8	209.1	215.9
Mar.-May	215.9	---	7.2	223.1	39.0	11.0	24.7	74.7	19.7	94.5	6.5	122.1	128.6
Mkt. year	135.4	464.3	24.5	624.2	158.0	12.9	230.2	401.1	94.5	495.6	6.5	122.1	128.6
1992/93:													
June-Aug.	128.6	457.9	6.6	593.1	41.8	0.0	114.5	156.3	18.4	174.7	5.8	412.6	418.4
Sept.-Nov.	418.4	---	1.5	419.9	35.3	0.9	15.1	51.3	22.0	73.4	5.4	341.2	346.6
Dec.-Feb.	346.6	---	1.4	348.0	35.0	1.1	46.1	82.2	21.9	104.1	5.5	238.4	243.9
Mar.-May	243.9	---	1.9	245.8	41.2	11.2	24.3	76.7	18.0	94.6	5.0	146.2	151.2
Mkt. year 2/	128.6	457.9	11.4	597.9	153.3	13.2	199.9	366.4	80.3	446.7	5.0	146.2	151.2
1993/94:													
June-Aug.	151.2	415.8	3.2	570.1	42.1	0.0	104.3	146.5	14.6	161.1	5.5	403.5	409.0
Mkt. year 3/	151.2	415.8	25.0	591.9	----165.0----		225.0	390.0	85.0	475.0			116.9

--- = Not applicable.

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Projected.

Appendix table 10--Oats: Marketing year supply and disappearance, 1986/87-1993/94

Year beginning June 1	Supply				Disappearance					Ending stocks			
	Begin- ning stocks	Produc- tion	Imports	Total	Food, alcohol, and industrial	Domestic use-- Seed	Feed and residual	Total	Exports	Total disap- pearance	Govt. owned	Privately owned	Total
Million bushels													
1986/87:													
June-Aug.	183.7	385.0	8.7	577.4	13.1	0.0	112.5	125.6	0.2	125.9	2.4	449.1	451.5
Sept.-Nov.	451.5	---	4.8	456.3	11.5	4.6	97.8	113.9	0.3	114.2	3.2	339.0	342.2
Dec.-Feb.	342.2	---	9.2	351.4	11.1	1.1	90.5	102.8	0.1	102.9	3.6	244.9	248.5
Mar.-May	248.5	---	9.6	258.1	9.3	32.3	83.7	125.2	0.3	125.5	3.5	129.1	132.6
Mkt. year	183.7	385.0	32.4	601.0	45.0	38.0	384.5	467.5	0.9	468.4	3.5	129.1	132.6
1987/88:													
June-Aug.	132.6	373.7	7.0	513.3	14.5	0.0	104.8	119.3	0.2	119.5	3.3	390.5	393.8
Sept.-Nov.	393.8	---	8.1	401.9	12.7	3.8	91.1	107.6	0.1	107.8	3.4	290.7	294.1
Dec.-Feb.	294.1	---	15.8	309.9	12.3	0.9	84.3	97.6	0.1	97.7	3.4	208.8	212.2
Mar.-May	212.2	---	14.8	227.0	10.2	26.9	77.9	115.0	0.1	115.1	3.5	108.4	111.9
Mkt. year	132.6	373.7	45.7	552.0	49.8	31.6	358.2	439.6	0.5	440.1	3.5	108.4	111.9
1988/89:													
June-Aug.	111.9	217.6	12.3	341.8	21.2	0.0	56.7	77.9	0.2	78.1	3.0	260.7	263.7
Sept.-Nov.	263.7	---	11.9	275.6	18.6	3.3	49.3	71.1	0.1	71.3	2.5	201.9	204.4
Dec.-Feb.	204.4	---	20.1	224.5	18.0	0.8	45.6	64.4	0.2	64.6	2.6	157.2	159.8
Mar.-May	159.8	---	18.6	178.5	15.0	23.0	42.2	80.1	0.1	80.2	2.4	95.9	98.3
Mkt. year	111.9	217.6	62.9	392.4	72.7	27.1	193.8	293.6	0.6	294.2	2.4	95.9	98.3
1989/90:													
June-Aug.	98.3	373.6	17.0	488.9	26.6	0.0	88.7	115.3	0.2	115.6	1.3	372.0	373.3
Sept.-Nov.	373.3	---	17.5	390.8	23.3	2.7	77.1	103.1	0.3	103.4	1.2	286.2	287.4
Dec.-Feb.	287.4	---	15.7	303.1	22.6	0.7	64.9	88.2	0.2	88.3	1.1	213.6	214.7
Mar.-May	214.7	---	16.3	231.0	19.1	20.0	34.8	73.9	0.2	74.1	0.7	156.2	156.9
Mkt. year	98.3	373.6	66.4	538.3	91.6	23.4	265.6	380.6	0.8	381.4	0.7	156.2	156.9
1990/91:													
June-Aug.	156.9	357.5	17.5	532.0	28.7	0.0	151.4	180.1	0.2	180.2	0.6	351.1	351.7
Sept.-Nov.	351.7	---	11.7	363.4	24.7	2.2	42.2	69.1	0.2	69.3	0.6	293.5	294.1
Dec.-Feb.	294.1	---	18.2	312.3	24.6	0.5	57.9	83.0	0.1	83.1	0.5	228.8	229.3
Mar.-May	229.3	---	16.0	245.2	22.9	16.4	34.6	73.9	0.1	74.0	0.3	170.9	171.2
Mkt. year	156.9	357.5	63.4	577.8	100.9	19.1	286.0	406.0	0.6	406.6	0.3	170.9	171.2
1991/92:													
June-Aug.	171.2	243.5	21.7	436.4	30.5	0.0	121.7	152.2	0.1	152.3	0.3	283.8	284.1
Sept.-Nov.	284.1	---	17.3	301.4	26.5	2.1	28.0	56.6	0.2	56.8	0.3	244.3	244.6
Dec.-Feb.	244.6	---	17.6	262.3	26.0	0.5	60.7	87.2	0.2	87.4	0.3	174.6	174.9
Mar.-May	174.9	---	18.1	193.0	24.2	15.2	24.5	63.9	1.4	65.3	0.2	127.5	127.7
Mkt. year	171.2	243.5	74.8	489.4	107.2	17.8	234.8	359.8	1.9	361.7	0.2	127.5	127.7
1992/93:													
June-Aug.	127.7	294.8	15.1	437.6	30.5	0.0	111.5	142.0	1.0	143.0	0.1	294.5	294.6
Sept.-Nov.	294.6	---	11.9	306.5	26.5	2.1	33.4	62.0	2.1	64.0	0.1	242.4	242.5
Dec.-Feb.	242.5	---	10.7	253.2	26.0	0.5	50.2	76.7	1.4	78.1	0.1	175.0	175.1
Mar.-May	175.1	---	17.2	192.4	24.2	15.2	38.2	77.6	1.6	79.2	0.0	113.2	113.2
Mkt. year 1/	127.7	294.8	55.0	477.5	107.2	17.8	233.3	358.3	6.0	364.3	0.0	113.2	113.2
1993/94:													
June-Aug.	113.2	208.1	16.8	338.1	30.8	0.0	84.9	115.7	1.5	117.3	0.1	220.8	220.9
Mkt. year 2/	113.2	208.1	80.0	401.3	----125.0----		180.0	305.0	5.0	310.0			91.3

--- = Not applicable.

1/ Preliminary. 2/ Projected.

Appendix table 11--Average prices received by farmers, United States, by month, and loan rate, 1985-93 1/

Year	Sept.	Oct. 2/	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average 3/	Loan rate
-----														
\$/bu.														
Corn:														
1985	2.29	2.11	2.21	2.29	2.33	2.32	2.29	2.30	2.39	2.32	2.00	1.73	2.23	2.55
1986	1.45	1.40	1.47	1.50	1.48	1.42	1.47	1.52	1.66	1.69	1.60	1.47	1.50	1.92
1987	1.49	1.55	1.61	1.72	1.77	1.83	1.86	1.88	1.94	2.41	2.72	2.65	1.94	1.82
1988	2.60	2.58	2.51	2.53	2.60	2.59	2.60	2.56	2.58	2.52	2.47	2.27	2.54	1.77
1989	2.29	2.22	2.24	2.27	2.31	2.32	2.37	2.51	2.62	2.63	2.62	2.51	2.36	1.65
1990	2.32	2.19	2.16	2.22	2.27	2.32	2.39	2.42	2.38	2.31	2.27	2.33	2.28	1.57
1991	2.33	2.31	2.29	2.33	2.40	2.46	2.49	2.48	2.49	2.47	2.33	2.15	2.37	1.63
1992	2.16	2.05	1.98	1.97	2.03	2.00	2.10	2.16	2.14	2.09	2.22	2.25	2.07	1.72
1993	2.21	2.28												
-----														
\$/cwt														
Sorghum:														
1985	3.27	3.30	3.47	3.76	3.69	3.55	3.67	3.80	3.99	3.43	3.06	2.66	3.45	4.32
1986	2.36	2.34	2.39	2.41	2.37	2.36	2.44	2.58	2.69	2.79	2.66	2.52	2.45	3.25
1987	2.43	2.48	2.69	2.72	2.75	2.88	2.92	2.94	2.90	4.13	4.56	4.41	3.04	3.11
1988	4.26	4.16	3.99	4.07	4.09	4.05	4.04	4.21	4.03	3.90	4.00	3.81	4.05	3.00
1989	3.80	3.61	3.68	3.54	3.58	3.53	3.69	3.89	4.07	4.29	4.44	4.14	3.75	2.80
1990	3.96	3.55	3.57	3.67	3.72	3.88	3.93	4.05	4.11	3.89	3.95	4.01	3.79	2.66
1991	4.10	3.93	3.94	3.99	4.07	4.19	4.31	4.28	4.31	4.22	3.82	3.77	4.01	2.75
1992	3.71	3.23	3.21	3.27	3.38	3.32	3.38	3.38	3.34	3.40	3.71	3.77	3.38	2.91
1993	3.69	3.75												
-----														
Year	June	July	Aug.	Sept.	Oct. 2/	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Average 3/	Loan rate
-----														
\$/bu.														
Oats:														
1985	1.59	1.31	1.16	1.10	1.08	1.17	1.20	1.18	1.16	1.14	1.13	1.21	1.23	1.31
1986	1.10	0.90	0.86	0.99	1.10	1.32	1.44	1.46	1.47	1.45	1.50	1.57	1.21	0.99
1987	1.52	1.29	1.40	1.49	1.60	1.62	1.76	1.79	1.84	1.78	1.82	1.84	1.56	0.94
1988	2.63	2.86	2.54	2.57	2.56	2.41	2.47	2.52	2.46	2.41	2.24	2.13	2.61	0.90
1989	1.82	1.53	1.47	1.38	1.47	1.48	1.53	1.47	1.43	1.39	1.44	1.45	1.49	0.85
1990	1.33	1.15	1.06	1.09	1.14	1.16	1.17	1.13	1.13	1.16	1.16	1.16	1.14	0.81
1991	1.08	1.08	1.09	1.12	1.21	1.25	1.25	1.31	1.44	1.44	1.46	1.43	1.21	0.83
1992	1.38	1.32	1.23	1.28	1.31	1.35	1.36	1.41	1.42	1.42	1.44	1.51	1.32	0.87
1993	1.43	1.36	1.33	1.32	1.34									
-----														
All barley:														
1985	2.14	2.08	1.98	1.88	1.96	2.05	2.07	2.05	1.95	1.88	1.85	1.73	1.98	2.08
1986	1.57	1.67	1.51	1.45	1.58	1.69	1.62	1.60	1.63	1.69	1.69	1.76	1.61	1.56
1987	1.74	1.82	2.00	1.87	1.72	1.88	1.83	1.78	1.72	1.65	1.74	1.77	1.81	1.49
1988	2.45	2.97	2.96	2.94	2.86	2.96	2.73	2.74	2.67	2.74	2.73	2.64	2.80	1.44
1989	2.34	2.16	2.70	2.47	2.41	2.47	2.47	2.33	2.33	2.19	2.22	2.36	2.42	1.34
1990	2.29	2.16	2.13	2.13	2.04	2.16	2.13	2.14	2.13	2.15	2.10	2.05	2.14	1.28
1991	1.90	1.73	2.06	2.06	2.10	2.20	2.24	2.21	2.15	2.12	2.14	2.22	2.10	1.32
1992	2.09	2.26	2.16	1.84	1.92	2.05	1.95	2.07	2.00	2.00	2.09	1.98	2.05	1.40
1993	1.96	1.81	2.04	1.84	1.82									
-----														
Year	June	July	Aug.	Sept.	Oct. 2/	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May		
-----														
\$/bu.														
Feed barley:														
1985	2.26	2.05	1.75	1.74	1.85	1.90	2.03	2.00	1.90	1.83		1.85	1.81	
1986	1.61	1.44	1.21	1.33	1.49	1.62	1.59	1.56	1.61	1.69		1.71	1.84	
1987	1.79	1.59	1.54	1.57	1.65	1.68	1.63	1.65	1.64	1.59		1.73	1.76	
1988	2.07	2.34	2.37	2.39	2.34	2.30	2.27	2.28	2.29	2.35		2.32	2.27	
1989	2.18	1.96	2.06	1.98	1.97	2.09	2.10	2.02	2.01	1.99		2.08	2.28	
1990	2.26	2.04	1.77	1.85	1.91	1.95	1.89	2.02	1.94	1.95		1.99	2.00	
1991	1.91	1.63	1.63	1.84	1.90	1.96	2.02	1.96	1.99	1.99		2.00	2.19	
1992	2.06	1.99	1.73	1.72	1.78	1.78	1.79	1.86	1.86	1.83		1.84	1.87	
1993	1.98	1.77	1.62	1.57	1.61									
-----														
Malting barley:														
1985	2.02	2.13	2.49	2.33	2.24	2.32	2.19	2.13	1.99	1.93		1.85	1.66	
1986	1.52	2.07	2.23	1.85	1.83	1.78	1.65	1.70	1.69	1.69		1.65	1.66	
1987	1.68	2.04	2.55	2.39	1.88	2.07	2.01	2.15	1.80	1.69		1.75	1.79	
1988	2.80	3.26	3.38	3.47	3.41	3.34	3.27	3.32	3.22	3.22		3.16	3.04	
1989	2.62	2.68	3.04	2.87	2.89	2.90	2.88	2.73	2.61	2.45		2.51	2.53	
1990	2.35	2.37	2.47	2.42	2.29	2.34	2.44	2.24	2.33	2.40		2.26	2.10	
1991	1.88	2.02	2.80	2.65	2.66	2.54	2.45	2.53	2.47	2.31		2.40	2.27	
1992	2.15	2.51	2.60	2.11	2.14	2.23	2.11	2.31	2.20	2.17		2.32	2.14	
1993	1.92	1.86	2.56	2.36	2.36									

1/ Prices do not include an allowance for loans outstanding and government purchases. 2/ October 1993 data are preliminary. 3/ U.S. season-average prices based on monthly prices weighted by monthly marketings.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Appendix table 12--Cash prices at principal markets, 1987-93

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
\$/bu.													
Corn, no. 2 yellow, Central Illinois:													
1987	1.50	1.64	1.74	1.78	1.84	1.90	1.92	1.92	1.97	2.66	2.85	2.70	2.03
1988	2.68	2.70	2.54	2.58	2.62	2.60	2.64	2.58	2.64	2.53	2.44	2.30	2.57
1989	2.35	2.25	2.29	2.29	2.29	2.34	2.44	2.64	2.73	2.70	2.68	2.54	2.46
1990	2.25	2.18	2.20	2.27	2.31	2.36	2.45	2.50	2.41	2.34	2.34	2.45	2.34
1991	2.39	2.41	2.41	2.42	2.49	2.58	2.64	2.50	2.51	2.51	2.31	2.17	2.45
1992	2.13	1.97	1.99	2.05	2.07	2.06	2.16	2.23	2.20	2.09	2.25	2.27	2.12
1993	2.20	2.27											
Corn, no. 2 yellow, Gulf Ports:													
1987	1.86	1.99	2.08	2.11	2.20	2.23	2.29	2.28	2.29	3.05	3.22	3.02	2.39
1988	3.08	3.07	2.89	2.99	3.01	2.99	3.02	2.93	2.99	2.87	2.73	2.57	2.93
1989	2.60	2.40	2.75	2.75	2.69	2.70	2.72	3.01	3.08	3.05	2.92	2.79	2.79
1990	2.59	2.55	2.54	2.60	2.68	2.70	2.77	2.80	2.69	2.65	2.67	2.79	2.67
1991	2.76	2.76	2.72	2.71	2.70	2.89	2.96	2.77	2.77	2.80	2.61	2.48	2.74
1992	2.50	2.40	2.42	2.39	2.39	2.40	2.48	2.55	2.50	2.36	2.59	2.55	2.46
1993	2.55	2.68											
Corn, no. 2 yellow, St. Louis:													
1987	1.65	1.78	1.91	1.97	2.05	2.07	2.09	2.10	2.13	2.77	2.96	2.81	2.19
1988	2.82	2.82	2.70	2.76	2.81	2.79	2.82	2.76	2.83	2.58	2.57	2.38	2.72
1989	2.38	2.39	2.48	2.44	2.45	2.48	2.57	2.77	2.86	2.85	2.75	2.59	2.58
1990	2.37	2.32	2.65	2.41	2.46	2.50	2.58	2.61	2.52	2.47	2.45	2.54	2.49
1991	2.44	2.46	2.50	2.53	2.51	2.73	2.78	2.59	2.63	2.61	2.32	2.32	2.53
1992	2.23	2.01	2.16	2.20	2.20	2.23	2.28	2.36	2.33	2.23	2.38	2.37	2.25
1993	2.30	2.39											
Sorghum, no. 2 yellow, Gulf Ports: 1/													
\$/cwt													
1987	3.13	3.35	3.55	3.50	3.65	3.80	3.86	3.70	3.73	5.00	5.33	4.93	3.96
1988	4.99	4.91	4.64	4.93	4.99	4.99	5.02	4.89	5.05	4.75	4.02	4.53	4.81
1989	4.67	4.61	4.69	4.70	4.62	4.59	4.70	4.97	5.04	4.87	4.95	4.73	4.76
1990	4.52	4.43	4.43	4.60	4.76	4.82	4.97	4.94	4.64	4.45	4.54	4.72	4.65
1991	4.81	4.86	4.79	4.90	5.08	5.30	5.39	5.00	4.89	4.72	4.27	4.26	4.86
1992	4.26	4.11	4.22	4.33	4.33	4.29	4.32	4.30	4.22	4.03	4.38	4.41	4.27
1993	4.40	4.55											
Sorghum, no. 2 yellow, Kansas City:													
1987	2.64	2.75	2.90	2.95	3.05	3.24	3.27	3.16	3.21	4.58	4.79	4.28	3.40
1988	4.27	4.17	4.00	4.23	4.24	4.26	4.32	4.17	4.29	4.15	3.96	3.92	4.17
1989	4.73	3.91	4.00	3.98	3.91	3.84	4.01	4.32	4.47	4.54	4.48	4.27	4.21
1990	3.89	3.79	3.85	3.97	4.12	4.21	4.35	4.34	4.13	4.02	4.05	4.22	4.08
1991	4.24	4.30	4.27	4.35	4.44	4.62	4.78	4.41	4.54	4.51	4.05	3.77	4.36
1992	3.76	3.60	3.61	3.70	3.70	3.66	3.70	3.72	3.82	3.58	3.99	4.01	3.74
1993	3.89	4.03											
Sorghum, no. 2 yellow, Texas High Plains: 2/													
1987	3.19	3.27	3.27	3.39	3.40	3.53	3.56	3.54	3.55	4.84	5.25	4.96	3.81
1988	4.98	4.95	4.62	4.63	4.75	4.69	4.72	4.63	4.50	4.59	4.46	4.44	4.66
1989	4.39	4.13	4.06	4.03	4.04	4.02	4.10	4.38	4.96	4.94	4.82	4.63	4.38
1990	4.27	4.17	4.28	4.49	4.49	4.57	4.69	4.66	4.66	4.48	4.39	4.57	4.48
1991	4.52	4.56	4.57	4.61	4.76	4.92	5.04	4.93	5.01	5.03	4.85	4.54	4.78
1992	4.14	3.68	3.72	3.86	3.91	3.86	4.04	4.14	4.05	3.95	4.47	4.46	4.02
1993	4.43	4.63											
\$/bu.													
Barley, no. 3 or better malting, 65% or better plump, Minneapolis:													
1987	2.07	1.93	1.73	1.98	2.08	2.05	2.01	2.02	2.15	2.08	2.11	2.24	2.04
1988	3.61	3.87	4.25	4.40	4.39	4.14	3.82	4.14	4.19	4.33	4.29	3.84	4.11
1989	3.02	3.33	3.57	3.43	3.48	3.18	3.19	3.20	3.02	3.83	2.97	3.17	3.28
1990	2.92	2.35	2.35	2.32	2.30	2.40	2.31	2.33	2.38	2.46	2.48	2.41	2.42
1991	2.26	2.14	2.14	2.21	2.38	2.50	2.54	2.51	2.51	2.50	2.50	NQ	2.38
1992	2.58	2.59	2.19	2.30	2.39	2.35	2.36	2.36	2.32	2.33	2.34	2.34	2.37
1993	2.30	2.27	2.27	2.18	2.26								
Barley, no. 2 feed, Duluth: 3/, 4/													
1987	1.73	1.59	1.60	1.76	1.78	1.82	1.74	1.72	1.77	1.88	1.94	1.98	1.78
1988	2.41	2.38	2.08	2.24	2.32	2.27	2.14	2.24	2.33	2.49	2.52	2.41	2.32
1989	2.12	2.11	2.17	2.13	2.16	2.15	2.23	2.28	2.20	2.27	2.27	2.33	2.20
1990	2.39	2.17	1.99	2.01	2.11	2.16	2.07	2.09	2.15	2.14	2.12	2.13	2.13
1991	2.02	1.89	1.92	2.08	2.18	2.23	2.18	2.20	2.28	2.30	2.35	2.38	2.17
1992	2.30	2.15	2.03	2.12	2.11	2.08	2.06	2.06	2.08	2.10	2.12	2.05	2.11
1993	1.99	1.96	1.89	1.89	2.01								
Oats, no. 2 heavy white, Minneapolis:													
1987	1.64	1.61	1.77	1.85	1.97	2.05	2.02	2.10	2.06	1.93	1.94	2.12	1.92
1988	3.26	3.25	3.09	3.07	2.99	2.71	2.74	2.87	2.59	2.49	2.30	2.22	2.80
1989	1.97	1.72	1.59	1.58	1.61	1.68	1.70	1.56	1.48	1.57	1.63	1.68	1.65
1990	1.52	1.37	1.25	1.23	1.29	1.30	1.24	1.22	1.18	1.27	1.32	1.36	1.30
1991	1.25	1.33	1.38	1.35	1.41	1.42	1.49	1.50	1.68	1.66	1.57	1.59	1.47
1992	1.55	1.49	1.45	1.58	1.52	1.59	1.63	1.66	1.63	1.63	1.66	1.57	1.58
1993	1.54	1.63	1.63	1.66	1.56								

NQ = No quotes.

1/ Rail delivered to Texas Gulf. 2/ Reporting point changed from Texas High Plains to South Panhandle starting January 1991. 3/ Prior to June 1977 reported as barley, no. 3 or better. 4/ Reporting point changed from Minneapolis #2 feed to Duluth #2 feed beginning March 1987.

Source: Grain and Feed Market News, Agricultural Marketing Service, USDA.

Appendix table 13--Feed-price ratios for livestock, poultry, and milk, by month, 1984-93

Year	Sept.	Oct. 1/	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
<b>Hog/corn, U.S. basis 2/:</b>													
1984	16.00	16.50	18.40	19.00	18.20	18.40	16.30	15.30	15.40	16.90	17.60	17.40	17.12
1985	17.30	20.40	19.50	19.80	19.00	18.40	17.60	17.30	19.20	22.70	29.50	35.90	21.38
1986	40.20	37.90	35.90	33.70	31.90	33.90	32.20	33.40	32.80	35.00	37.30	39.90	35.34
1987	36.40	31.50	25.20	23.40	24.30	25.00	22.70	22.30	23.90	19.50	16.20	16.90	23.94
1988	15.70	15.00	14.40	15.70	15.70	15.60	15.10	14.40	16.10	17.90	18.60	20.10	16.99
1989	19.00	21.00	20.10	21.20	20.50	20.80	21.60	21.40	23.40	22.90	23.20	23.30	21.53
1990	22.30	23.30	25.90	21.50	22.00	22.50	21.50	21.00	22.70	23.70	23.90	22.00	22.69
1991	19.90	18.90	16.60	16.60	15.20	16.20	15.70	16.50	18.10	18.90	19.10	20.50	17.68
1992	19.50	20.50	20.70	21.20	20.50	22.10	22.30	21.10	22.10	23.10	20.70	21.10	21.24
1993	21.60	20.70											
<b>Beef-steer/corn, Omaha 3/:</b>													
1984	21.30	22.40	24.60	25.60	24.80	24.10	22.20	21.50	21.50	21.00	20.40	21.70	22.59
1985	21.80	25.70	27.80	26.70	25.60	24.40	24.00	22.90	23.00	22.30	28.90	36.70	25.82
1986	42.10	42.70	39.70	38.80	40.80	43.90	41.90	42.20	40.20	38.90	41.40	43.90	41.38
1987	42.10	41.40	38.40	36.70	36.40	37.40	38.20	39.40	38.60	29.50	24.40	26.10	35.72
1988	26.40	26.40	28.40	27.90	28.10	28.70	29.40	30.20	29.30	29.10	29.60	32.00	28.79
1989	30.80	31.10	32.20	32.80	34.20	34.00	32.60	31.10	29.30	27.90	28.50	30.90	31.28
1990	34.50	36.50	37.30	36.50	35.30	34.30	34.00	32.80	32.70	32.00	31.30	28.50	33.81
1991	28.80	29.90	30.50	29.70	29.90	31.00	30.40	31.60	30.60	29.40	32.20	34.70	30.73
1992	35.10	37.40	38.00	38.80	39.60	40.00	38.70	37.60	37.50	36.80	31.40	32.80	36.98
1993	32.00	29.60											
<b>Milk/feed, U.S. basis 4/:</b>													
1984	1.48	1.56	1.62	1.59	1.57	1.57	1.55	1.51	1.47	1.45	1.44	1.47	1.52
1985	1.51	1.56	1.55	1.53	1.48	1.50	1.48	1.48	1.46	1.45	1.51	1.55	1.51
1986	1.61	1.75	1.77	1.77	1.73	1.69	1.63	1.61	1.57	1.57	1.56	1.58	1.65
1987	1.65	1.64	1.65	1.63	1.51	1.47	1.43	1.40	1.37	1.36	1.15	1.19	1.45
1988	1.25	1.32	1.36	1.37	1.38	1.35	1.30	1.29	1.28	1.29	1.37	1.43	1.33
1989	1.52	1.63	1.71	1.76	1.67	1.56	1.49	1.48	1.49	1.52	1.55	1.58	1.58
1990	1.54	1.45	1.40	1.29	1.31	1.28	1.27	1.27	1.27	1.28	1.37	1.43	1.35
1991	1.49	1.53	1.57	1.57	1.50	1.44	1.40	1.41	1.43	1.47	1.51	1.52	1.49
1992	1.52	1.51	1.48	1.45	1.39	1.36	1.35	1.41	1.45	1.46	1.43	1.40	1.43
1993	1.42	1.43											
<b>Egg/feed, U.S. basis 5/:</b>													
1984	5.90	5.70	6.50	6.30	5.50	5.60	6.30	5.70	5.50	5.90	5.90	6.50	5.94
1985	7.10	7.30	7.50	7.40	7.20	6.90	7.60	6.40	6.40	5.70	6.90	7.30	6.98
1986	7.30	7.00	8.00	7.80	7.30	7.10	6.60	6.60	5.90	6.00	5.70	5.60	6.74
1987	6.50	6.00	6.40	5.70	5.50	5.30	5.60	5.20	5.00	5.30	4.90	4.90	5.53
1988	5.40	5.30	5.40	5.40	5.90	5.80	7.50	6.20	5.90	6.00	6.10	6.80	5.98
1989	6.80	7.10	7.90	8.30	8.40	7.10	6.00	7.30	6.20	6.40	5.40	6.40	7.11
1990	6.70	7.30	7.30	7.70	7.90	6.90	7.80	6.80	6.10	6.10	6.80	6.70	7.01
1991	6.50	6.20	6.30	7.00	5.70	5.50	5.40	5.50	5.10	5.30	5.20	5.30	5.75
1992	5.90	5.80	6.60	6.60	6.40	6.20	7.10	6.90	6.30	6.50	5.70	6.10	6.34
1993	5.60	5.80											
<b>Broiler/feed, U.S. basis 6/:</b>													
1984	2.80	2.60	2.80	2.70	2.90	2.90	2.80	2.80	3.10	3.20	3.10	3.10	2.90
1985	3.20	3.10	3.50	3.20	3.20	3.10	3.10	3.10	3.40	3.80	4.50	4.60	3.48
1986	3.80	4.40	3.90	3.40	3.60	3.40	3.50	3.20	3.30	3.00	2.90	3.30	3.47
1987	2.90	2.60	2.70	2.50	2.70	2.70	2.80	3.10	3.70	4.10	3.30	3.40	3.04
1988	3.20	2.80	2.70	2.80	2.80	2.80	3.10	3.30	3.70	3.50	3.30	3.00	3.08
1989	3.10	2.70	2.60	2.50	2.70	3.00	3.20	3.00	3.20	3.10	3.30	3.00	2.95
1990	3.10	2.70	2.70	2.70	2.90	2.90	2.90	2.90	3.00	3.00	3.20	3.20	2.93
1991	3.20	3.00	2.80	2.80	2.90	2.90	2.90	2.80	3.10	3.00	3.20	3.30	2.99
1992	3.00	3.30	3.30	3.10	3.10	3.10	3.10	3.20	3.40	3.30	3.40	3.60	3.24
1993	3.60	3.20											
<b>Turkey/feed, U.S. basis 7/:</b>													
1984	3.90	4.40	5.00	5.50	4.70	3.80	3.70	3.70	3.70	3.90	4.20	4.50	4.25
1985	5.00	5.50	5.50	5.60	3.40	3.40	3.50	3.50	3.80	4.30	4.50	4.60	4.38
1986	4.70	4.90	4.80	4.00	3.30	3.40	3.40	3.50	3.40	3.30	3.10	3.00	3.73
1987	2.90	2.80	3.10	3.60	2.90	2.60	2.50	2.70	2.80	3.00	3.00	3.10	2.92
1988	3.40	3.60	3.60	2.90	2.70	2.90	3.10	3.30	3.50	3.50	3.30	3.30	3.26
1989	3.00	3.20	3.40	3.30	3.00	2.80	3.10	3.10	3.20	3.20	3.30	3.40	3.17
1990	3.40	3.60	3.60	3.10	2.90	3.00	3.10	3.20	3.20	3.30	3.40	3.50	3.28
1991	3.50	3.10	3.10	3.20	3.00	3.00	3.10	3.10	3.20	3.20	3.10	3.10	3.14
1992	3.10	3.20	3.30	3.20	3.00	2.90	3.10	3.00	3.10	3.00	3.10	3.20	3.10
1993	3.30	3.40											

1/ October 1993 data are preliminary. 2/ Bushels of corn equal in value to 100 pounds of hog, live weight. 3/ Based on price of choice beef-steers, 900-1100 pounds. 4/ Pounds of 16-percent mixed dairy feed equal in value to 1 pound whole milk. 5/ Pounds of laying feed equal in value to 1 dozen eggs. 6/ Pounds of broiler grower feed equal in value to 1 pound broiler, live weight. 7/ Pounds of turkey grower feed equal in value to 1 pound of turkey, live weight.

Sources: Agricultural Prices, Agricultural Statistics Board, USDA  
Livestock, Meat & Wool Market News, Agricultural Marketing Service, USDA.

Appendix table 14--Price trends, selected feeds, and corn products

Item		Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.-Aug.
														Average 1/
-----\$/ton-----														
Wholesale, mostly bulk 2/:														
Soybean meal, 44% solvent, Decatur:	1991/92	191.90	183.00	178.00	170.70	172.70	174.30	174.20	174.80	182.75	181.70	173.90	174.40	177.70
	1992/93	175.10	168.60	170.90	176.40	175.60	167.50	172.40	175.60	181.70	181.30	217.60	206.90	180.80
	1993/94	186.50	180.80											
Soybean meal, high protein, Decatur:	1991/92	204.25	196.30	190.25	183.10	184.00	185.40	185.90	187.20	195.25	203.90	186.25	186.00	190.65
	1992/93	187.00	180.60	181.90	187.60	188.75	179.90	183.60	187.40	191.70	193.10	229.90	219.10	192.55
	1993/94	199.90	194.50											
Cottonseed meal, 41% solvent, Memphis:	1991/92	133.10	131.00	144.40	162.00	156.25	143.10	124.25	121.25	127.50	132.50	133.75	146.90	138.00
	1992/93	163.00	154.40	157.50	174.50	164.40	149.40	153.50	149.00	143.10	153.00	170.30	178.50	159.22
	1993/94	193.75	173.10											
Linseed meal, 34% solvent, Minneapolis:	1991/92	116.25	128.00	133.75	127.80	122.00	124.00	115.00	117.50	120.00	125.00	123.50	126.25	123.25
	1992/93	131.00	141.25	152.50	137.40	136.70	142.50	135.40	125.50	126.25	123.20	133.75	150.00	136.29
	1993/94	148.75	147.50											
Meat and bone meal, Kansas City 3/:	1991/92	232.50	227.00	219.40	208.50	208.90	205.90	215.70	202.25	206.50	206.20	197.10	204.40	211.20
	1992/93	217.20	216.60	208.60	214.50	225.00	214.25	215.80	221.90	208.90	208.50	268.40	231.50	220.93
	1993/94	218.10	205.80											
Fishmeal, 67% protein East Coast:	1991/92	385.00	403.50	406.90	321.50	394.40	390.60	NQ	348.00	364.20	365.80	345.00	300.70	365.96
	1992/93	404.00	412.50	412.50	410.00	NQ	NQ	NQ	NQ	333.75	334.00	375.00	365.50	380.91
	1993/94	344.40	326.90											
Corn gluten feed, Illinois pts.:	1991/92	95.60	104.60	106.10	107.00	107.40	108.50	101.50	95.50	95.40	94.40	99.40	102.50	101.49
	1992/93	107.30	108.50	106.10	115.20	108.10	107.00	89.00	80.50	81.60	82.70	81.90	83.50	95.95
	1993/94	82.50	80.90											
Corn gluten meal, 60% protein, IL. pts.:	1991/92	269.40	292.50	296.25	287.50	267.50	275.60	272.00	247.50	246.25	248.50	243.75	242.75	265.79
	1992/93	266.00	269.40	266.90	287.00	283.10	294.40	295.50	284.40	276.90	276.50	300.60	314.50	284.60
	1993/94	305.60	296.20											
Brewers' dried grains grains, Milwaukee:	1991/92	99.00	107.50	113.10	121.00	121.90	122.50	108.50	87.75	90.00	90.00	94.40	99.40	104.59
	1992/93	103.60	110.25	110.50	111.00	111.00	113.00	108.90	99.60	89.50	87.00	NQ	NQ	104.44
	1993/94	NQ	NQ											
Dist. dried grains, Lawrenceburg, IN.:	1991/92	118.00	118.00	122.00	126.60	128.00	127.60	124.10	121.00	117.25	117.20	126.00	NQ	122.34
	1992/93	130.00	110.25	134.00	135.00	135.00	135.00	131.00	123.00	106.00	106.00	106.00	NQ	122.84
	1993/94	120.00	121.25											
Feather meal, Arkansas pts.:	1991/92	202.50	198.80	205.00	227.50	221.40	209.75	226.00	198.10	191.25	195.20	192.50	201.75	205.81
	1992/93	223.80	240.00	261.25	276.00	271.25	265.00	235.50	246.75	227.50	223.20	256.25	245.50	247.67
	1993/94	267.50	275.00											
Wheat bran, Kansas City:	1991/92	61.60	72.90	84.40	81.80	76.90	78.40	77.40	60.10	59.10	62.10	60.25	56.50	69.29
	1992/93	68.30	79.60	86.40	92.30	81.00	62.50	69.70	59.60	54.75	55.80	58.10	64.50	69.38
	1993/94	84.25	78.50											
Wheat middlings, Kansas City:	1991/92	61.60	72.90	84.40	81.80	76.90	78.40	77.40	60.10	59.10	62.10	60.25	56.50	69.29
	1992/93	68.30	79.60	86.40	92.30	81.00	66.25	69.70	59.60	54.75	55.80	58.10	64.50	69.69
	1993/94	84.25	78.50											
Rice bran, f.o.b. mills, Arkansas:	1991/92	49.90	46.60	59.90	75.50	77.50	60.50	52.70	52.60	50.10	51.90	56.75	49.20	56.93
	1992/93	42.50	45.10	62.60	76.75	79.90	57.60	53.80	51.00	32.75	45.30	50.60	48.30	53.85
	1993/94	52.00	50.00											
Hominy feed, Illinois pts.:	1991/92	80.00	77.20	83.60	86.20	88.00	93.60	91.70	92.75	84.50	83.90	83.25	77.90	85.22
	1992/93	76.40	72.50	67.10	66.90	65.60	60.00	60.80	66.90	69.40	65.70	73.25	69.50	67.84
	1993/94	69.00	68.50											

See footnotes at end of table.

Continued--

Appendix table 14--Price trends, selected feeds, and corn products--continued

Item		Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.-Aug. Average 1/
-----\$/ton-----														
Wholesale, mostly bulk 2/:														
Alfalfa meal, dehyd.	1991/92	103.00	103.00	103.00	104.00	104.00	104.00	102.60	101.75	98.75	98.00	97.75	97.00	101.40
Kansas City:	1992/93	96.20	99.50	102.75	106.60	111.00	112.00	115.40	124.10	125.00	111.00	109.00	113.10	110.47
	1993/94	118.75	127.75											
Cane molasses, New Orleans:	1991/92	65.25	65.00	65.00	67.00	65.00	65.00	65.00	65.00	63.75	62.50	62.50	62.50	64.46
	1992/93	58.75	55.30	55.00	61.30	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.25	55.88
	1993/94	55.30	56.25											
Molasses beet pulp, Los Angeles 4/:	1991/92	80.00	80.00	104.25	107.50	113.10	115.00	121.40	123.00	110.00	112.60	114.00	114.00	107.90
	1992/93	113.20	102.80	98.90	108.10	114.50	114.75	112.00	109.00	108.80	108.40	106.50	103.50	108.37
	1993/94	NQ	NQ											
-----cents/lb.-----														
Animal fat, Kansas City 5/:	1991/92	10.50	10.20	9.60	9.60	10.00	10.00	10.00	10.30	10.20	NQ	NQ	NQ	10.04
	1992/93	11.40	NQ	NQ	NQ	NQ	NQ	12.00	12.80	NQ	NQ	NQ	NQ	12.07
	1993/94	NQ	NQ											
-----\$/ton-----														
Urea, 42% nitrogen, Fort Worth:	1991/92	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	190.00	190.00	190.00	182.50
	1992/93	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00
	1993/94	NA	NA											
-----\$/bu.-----														
Corn, no. 2 white, Kansas City:	1991/92	2.80	2.80	2.73	2.64	2.66	2.73	3.30	3.54	3.55	3.60	3.54	2.79	3.06
	1992/93	2.70	2.61	2.55	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.49
	1993/94	2.45	2.45											
-----\$/cwt-----														
Prices paid, U.S. basis 6/ 7/:														
Soybean meal, 44%:	1991/92	---	13.40	---	---	13.00	---	---	13.00	---	---	13.20	---	13.15
	1992/93	---	12.90	---	---	13.60	---	---	13.20	---	---	13.90	---	13.40
	1993/94	---	14.10	---	---		---	---		---	---		---	
Cottonseed meal, 41%:	1991/92	---	13.40	---	---	14.00	---	---	13.80	---	---	13.90	---	13.78
	1992/93	---	14.50	---	---	14.70	---	---	14.60	---	---	14.90	---	14.68
	1993/94	---	15.40	---	---		---	---		---	---		---	
Wheat bran:	1991/92	---	10.60	---	---	10.90	---	---	10.80	---	---	10.80	---	10.78
	1992/93	---	10.70	---	---	11.00	---	---	10.90	---	---	10.90	---	10.88
	1993/94	---	11.00	---	---		---	---		---	---		---	
-----\$/ton-----														
Broiler grower feed:	1991/92	---	208.00	---	---	205.00	---	---	212.00	---	---	211.00	---	209.00
	1992/93	---	203.00	---	---	206.00	---	---	209.00	---	---	204.00	---	205.50
	1993/94	---	218.00	---	---		---	---		---	---		---	
Laying feed:	1991/92	---	199.00	---	---	202.00	---	---	200.00	---	---	201.00	---	200.50
	1992/93	---	196.00	---	---	198.00	---	---	201.00	---	---	201.00	---	199.00
	1993/94	---	208.00	---	---		---	---		---	---		---	
Turkey grower feed:	1991/92	---	241.00	---	---	239.00	---	---	239.00	---	---	244.00	---	240.75
	1992/93	---	242.00	---	---	243.00	---	---	248.00	---	---	248.00	---	245.25
	1993/94	---	251.00	---	---		---	---		---	---		---	

See footnotes at end of table.

Continued--

Appendix table 14--Price trends, selected feeds, and corn products--continued

Item		Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.-Aug. Average 1/
-----\$/ton-----														
Prices paid, U.S. basis 6/ 7/:														
Chick starter:	1991/92	---	225.00	---	---	227.00	---	---	228.00	---	---	228.00	---	227.00
	1992/93	---	227.00	---	---	219.00	---	---	224.00	---	---	228.00	---	224.50
	1993/94	---	231.00	---	---	---	---	---	---	---	---	---	---	---
Dairy feed, 16%:	1991/92	---	176.00	---	---	179.00	---	---	179.00	---	---	178.00	---	178.00
	1992/93	---	177.00	---	---	181.00	---	---	179.00	---	---	179.00	---	179.00
	1993/94	---	181.00	---	---	---	---	---	---	---	---	---	---	---
Beef cattle conc., 32-36% protein 8/:	1991/92	---	248.00	---	---	250.00	---	---	249.00	---	---	250.00	---	249.25
	1992/93	---	254.00	---	---	261.00	---	---	261.00	---	---	264.00	---	260.00
	1993/94	---	270.00	---	---	---	---	---	---	---	---	---	---	---
Hog concentrate, 38-42% protein 8/:	1991/92	---	312.00	---	---	301.00	---	---	304.00	---	---	302.00	---	304.75
	1992/93	---	303.00	---	---	311.00	---	---	305.00	---	---	324.00	---	310.75
	1993/94	---	321.00	---	---	---	---	---	---	---	---	---	---	---
-----50 lb.-----														
Stock salt 8/:	1991/92	---	3.58	---	---	3.57	---	---	3.60	---	---	3.63	---	3.60
	1992/93	---	3.65	---	---	3.51	---	---	3.57	---	---	3.58	---	3.58
	1993/94	---	3.59	---	---	---	---	---	---	---	---	---	---	---
-----\$/cwt-----														
Corn products, wholesale 9/:														
Corn meal, yellow, New York:	1991/92	13.40	13.46	13.32	13.36	13.42	13.75	13.77	13.51	13.56	13.79	13.48	13.25	13.51
	1992/93	13.30	13.10	13.18	13.14	13.09	13.07	13.33	13.66	13.65	13.51	13.83	13.83	13.39
	1993/94	13.80	14.33	---	---	---	---	---	---	---	---	---	---	---
Brewers' grits, Chicago:	1991/92	9.90	9.95	9.81	9.85	9.91	10.07	10.06	9.85	9.90	10.13	9.82	9.59	9.90
	1992/93	9.64	9.44	9.51	9.48	9.43	9.41	9.67	9.88	9.88	9.74	10.07	10.05	9.68
	1993/94	10.00	10.58	---	---	---	---	---	---	---	---	---	---	---
-----cents/lb.-----														
Syrup, Midwest/West:	1991/92	12.86	13.23	13.23	13.23	13.23	13.23	13.23	13.23	13.23	13.23	13.23	13.23	13.20
	1992/93	13.23	9.13	9.13	9.03	8.88	8.88	9.01	9.80	10.41	10.41	11.91	11.91	10.14
	1993/94	11.91	11.91	---	---	---	---	---	---	---	---	---	---	---
Sugar, dextrose, Midwest:	1991/92	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
	1992/93	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
	1993/94	24.50	24.50	---	---	---	---	---	---	---	---	---	---	---
High-fructose 42% in tank cars, Midwest:	1991/92	17.25	14.70	14.70	14.70	14.70	14.70	14.70	14.70	14.70	14.70	16.61	16.61	15.23
	1992/93	16.61	12.78	12.78	12.78	12.78	12.78	12.38	11.69	12.46	12.46	15.02	15.02	13.30
	1993/94	15.02	15.02	---	---	---	---	---	---	---	---	---	---	---
-----\$/cwt-----														
Corn starch, f.o.b. Midwest:	1991/92	11.56	11.35	11.05	10.50	10.38	10.62	10.92	11.22	11.22	11.22	11.32	11.02	11.03
	1992/93	10.62	10.62	10.17	10.17	10.37	10.37	10.37	10.82	11.27	11.27	11.00	11.36	10.70
	1993/94	11.36	11.36	---	---	---	---	---	---	---	---	---	---	---

--- = Not applicable. NQ = No quotes. NA = Not available.

1/ 1992/93 preliminary. 2/ Grain and Feed Market News, Agricultural Marketing Service, USDA, except urea, which is from Feedstuffs, Miller Publishing Co., Minneapolis, Minnesota. 3/ Reported as Central U.S. starting December 1991. 4/ Reported as N. California & Central Areas starting November 1991. 5/ Reported as Central U.S. starting November 1991. 6/ Agricultural Prices, Agricultural Statistics Board, USDA. 7/ Prices-paid data are available on a quarterly basis only. 8/ Prices previously published in cwt. 9/ Milling and Baking News, Kansas City, Missouri, except starch which is from industry sources.

Appendix table 15--Corn, sorghum, barley, and oats exports, 1990/91 to date 1/

Year and month	Corn			Year and month	Barley		Oats	
	Grain only	Total	Sorghum		Grain only	Total	Grain only	Total
	Bushels				Bushels			
1990/91:				1990/91:				
Sept.:	104,481,725	107,660,786	18,212,550	June:	11,117,541	11,513,925	97,279	1,570,692
Oct.:	108,167,173	111,681,827	17,699,775	July:	9,710,625	10,087,024	40,786	85,603
Nov.:	168,267,057	171,969,242	20,675,433	Aug.:	10,034,291	10,539,588	44,988	110,494
1st Qtr.:	380,915,955	391,311,855	56,587,758	1st Qtr.:	30,862,457	32,140,537	183,053	1,766,789
Dec.:	142,014,814	144,624,717	17,623,325	Sept.:	1,988,477	3,087,548	126,284	169,650
Jan.:	145,445,932	149,685,190	16,913,071	Oct.:	14,051,755	14,502,068	60,283	128,768
Feb.:	183,223,004	188,180,356	26,673,364	Nov.:	9,145,553	9,384,739	44,644	114,072
2nd Qtr.:	470,683,750	482,490,263	61,209,760	2nd Qtr.:	25,185,785	26,974,355	231,211	412,490
Mar.:	188,842,557	192,831,722	29,896,642	Dec.:	12,191,330	13,434,072	16,328	72,335
Apr.:	144,273,134	146,807,586	29,567,333	Jan.:	5,306,020	5,997,147	56,218	123,360
May:	120,483,221	125,189,787	16,533,105	Feb.:	1,110,670	1,517,806	21,908	87,315
3rd Qtr.:	453,598,912	464,829,095	75,997,080	3rd Qtr.:	18,608,020	20,949,025	94,454	283,010
June:	105,294,130	108,117,400	4,063,146	Mar.:	2,768,592	3,627,196	23,631	2,293,212
July:	163,712,172	169,497,385	14,771,928	Apr.:	438,674	1,083,202	40,510	183,270
Aug.:	150,394,375	153,885,735	19,554,555	May:	2,764,091	4,068,414	38,168	136,809
4th Qtr.:	419,400,677	431,500,520	38,389,629	4th Qtr.:	5,971,357	8,778,813	102,308	2,613,291
Total:	1,724,599,294	1,770,131,733	232,184,227	Total:	80,627,619	88,842,730	611,026	5,075,580
1991/92:				1991/92:				
Sept.:	134,767,135	137,614,861	14,959,285	June:	679,758	1,335,352	58,422	121,576
Oct.:	136,956,614	140,060,404	16,459,811	July:	5,394,343	6,485,240	53,049	149,435
Nov.:	149,537,473	152,976,219	15,121,274	Aug.:	7,408,540	8,107,346	23,011	99,658
1st Qtr.:	421,261,222	430,651,484	46,540,370	1st Qtr.:	13,482,641	15,927,938	134,482	370,669
Dec.:	127,343,966	130,025,340	30,157,833	Sept.:	8,661,501	9,477,281	84,602	170,262
Jan.:	100,189,249	102,917,540	35,198,141	Oct.:	13,090,494	13,776,430	96,659	202,500
Feb.:	134,155,436	136,462,241	42,850,982	Nov.:	14,911,420	15,449,001	19,704	177,377
2nd Qtr.:	361,688,651	369,405,121	108,206,956	2nd Qtr.:	36,663,415	38,702,712	200,965	550,139
Mar.:	124,300,247	126,979,997	34,571,072	Dec.:	7,929,933	8,234,664	20,875	242,713
Apr.:	142,446,226	145,122,719	45,425,727	Jan.:	11,515,981	11,782,314	109,956	371,445
May:	104,711,888	107,538,905	25,007,215	Feb.:	5,187,016	5,698,245	48,226	202,737
3rd Qtr.:	371,458,361	379,641,621	105,004,014	3rd Qtr.:	24,632,930	25,715,223	179,057	816,895
June:	147,780,588	150,657,616	8,305,140	Mar.:	1,686,720	2,130,608	320,910	651,232
July:	146,358,254	149,453,379	9,326,321	Apr.:	11,396,426	12,749,187	673,168	813,441
Aug.:	135,557,511	137,710,736	14,349,388	May:	6,636,142	7,546,220	394,834	523,435
4th Qtr.:	429,696,353	437,821,730	31,980,849	4th Qtr.:	19,719,288	22,426,015	1,388,912	1,988,108
Total:	1,584,104,587	1,617,519,956	291,732,189	Total:	94,498,274	102,771,888	1,903,416	3,725,811
1992/93:				1992/93:				
Sept.:	153,957,070	156,156,803	23,555,198	June:	6,112,452	7,571,349	337,169	451,272
Oct.:	139,423,233	141,952,722	19,463,829	July:	5,114,631	5,669,888	319,670	437,796
Nov.:	194,133,827	196,628,374	13,422,100	Aug.:	7,136,040	7,769,056	376,990	658,652
1st Qtr.:	487,514,130	494,737,899	56,441,127	1st Qtr.:	18,363,123	21,010,293	1,033,830	1,547,720
Dec.:	173,102,447	175,021,686	33,459,163	Sept.:	5,269,184	5,968,023	704,032	902,051
Jan.:	153,676,630	155,732,807	33,278,777	Oct.:	6,811,777	7,581,022	925,252	1,127,925
Feb.:	136,262,663	138,416,028	34,737,232	Nov.:	9,947,530	10,406,612	429,419	621,799
2nd Qtr.:	463,041,740	469,170,521	101,475,172	2nd Qtr.:	22,028,491	23,955,657	2,058,704	2,651,775
Mar.:	135,915,165	138,816,513	32,915,201	Dec.:	8,404,065	9,162,048	292,870	455,869
Apr.:	153,345,015	156,300,395	35,484,351	Jan.:	3,686,266	4,645,437	412,402	512,386
May:	122,030,479	124,811,344	18,923,576	Feb.:	9,844,877	10,362,364	650,777	814,240
3rd Qtr.:	411,290,659	419,928,252	87,323,128	3rd Qtr.:	21,935,208	24,169,849	1,356,049	1,782,495
June:	111,325,832	114,691,178	4,939,828	Mar.:	5,658,346	7,324,734	444,645	514,950
July:	91,300,944	94,188,399	12,041,956	Apr.:	6,537,531	8,851,068	820,188	925,617
Aug.:	98,804,662	101,518,710	14,879,077	May:	5,768,991	6,935,036	304,789	460,022
4th Qtr.:	301,431,438	310,398,287	31,860,861	4th Qtr.:	17,964,868	23,110,838	1,569,622	1,900,589
Total:	1,663,277,967	1,694,234,959	277,100,288	Total:	80,291,690	92,246,637	6,018,205	7,882,579
1993/94:				1993/94:				
Sept.:	138,867,694	142,258,582	14,698,166	June:	3,878,573	5,772,239	636,998	767,269
Oct.:				July:	4,654,967	5,810,001	365,209	527,025
Nov.:				Aug.:	6,095,596	7,034,349	543,784	681,113
1st Qtr.:				1st Qtr.:	14,629,136	18,616,589	1,545,991	1,975,407
Dec.:				Sept.:	2,694,186	3,775,619	317,741	508,061

1/ Total corn exports include grain only (white, yellow, seed, relief), dry process (cornmeal for relief, as grain, grits), and wet process (corn starch, sugar dextrose, glucose, high fructose). Sorghum includes seed and unmilled. Barley includes grain only (grain for malting purposes, other) and barley malt. Oats include grain and oatmeal (bulk and packaged).

Source: Bureau of the Census, U.S. Department of Commerce.

Appendix table 16--Corn, sorghum, barley, and oats imports, 1990/91 to date 1/

Year and month	-----Corn-----			Sorghum	Year and month	-----Barley-----		-----Oats-----	
	Grain only	Total				Grain only	Total	Grain only	Total
: Bushels				: Bushels					
1990/91:					1990/91:				
Sept.	29,118	967,853	5,551		June	603,614	691,947	6,675,422	6,766,369
Oct.	172,220	1,396,469	0		July	309,116	547,246	5,841,249	5,908,451
Nov.	683,773	2,131,564	60		Aug.	117,460	357,140	4,998,143	5,090,611
1st Qtr.	885,111	4,495,886	5,611		1st Qtr.	1,030,190	1,596,333	17,514,814	17,765,432
Dec.	90,489	1,059,442	0		Sept.	117,510	200,053	2,240,097	2,358,047
Jan.	100,811	1,255,105	0		Oct.	293,888	485,842	4,464,410	4,636,239
Feb.	83,751	1,095,646	0		Nov.	839,438	1,014,543	4,970,603	5,078,808
2nd Qtr.	275,051	3,410,193	0		2nd Qtr.	1,250,836	1,700,438	11,675,110	12,073,094
Mar.	80,937	1,201,768	60,462		Dec.	1,288,335	1,569,231	6,027,830	6,118,040
Apr.	214,595	1,285,191	167		Jan.	1,194,977	1,306,682	2,543,485	2,642,746
May	487,548	1,534,735	12		Feb.	1,723,635	1,836,340	9,675,744	9,822,449
3rd Qtr.	783,080	4,021,694	60,641		3rd Qtr.	4,206,947	4,712,253	18,247,059	18,583,235
June	155,046	1,151,719	0		Mar.	2,248,034	2,423,555	4,618,596	4,763,254
July	423,345	1,586,421	679		Apr.	3,369,631	3,401,987	3,767,262	3,887,601
Aug.	893,816	1,996,622	1,319		May	1,373,891	1,581,999	7,585,984	7,719,294
4th Qtr.	1,472,207	4,734,762	1,998		4th Qtr.	6,991,556	7,407,541	15,971,842	16,370,149
Total	3,415,449	16,662,535	68,250		Total	13,479,529	15,416,565	63,408,825	64,791,910
1991/92:					1991/92:				
Sept.	1,100,354	2,099,166	0		June	4,575,522	4,778,394	5,759,634	5,844,622
Oct.	2,251,767	3,433,843	0		July	1,919,996	1,919,668	7,175,340	7,240,484
Nov.	3,128,935	3,991,138	0		Aug.	1,120,846	1,279,512	8,780,737	8,871,528
1st Qtr.	6,481,056	9,524,147	0		1st Qtr.	7,440,364	7,977,574	21,715,711	21,956,634
Dec.	1,420,521	2,368,422	118		Sept.	567,099	652,111	4,958,443	5,041,886
Jan.	1,404,407	2,572,915	0		Oct.	1,232,489	1,313,834	9,129,115	9,219,462
Feb.	1,579,933	2,826,668	0		Nov.	1,657,843	1,741,481	3,209,866	3,325,064
2nd Qtr.	4,404,861	7,768,005	118		2nd Qtr.	3,457,431	3,707,426	17,297,424	17,586,412
Mar.	1,962,895	3,380,386	393		Dec.	1,818,152	2,009,904	4,236,846	4,411,775
Apr.	2,193,891	3,361,470	0		Jan.	2,349,600	2,483,012	5,997,604	6,120,696
May	1,247,071	2,395,941	225		Feb.	2,286,473	2,460,709	7,414,705	7,525,443
3rd Qtr.	5,403,857	9,137,797	618		3rd Qtr.	6,454,225	6,953,625	17,649,155	18,057,914
June	1,380,817	2,692,486	4,565		Mar.	2,525,374	2,676,242	6,625,725	6,729,380
July	1,390,021	2,499,421	1,567		Apr.	2,288,155	2,422,134	8,797,008	8,894,410
Aug.	576,112	1,777,124	394		May	2,356,369	2,453,301	2,679,647	2,788,631
4th Qtr.	3,346,950	6,969,031	6,526		4th Qtr.	7,169,898	7,551,677	18,102,380	18,412,421
Total	19,636,724	33,398,980	7,262		Total	24,521,918	26,190,302	74,764,670	76,013,381
1992/93:					1992/93:				
Sept.	221,471	1,553,822	0		June	2,159,260	2,244,926	7,323,161	7,515,000
Oct.	296,504	1,510,619	0		July	3,279,771	3,467,803	4,075,120	4,197,542
Nov.	739,778	1,843,315	0		Aug.	1,117,761	1,210,126	3,740,291	3,898,321
1st Qtr.	1,257,753	4,907,756	0		1st Qtr.	6,556,792	6,922,855	15,138,572	15,610,863
Dec.	541,980	1,818,086	0		Sept.	566,767	676,418	2,452,932	2,632,483
Jan.	241,471	1,522,523	0		Oct.	499,308	594,740	3,920,278	4,104,556
Feb.	255,908	1,280,493	4,650		Nov.	467,239	565,914	5,525,416	5,733,071
2nd Qtr.	1,039,359	4,621,102	4,650		2nd Qtr.	1,533,314	1,837,072	11,898,626	12,470,110
Mar.	629,207	2,075,358	0		Dec.	359,479	465,468	5,190,977	5,359,648
Apr.	555,199	2,108,923	148		Jan.	611,251	750,665	2,661,061	2,875,420
May	814,925	2,048,094	876		Feb.	476,363	647,058	2,845,670	3,107,494
3rd Qtr.	1,999,331	6,232,374	1,024		3rd Qtr.	1,447,093	1,863,191	10,697,708	11,342,562
June	691,647	1,927,256	6,736		Mar.	321,428	466,275	1,979,249	2,238,823
July	978,610	2,242,449	0		Apr.	548,083	705,239	7,656,387	7,939,956
Aug.	1,124,329	2,532,369	0		May	997,906	1,088,029	7,607,251	7,818,451
4th Qtr.	2,794,586	6,702,074	6,736		4th Qtr.	1,867,417	2,259,543	17,242,887	17,997,230
Total	7,091,029	22,463,306	12,410		Total	11,404,616	12,882,661	54,977,793	57,420,765
1993/94:					1993/94:				
Sept.	626,777	2,048,980	0		June	951,500	1,133,778	8,118,931	8,329,893
Oct.					July	751,986	1,104,042	5,207,841	5,471,101
Nov.					Aug.	1,467,158	1,868,049	3,492,138	3,724,005
1st Qtr.					1st Qtr.	3,170,644	4,105,869	16,818,910	17,524,999
Dec.					Sept.	1,495,435	1,919,584	9,336,793	9,728,511

1/ Corn includes grain only (yellow dent corn, other), seed, and cornmeal. Sorghum is grain only. Barley includes grain only barley for malting, other), pearl barley, milled and malting. Oats include grain (hulled or unhulled), unhulled oats fit and unfit for human consumption, and oatmeal fit for human consumption.

Source: Bureau of the Census, U.S. Department of Commerce.

Appendix table 17--Hay (all): Acreage, supply, and disappearance, 1986/87-1993/94

Item	Unit	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
Acreage harvested	Mill. acres	62.3	60.1	65.1	63.3	61.4	62.5	59.6	61.0
Yield per acre	Tons	2.49	2.45	1.94	2.30	2.39	2.45	2.50	2.53
Carryover (May 1)	Mill. tons	26.7	32.3	27.1	17.5	27.1	27.0	28.6	21.2
Production	"	155.4	147.5	126.0	145.5	146.8	153.3	149.1	154.0
Supply	"	182.1	179.8	153.1	163.0	173.9	180.3	177.7	175.2
Disappearance	"	149.9	152.7	135.6	135.9	146.9	152.0	156.6	NA
Roughage-consuming animal units (RCAU's)	Mill. units	78.3	76.3	75.5	75.5	75.5	76.4	76.9	77.4
Supply per RCAU	Tons	2.33	2.36	2.03	2.16	2.30	2.36	2.31	2.26
Disappearance per RCAU	"	1.91	2.00	1.80	1.80	1.94	1.98	2.03	NA

NA = Not available.

Appendix table 18--Hay: Average prices received by farmers, United States, by month, 1983/84-1993/94 1/

Year	May	June	July	Aug.	Sept.	Oct. 2/	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Average 3/
\$/ton													
<b>Alfalfa:</b>													
1983/84	83.80	78.30	77.40	77.40	79.10	82.40	80.10	81.70	82.00	85.10	84.40	84.30	81.33
1984/85	87.10	80.10	75.60	72.80	73.90	76.70	74.30	77.50	76.20	76.40	75.80	76.70	76.93
1985/86	85.50	74.90	72.50	68.10	70.70	70.50	67.70	69.10	70.20	71.30	72.00	69.80	71.86
1986/87	69.50	64.10	61.40	60.10	58.80	59.90	57.90	60.70	58.80	61.10	62.80	67.90	61.92
1987/88	76.30	66.90	65.10	66.30	67.60	67.70	63.70	67.40	66.50	69.60	72.50	76.90	69.31
1988/89	84.50	81.90	87.90	86.10	87.30	90.30	92.20	94.40	96.70	99.40	105.00	107.00	93.83
1989/90	105.00	96.50	89.90	87.50	91.20	89.80	91.30	92.50	93.30	95.20	96.70	103.00	93.80
1990/91	104.00	92.60	89.40	86.30	89.20	90.70	85.70	84.60	84.20	84.80	85.90	90.10	86.60
1991/92	86.50	80.10	75.40	74.00	72.30	71.20	71.00	72.00	72.30	74.50	72.90	73.70	74.60
1992/93	80.00	80.00	75.80	72.80	73.80	74.70	78.30	79.10	80.80	83.70	84.30	88.20	78.40
1993/94	93.20	87.40	83.40	81.60	84.30	88.00							
<b>Other hay:</b>													
1983/84	58.90	56.10	54.30	52.90	57.80	59.50	62.10	64.30	63.30	63.80	64.90	66.50	60.37
1984/85	64.90	63.40	61.80	60.90	62.40	62.00	62.60	64.80	64.80	64.70	61.70	58.40	62.70
1985/86	58.70	54.00	57.00	58.40	58.60	58.20	55.30	56.00	56.10	56.00	54.80	54.90	56.50
1986/87	54.00	50.90	50.00	51.00	52.70	50.00	49.70	49.40	48.10	50.90	48.30	48.20	50.27
1987/88	51.90	50.80	49.60	51.00	51.80	51.10	52.30	51.10	52.20	51.50	51.70	51.90	52.09
1988/89	59.30	62.00	65.10	68.10	68.90	69.00	70.00	69.50	70.00	72.10	73.60	76.70	70.03
1989/90	78.80	69.00	63.60	63.10	66.10	62.80	63.00	63.00	64.00	62.50	63.70	65.10	65.50
1990/91	66.10	62.90	60.40	62.90	63.20	63.50	63.60	62.40	61.30	60.20	61.60	60.10	65.10
1991/92	59.90	58.00	59.20	61.20	62.00	60.00	59.60	60.00	59.20	62.30	61.90	59.00	60.50
1992/93	56.40	58.60	53.60	56.10	55.50	57.40	58.30	58.00	59.60	63.50	61.60	63.40	57.60
1993/94	61.60	59.00	58.00	62.00	60.90	60.50							
<b>All hay:</b>													
1983/84	78.10	72.70	71.20	71.20	74.70	76.80	75.10	76.70	76.60	78.70	79.40	79.80	75.80
1984/85	82.50	76.10	72.40	70.40	70.70	73.10	71.40	73.40	73.00	73.10	72.20	72.50	72.70
1985/86	80.80	70.20	67.90	65.20	67.10	67.50	64.30	65.40	65.80	66.70	67.10	66.20	67.60
1986/87	66.70	61.00	58.80	58.20	57.60	57.90	56.00	57.70	56.10	58.50	59.20	64.10	59.70
1987/88	71.70	62.90	61.20	62.70	64.10	64.20	61.10	63.20	62.80	64.60	67.20	71.40	65.00
1988/89	79.70	77.00	81.60	81.40	82.90	85.10	86.40	87.60	89.50	91.80	96.90	101.00	85.20
1989/90	100.00	90.20	83.40	81.60	85.70	83.20	83.20	83.50	84.90	85.70	87.50	95.00	85.40
1990/91	96.00	85.00	81.60	81.00	83.20	84.00	80.40	78.70	77.90	77.80	80.50	85.50	80.60
1991/92	81.10	75.20	71.80	70.80	69.80	68.50	68.20	68.90	68.70	71.10	69.90	70.90	71.20
1992/93	74.70	74.50	69.90	69.20	69.20	70.30	73.40	73.60	75.10	77.70	78.90	83.80	73.20
1993/94	86.30	80.50	77.20	77.40	77.60	82.50							

1/ Revised prices reported for mid-month. 2/ October 1993 data are preliminary. 3/ U.S. season average prices weighted by monthly marketings.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Appendix table 19--Shipments of grain on the Illinois waterway and the Mississippi River (Locks 11-22), 1981/82-1993/94

Crop year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
Million tons													
1981/82	3.4	3.4	4.6	3.9	1.2	0.8	2.1	4.1	3.8	4.4	3.9	5.0	3.4
1982/83	4.1	3.2	4.2	3.2	2.7	2.3	3.8	3.3	3.9	4.2	4.2	4.8	3.6
1983/84	5.3	4.9	5.7	4.4	1.0	3.6	4.5	5.3	4.4	3.7	3.4	3.3	4.1
1984/85	3.1	4.6	5.5	3.1	2.0	0.9	3.1	4.1	3.1	3.2	3.4	3.0	3.3
1985/86	2.4	2.6	4.3	3.3	1.8	1.7	2.9	3.4	3.6	3.2	2.5	3.3	2.9
1986/87	3.2	3.1	5.2	2.4	1.2	1.7	3.6	3.8	4.0	3.8	2.8	3.5	3.2
1987/88	3.3	3.8	3.9	2.9	1.9	2.0	3.0	4.2	4.3	3.6	2.7	3.3	3.2
1988/89	3.3	3.3	3.9	3.5	1.7	1.5	2.6	3.5	4.3	4.1	3.9	3.4	3.3
1989/90	3.0	3.9	4.7	2.5	2.2	2.2	3.5	4.5	5.2	4.5	5.0	4.0	3.8
1990/91	3.6	3.4	4.8	2.1	1.6	2.0	3.1	4.0	3.7	3.6	4.4	3.8	3.4
1991/92	3.3	3.5	3.7	2.9	1.8	2.0	3.4	3.8	4.1	4.1	4.8	4.6	3.5
1992/93	3.2	2.6	3.3	2.9	2.0	1.7	3.0	2.5	3.7	3.7	0.4	1.3	2.5
1993/94	3.6	3.5											3.6

Source: Mississippi River Barge Traffic, U.S. Army Corps of Engineers, Rock Island District.

Appendix table 20--Weekly average of rail car loadings of grain and soybeans, 1981/82-1993/94

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
Carloads													
1981/82	25,607	25,609	27,419	22,384	22,967	27,220	26,813	25,798	23,755	22,540	27,020	25,123	25,188
1982/83	20,321	29,523	25,350	21,888	24,700	26,318	26,807	21,243	20,849	21,393	27,942	27,461	24,483
1983/84	29,735	31,414	29,515	25,927	31,068	29,105	27,666	26,784	23,616	24,335	26,632	29,848	27,970
1984/85	29,162	24,482	28,537	25,441	25,310	23,688	23,340	20,164	17,715	24,724	22,662	20,218	23,791
1985/86	18,889	26,227	28,214	23,482	25,424	22,558	20,648	17,743	17,673	24,907	24,426	24,342	22,878
1986/87	27,329	33,605	29,877	24,827	23,086	26,663	27,134	25,046	26,189	32,154	32,257	30,825	28,249
1987/88	32,977	32,820	29,947	29,225	32,223	34,224	34,241	32,963	30,861	33,316	29,678	27,010	31,624
1988/89	29,014	30,628	27,140	27,120	30,324	30,583	31,436	30,181	25,943	27,253	25,095	25,990	28,392
1989/90	24,437	28,950	31,701	29,411	32,250	32,605	29,648	27,938	25,696	28,122	25,717	26,904	28,615
1990/91	23,982	27,622	26,822	24,359	26,337	28,560	28,100	24,927	20,833	24,500	25,581	27,573	25,766
1991/92	27,537	29,833	27,300	28,264	30,017	29,966	29,862	24,974	20,508	23,606	25,739	26,200	26,984
1992/93	25,785	30,684	31,497	29,667	29,642	30,707	30,065	28,049	24,694	24,715	25,934	25,636	28,089
1993/94	26,931	28,839											27,885

Source: Association of American Railroads.

Appendix table 21--Rail-freight-rate index for grain, crop years 1981/82-1993/94

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
December 1984=100													
1981/82	88.5	89.4	89.4	89.4	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	92.1
1982/83	93.0	93.0	93.0	93.0	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.9	93.6
1983/84	93.9	94.2	94.2	94.2	98.0	98.0	98.0	98.0	98.0	98.0	98.4	98.4	96.8
1984/85	98.4	100.0	100.0	100.0	100.0	100.0	99.3	99.3	98.7	97.3	96.4	96.3	98.8
1985/86	98.0	98.0	98.0	98.0	98.9	99.0	99.0	99.1	99.2	99.2	99.2	99.2	98.7
1986/87	99.2	98.5	98.5	97.8	98.3	98.3	98.8	98.6	98.5	98.6	98.6	98.5	98.5
1987/88	98.9	99.2	99.1	98.5	101.2	101.2	101.4	102.7	104.1	104.3	106.4	109.3	102.2
1988/89	109.3	108.3	108.5	108.2	109.2	109.2	108.8	108.8	108.8	108.0	108.4	108.4	108.7
1989/90	108.4	108.6	108.7	108.7	109.1	109.1	109.1	109.7	109.7	109.2	109.7	110.5	109.1
1990/91	110.6	111.3	111.3	111.3	111.0	111.0	112.5	112.0	111.2	109.9	110.8	110.8	111.1
1991/92	110.8	111.6	111.3	111.3	111.4	111.6	110.8	110.2	110.5	110.5	110.3	110.3	110.9
1992/93	110.3	113.1	113.1	114.4	114.4	114.4	114.5	114.5	114.2	114.1	114.1	114.0	113.8
1993/94	114.3	116.0											115.2

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Appendix table 22--Processed feeds: Quantity fed, 1985-93 1/ 2/

	1985	1986	1987	1988	1989	1990	1991	1992	1993 3/
---- 1,000 metric tons ----									
High protein:									
Oilseed meal--									
Soybean 4/	17,318	18,495	19,317	17,833	20,197	20,805	20,873	21,918	21,772
Cottonseed	1,379	1,026	1,442	1,481	1,239	1,470	1,583	1,285	1,451
Linseed	100	115	127	93	126	112	115	94	102
Peanut	159	103	109	147	112	103	155	162	137
Sunflower	313	269	381	293	271	306	450	397	440
Canola	120	204	219	322	342	353	586	570	775
Total	19,389	20,212	21,595	20,169	22,287	23,149	23,762	24,427	24,678
Animal proteins--									
Tankage and meat meal	2,540	2,395	2,457	2,328	2,320	2,292	2,305	2,158	2,195
Fishmeal and solubles	464	471	353	265	324	249	232	327	272
Milk products	374	398	411	405	418	416	428	413	413
Total	3,377	3,265	3,221	2,998	3,062	2,957	2,965	2,897	2,880
Grain protein feeds--									
Gluten feed and meal	1,055	1,165	1,484	1,289	218	164	795	796	794
Brewers' dried grains	135	146	120	107	108	NA	NA	NA	NA
Distillers' dried grains	873	805	1,035	947	1,027	NA	NA	NA	NA
Total	2,063	2,116	2,639	2,343	1,353	1,287	1,725	1,618	NA
Other:									
Wheat millfeeds	5,278	5,714	5,652	5,717	5,617	5,987	6,210	6,299	6,341
Rice millfeeds	503	610	551	615	554	555	530	548	590
Dried and molasses beetpulp	701	645	699	661	758	1,051	791	1,298	1,136
Alfalfa meal	777	589	554	365	300	333	265	318	340
Fats and oils	765	832	826	943	973	999	878	995	1,012
Molasses, inedible	1,887	1,771	1,598	1,593	1,988	2,168	1,723	1,728	1,724
Miscellaneous byproduct feeds 5/	791	895	976	1,107	1,202	1,248	1,297	1,327	1,324
Total	10,702	11,056	10,856	11,000	11,391	12,341	11,694	12,513	12,468
Grand total	35,531	36,649	38,311	36,510	38,093	39,734	40,146	41,455	40,026

NA = Not available.

1/ Year beginning October. 2/ Adjusted for stocks, productions, foreign trade, and nonfeed uses where applicable. 3/ Forecast.

4/ Includes use in edible soy products and shipments to U.S. territories. 5/ Allowance for hominy feed, oat millfeeds, and screenings.

Appendix table 23--Feed concentrates, number of animal units, and feed per unit, 1985-93 1/

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Million metric tons									
Concentrates:									
Corn	104.5	118.6	121.9	100.1	111.5	118.4	123.9	134.6	123.2
Sorghum	16.9	13.6	14.1	11.8	13.1	10.4	9.5	12.1	11.7
Oats	6.4	5.5	4.5	3.3	4.8	3.7	3.3	3.0	2.7
Barley	7.1	6.0	5.9	4.2	3.9	4.7	5.1	4.1	5.0
Wheat and rye	11.2	11.6	6.0	3.9	8.0	12.8	6.4	4.2	11.0
Oilseed meals	19.4	20.2	21.6	2.2	22.3	23.1	23.8	24.4	24.7
Animal protein feeds	3.4	3.3	3.2	3.0	3.1	3.0	3.0	2.9	2.9
Grain protein feeds	2.1	2.1	2.6	2.3	1.7	0.2	0.8	0.8	0.8
Other byproduct feeds	10.7	11.1	10.9	11.0	11.4	12.3	11.7	12.5	12.5
Total	181.6	192.0	190.7	141.8	179.8	188.6	187.5	198.6	194.5
Grain-consuming animal units (GCAU's):									
Million units									
Dairy cattle	12.5	11.7	11.5	11.4	11.4	11.4	11.1	11.1	10.9
Cattle on feed	18.0	17.3	18.2	17.5	17.8	19.3	18.3	19.5	20.1
Other cattle	4.3	4.2	4.0	4.0	4.0	3.9	4.0	4.1	4.1
Hogs	19.3	19.4	20.8	21.3	20.7	21.0	22.4	22.6	22.1
Poultry	19.8	21.1	21.5	22.0	23.1	23.9	24.5	25.3	26.2
Other livestock	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total	74.5	74.4	76.7	77.0	77.7	80.3	81.0	83.3	84.1
Concentrates GCAU									
Tons per unit									
Four feed grains	1.81	1.93	1.91	1.55	1.71	1.71	1.75	1.8	1.7
All concentrates	2.44	2.58	2.49	1.84	2.31	2.35	2.31	2.4	2.3

1/ Marketing years, 1992/93 forecast.

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- 2016 Feed demand (1-2 pages).
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- 2018 Transportation update (3-4 pages).
- 2019 World coarse grains (2-3 pages).
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## Data Tables:

- 2025 Corn, sorghum, oats and barley: farm price, acreage, production, and yield (1-3 pages).
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- 2040 Animal units, feed concentrates, and processed feeds fed (3 pages).

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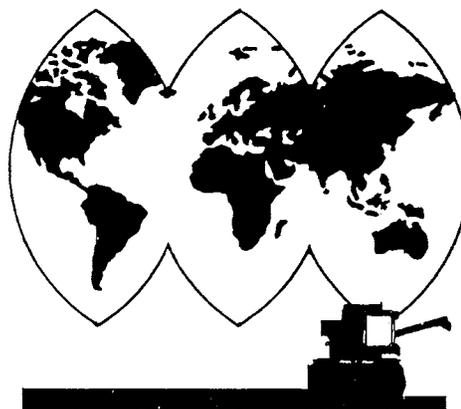
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