Iowa Ag Review

A Publication from the Center for Agricultural and Rural Development, Department of Economics, College of Agriculture

September 1996 | Quarterly | Vol. 2, No. 4

What's Inside?

ISSN 1080-2193
http://www.econ.iastate.edu/card/agreview

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

The Current Situation In Iowa

The Impact of 1996 Weather on Crop Markets

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Every summer the agricultural sector anticipates the harvest and speculates on how much grain will be produced. As time passes, more information is gathered about probable yields, harvested area, and production in the U.S. and the rest of the northern hemisphere. The information this year may be more critical because of the current high crop prices and low stockholding situation.

To provide market information, USDA brings out monthly estimates of crop conditions, production, and use of major crops. These estimates change over time as more information is gathered and made available. For example, the July estimates showed corn production in the U.S. at 9.1 billion bushels, but after surveying the major corn producing states, the estimates were revised downward to 8.7 billion bushels in August, then were bumped up to 8.8 billion bushels in September.

FAPRI analyzed the new crop conditions reported by the USDA in July and a lower production scenario that market experts thought likely. FAPRI's lower production estimate of an 8.8 billion bushel crop of corn turned out to be only 0.3 percent higher than USDA's September estimate. This production of grain crops and updated hog inventory numbers were used for the basis of a short term agricultural outlook update. This three year outlook provides information of the impact on the early season wet weather on U.S. and Iowa agricultural markets.

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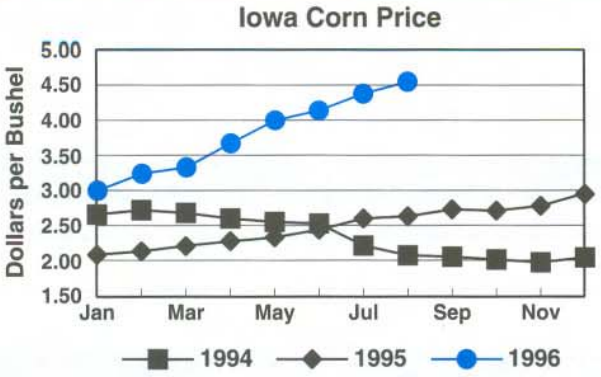
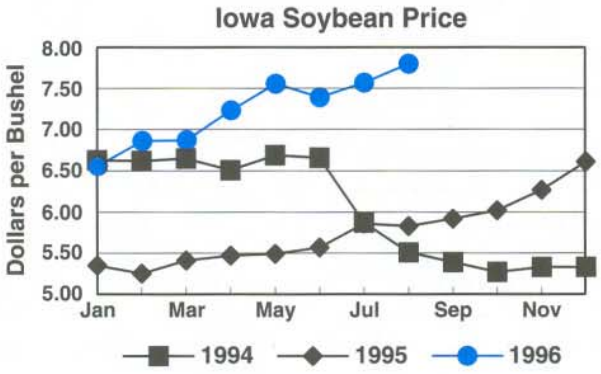
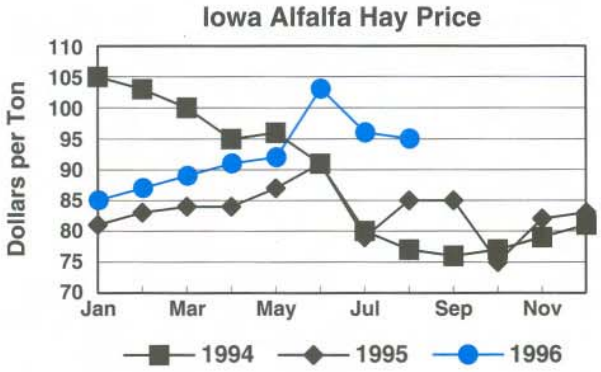
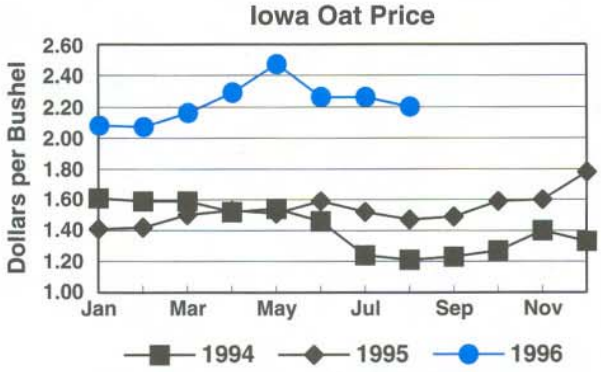








U.S. Crops

With low carry-over stocks, the 1996/97 corn and soybean markets are tight and susceptible to additional yield shocks. Barring an early frost, the U.S. will be facing a crop situation similar to the current scenario shown in Table 1. The wheat estimates do not change as much as corn and soybeans because more information was known about the winter wheat crop when the baseline was developed in early April. Nevertheless, estimated wheat prices for 1996/97 increase by more than 10 percent.

Corn planted area and production are smaller than was earlier anticipated, due to the wet spring planting conditions. Corn production in the current scenario is 457 million bushels below baseline, making a tight situation even tighter. The reduced supply sharply increases the estimated farm level corn price for 1996/97 from $2.75 per bushel to $3.21 per bushel. Exports and domestic use decrease in response to the higher prices. Responding to the higher prices, farmers are expected to plant 2 million more acres of corn in 1997/98 and increase production by 343 million bushels over the baseline. Estimated soybean production for 1996/97 is slightly higher than the baseline, but supply is reduced due to lower carry over stocks this year. The soybean price is also driven higher by feed demand pressures in sympathy with corn prices.

Table 1: Select Effects on United States

	U.S. Corn		
	96/97	97/98	98/99
Production	*(Million Bushels)*		
Baseline	9,289	9,336	9,450
Current Scenario	8,832	9,679	9,381
Change	-457	343	-69
Domestic Use			
Baseline	6,724	6,994	7,079
Current Scenario	6,550	7,078	7,087
Change	-174	84	8
Exports			
Baseline	2,236	2,168	2,201
Current Scenario	2,089	2,130	2,174
Change	-147	-38	-27
Farm Price	*(Dollars per Bushel)*		
Baseline	2.75	2.46	2.31
Current Scenario	3.21	2.43	2.33
Change	0.46	-0.03	0.02

Table 1: Select Effects on United States Crops (continued)

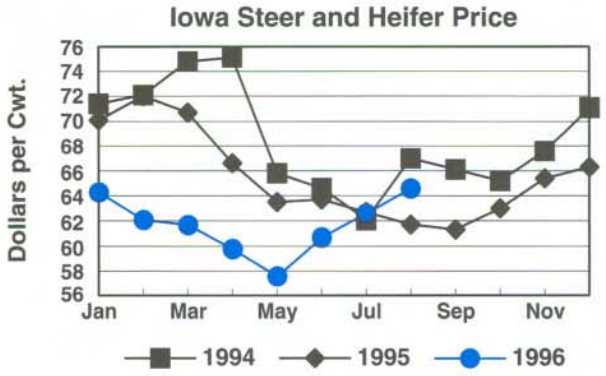
U.S. Soybeans	96/97	97/98	98/99
Production	*(Million Bushels)*		
Baseline	2,292	2,344	2,428
Current Scenario	2,383	2,496	2,695
Change	91	152	267
Domestic Use			
Baseline	1,465	1,507	1,556
Current Scenario	1,467	1,494	1,567
Change	2	-13	11
Exports			
Baseline	808	805	804
Current Scenario	794	799	802
Change	-14	-6	-2
Farm Price	*(Dollars per Bushel)*		
Baseline	6.50	6.26	5.74
Current Scenario	7.31	6.57	5.66
Change	0.81	0.31	-0.08

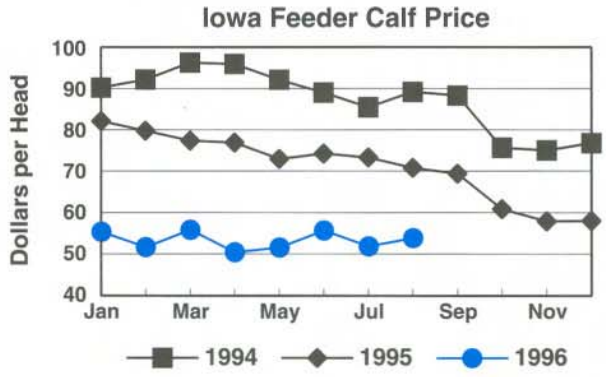
U.S. Wheat	96/97	97/98	98/99
Production	*(Million Bushels)*		
Baseline	2,363	2,443	2,439
Current Scenario	2,263	2,469	2,516
Change	-100	26	77
Domestic Use			
Baseline	1,252	1,319	1,315
Current Scenario	1,248	1,368	1,365
Change	-4	49	50
Exports			
Baseline	1,087	1,131	1,215
Current Scenario	1,047	1,097	1,205
Change	-40	-34	-10
Farm Price	*(Dollars per Bushel)*		
Baseline	3.78	3.37	3.43
Scenario	4.25	3.55	3.40
Change	0.47	0.18	-0.03

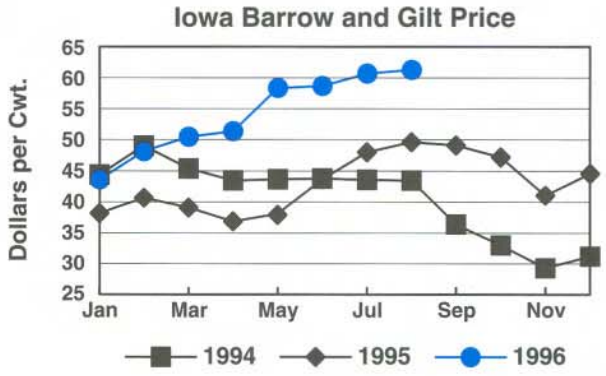
U.S. Livestock

The U.S. livestock industry is affected by the high feedgrain prices. Pork production falls even though the industry is receiving higher barrow and gilt prices (Table 2). The relatively high feed prices more than offset the higher market prices for hogs.

Production falls as hog inventories decline in response to high feed costs. Higher prices and lower supplies reduce domestic consumption and especially exports. The impact of the current scenario on beef is very small. The U.S. beef price appears to be at the bottom of the market cycle in 1996 instead of 1997, as in the baseline. Liquidation of some of the breeding herd due







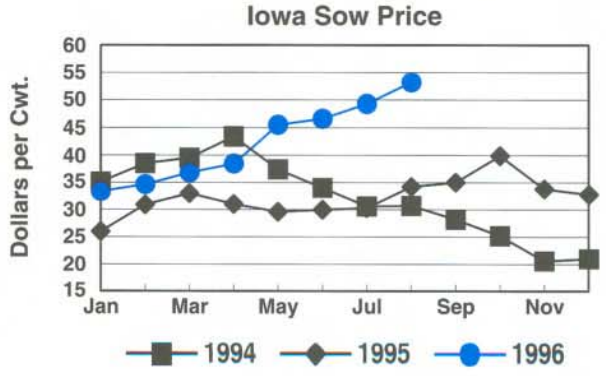


Table 2: Select Effects on United States Livestock.

U.S. Pork	1996	1997	1998
Production	*(Million Pounds)*		
Baseline	18,051	18,949	19,092
Current Scenario	17,229	17,207	17,745
Change	-822	-1,742	-1,347
Use			
Baseline	18,715	19,002	19,657
Current Scenario	17,824	17,801	18,307
Change	-891	-1,201	-1,350
Barrow & Gilt Price	*(Dollars per Cwt.)*		
Baseline	46.00	47.70	45.13
Current Scenario	51.91	53.24	49.30
Change	5.91	5.54	4.17

U.S. Beef	1996	1997	1998
Production	*(Million Pounds)*		
Baseline	25,917	26,674	26,474
Current Scenario	25,813	26,387	26,435
Change	-104	-287	-39
Use			
Baseline	28,038	28,761	28,613
Current Scenario	27,914	28,400	28,509
Change	-124	-361	-104
Nebraska Direct Steers	*(Dollars per Cwt.)*		
Baseline	63.82	62.18	68.35
Current Scenario	63.37	63.98	65.67
Change	-0.45	1.80	-2.68

to the high feed prices slightly reduces production for the remainder of the period. Prices pick up in 1997 but grow at a slightly slower rate thereafter.

Iowa Impacts

The short-run impact on Iowa due to this year's weather appears to be positive in the crop sector. Iowa farmers would have had gross market receipts of $11.4 billion under the April baseline projection, which are now projected to be over $12.4 billion for 1996/97. The $1 billion increase in receipts is evenly divided between crops and livestock (Table 3).

Low carry-over stocks and high prices due to solid demand have set the stage for either a good or a bad 1996 crop year depending on whether one is buying or selling the high priced crops. One thing that can be said about this situation, it is volatile. The lower production expectations due to the weather this year has had a measurable impact on the markets for the next three years. Even so, crop markets could receive another jolt this fall if there should be an early frost. ◆

Table 3: Select Effects on Iowa Agriculture.

Cash Receipts	FY96/97	FY97/98	FY98/99
Crops	*(Million Dollars)*		
Baseline	5,856	5,688	5,457
Scenario	6,348	6,134	5,486
Change	493	446	28
Livestock			
Baseline	5,513	5,402	5,170
Scenario	6,063	6,106	6,008
Change	549	704	838

Iowa Corn	96/97	97/98	98/99
Planted Area	*(Thousand Acres)*		
Baseline	12,500	12,888	12,808
Scenario	12,700	12,585	12,803
Change	200	-303	-5
Production	*(Million Bushels)*		
Baseline	1,645	1,711	1,742
Scenario	1,600	1,673	1,741
Change	-45	-38	-1
Farm Price	*(Dollars per Bushel)*		
Baseline	2.71	2.43	2.43
Scenario	3.17	2.40	2.41
Change	0.45	-0.03	-0.02

Iowa Soybeans	96/97	97/98	98/99
Planted Area	*(Thousand Acres)*		
Baseline	9,400	9,480	9,844
Scenario	9,500	9,579	9,753
Change	100	99	-91
Production	*(Million Bushels)*		
Baseline	409	412	436
Scenario	425	417	432
Change	16	5	-4
Farm Price	*(Dollars per Bushel)*		
Baseline	6.44	6.20	5.69
Scenario	7.23	6.50	5.62
Change	0.79	0.30	-0.07

Iowa Hogs	1996	1997	1998
Breeding Hogs	*(Thousand Head)*		
Baseline	1,393	1,603	1,852
Scenario	1,482	1,579	1,762
Change	89	-24	-64
Market Hogs			
Baseline	12,544	12,687	13,639
Scenario	11,852	11,924	12,591
Change	-692	-763	-1,049
Barrow & Gilt Price	*(Dollars per Cwt.)*		
Baseline	45.24	43.33	38.53
Scenario	50.37	50.96	46.75
Change	5.13	7.64	8.22

Iowa Farm Economic Indicators

Iowa Cash Receipts

	January — May		
	1996	1995	1994
	(Million Dollars)		
Crops	2,667	2,104	1,460
Livestock	2,257	2,293	2,322
Total	4,923	4,396	3,782

Average Farm Prices Received By Iowa Farmers

	August 1996	July 1996	August 1995
		($/Bushel)	
Corn	4.55	4.38	2.63
Soybeans	7.80	7.57	5.83
Oats	2.20	2.26	1.47
		($/Ton)	
Alfalfa	95.00	96.00	85.00
All Hay	90.00	93.00	81.00
		($/Cwt.)	
Steers & Heifers	64.60	62.60	61.70
Feeder Calves	53.90	51.90	70.80
Cows	30.70	30.70	36.10
Barrows & Gilts	61.30	60.70	49.60
Sows	53.20	49.30	34.20
Sheep	27.30	23.50	27.00
Lambs	101.00	105.00	85.70
		($/Lb.)	
Turkeys	0.48	0.47	0.42
		($/Dozen)	
Eggs	0.55	0.49	0.37
		($/Cwt.)	
All Milk	15.30	14.30	12.40

World Stocks-to-Use Ratios

	Crop Year		
	1996/97 August Projection	1995/96 August Estimate	1994/95
		(Percent)	
Corn	9.90	9.95	15.15
Soybeans	10.58	10.39	14.29
Wheat	16.20	15.86	17.84

CARD/FAPRI Analysis

The EU Export Tax: Impact on U.S. Markets

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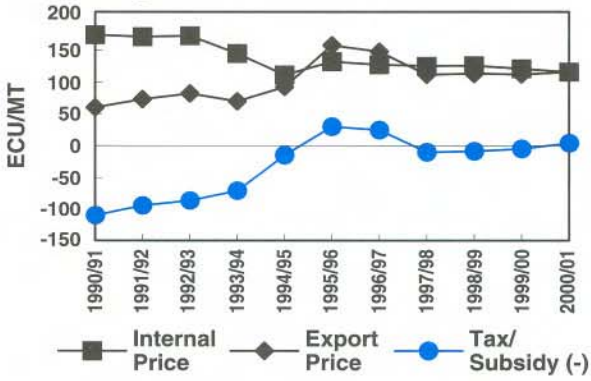
In response to high world grain prices, the European Union (EU) introduced wheat export taxes in November 1995 for the first time in more than a decade. Normally, the EU offers export subsidies to make up the difference between their high internal grain prices and world market prices. However, EU internal support prices have been reduced over the last three years as a result of policy reforms. Recent high world grain prices have exceeded the EU support prices since early in the 1995/96 crop year. Rather than let internal prices follow world market prices upward, the EU decided to protect its domestic grain users and levy an export tax to prevent internal prices from rising to world levels (Figure 1). The major impacts of this tax were to reduce EU wheat production and exports from what they would have been without the tax, reduce internal grain prices, and increase wheat feed use. These changes directly impact the U.S. and world wheat markets and indirectly influence feed grain markets.

Figure 1: EU Wheat Tax and Prices



CARD analyzed the impacts of the export tax, assuming that it would continue into the new crop year at a slightly lower level than in 1995/96. The reduced exports and wheat production from the EU increases demand for the exports of the U.S. and other countries and raises world wheat prices to a level higher than they would have been without the EU export tax (Table 1). In both crop years it is estimated that the U.S. wheat farm price is 11 to 12 cents per bushel higher as a consequence of this export tax.

The impact on feed grains and U.S. corn markets is brought about primarily through the substitution of wheat for feedgrains in animal feed and a marginal shift of planting from wheat to feed grains in the EU. This indirect effect is rather small and is estimated to have no significant effect on U.S. corn price in the current crop year and a very small price reduction in 1996/97.

Table 1. Impacts of the EU Wheat Export Tax

	1995/96	1996/97
Wheat	*(1,000 Metric tons)*	
EU Production	0	-2546
EU Feed Use	1886	1323
EU Net Exports	-1850	-3840
U.S. Net Exports	1045	1585
Feedgrains		
EU Production	0	1398
EU Feed Use	-1152	-662
EU Net Exports	498	1864
U.S. Corn Net Exports	-339	-897
FOB U.S. Gulf Price	*($/Metric ton)*	
Wheat	4.96	5.08
Corn	-0.20	-1.57
U.S. Farm Price	*($/Bushel)*	
Wheat	0.11	0.12
Corn	-0.00	-0.04

As grain prices return to normal levels in 1997/98 and beyond, it is expected that the EU will remove the export tax and revert to the use of export subsidies whenever world prices fall below domestic support levels. These kinds of policies are a typical example of a country trying to stabilize its internal prices at the expense of creating more instability externally. In this case, the EU action to stabilize its domestic wheat price has caused world market and U.S. prices for wheat to be even more unstable. ◆

Agriculture's Next Ten Years: 1996 Iowa Baseline

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CARD's *Iowa Outlook 1996-2005* consists of benchmark numbers used to determine how agricultural policies at the federal level affect local Iowa farmers. The ten-year projections represent a composite of model results and judgments regarding future Iowa, U.S., and international crop and livestock production, consumption, trade and prices. The baseline results are not a forecast, but rather represent a scenario conditional upon Iowa, U.S., and international macroeconomic assumptions and continuation of current agricultural policies.

The Iowa results are based on the FAPRI 1996 U.S. and International baseline results (See the June 1996 issue of the *Iowa Ag Review*) and updated for recent crop and livestock developments. Here are some key factors of the analysis:

Corn

With a 7.5 percent ARP rate and unfavorable c[illegible] conditions in 1995/96, corn planted area had dropped to 11.7 million acres. With no ARPs in the FAIR Act and larger flexibility in planting decisions, planted area increased to 12.5 million acres in 1996/97 and is expected to continue rising the next two years. A record yield of 152 bushels per acre in 1994/95 and a lower than normal yield of 121 bushels per acre in 1995/96 sets the stage for this year.

Iowa corn yield is projected to be 129 bushels per acre in 1996/97 and then grow steadily to 151.6 bushels per acre by 2005/06. Coming off the record high production of 1.9 billion bushels in 1994/95, Iowa posted a 1.5 billion bushel crop last year.

Iowa corn production is currently expected to be 1.6 billion bushels in 1996/97 and grow steadily to 1.8 billion bushels by 2005/06. High prices were the hallmark of the 1995/96 crop year with corn farm price averaging $3.10 per bushel. Corn price for 1996/97 is expected to be $3.21 per bushel if average weather conditions hold for the rest of the growing season.

With the new farm bill changing the government program structure to decoupled payments, a change occurs in attributing the payments to the net returns. Net returns rise from $212 per acre in 1995/96 to $249 per acre in 1996/97 due to strong farm prices. Costs of production continue to rise steadily throughout the period. With increased production and lower prices in 1997/98, net returns fall off by just under $80 per acre. Prices and yields increase in the later years causing net returns to increase to $183 per acre by 2005/06.

Soybeans

Soybean planted acreage in Iowa broke 9 million acres for the first time in history last year. The current estimate of 1996/97 planted area is 9.5 million acres. Planted area is projected to continue growing due to the relatively higher soybean over corn net returns and

also the net returns benefit when a corn-soybean rotation is used. The outlook for soybean area is to break 10 million acres by 2000/01 and plateau at 10.2 million acres throughout the remainder of the period.

Average soybean yield in Iowa last year was 43.0 bushels per acre, slightly below the trend yield of 43.3 bushels per acre. The trend yield indicates 43.7 bushels this year and 48.3 by the year 2005/06. The yield and area interact for an expected production of 425 million bushels this year, up from 401 million bushels in 1995/96. Production is expected to be over 450 million bushels by the turn of the century with a slow rise to 480 million bushels by the end of the baseline.

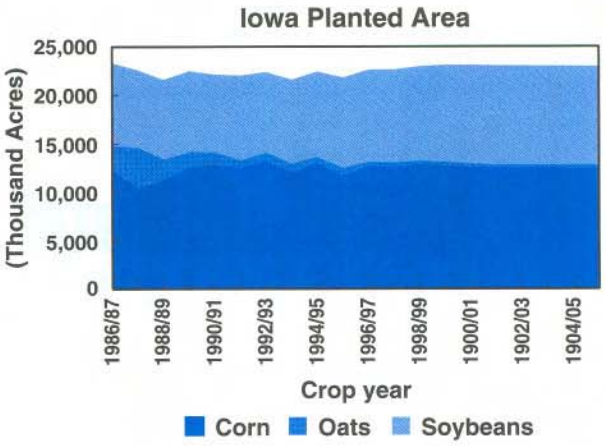
Low world stocks and strong demand for many grains and oilseeds have led to strong soybean prices. The season average price estimates for Iowa are at $6.75 per bushel in 1995/96 and $7.23 in 1996/97. As production and stocks return to normal weather levels, the projected prices fall to a low of $5.50 in 2000/01 before they rebound to $6.24 by 2005/06. Soybean net returns show surprising strength relative to corn and range from $242 per acre in 1997/98 to a low of $170 per acre in 2001/02, but rebound back to $208 by the end of the period.

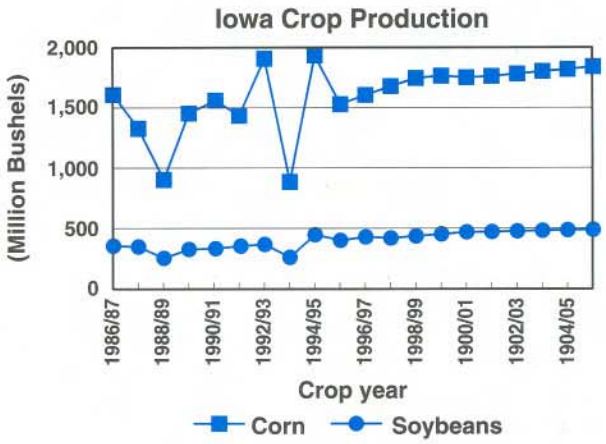
Hogs

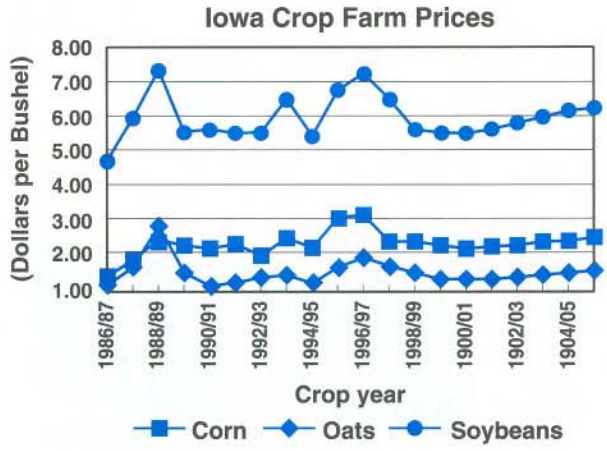
The situation for the Iowa pork industry remains relatively stable but cyclical. Cycle peaks are projected in 1997 and 2000. Barrow and gilt prices are projected to be above $48 per hundredweight for both of those years. Increasing production brings projected prices to another low point in 2003, before the cycle changes and prices approach $45 by the end of the period.

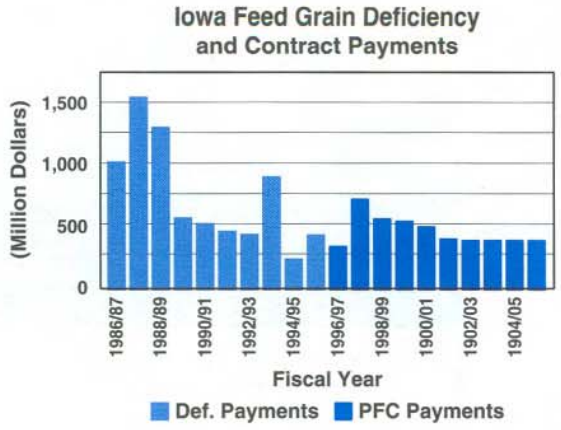
Income

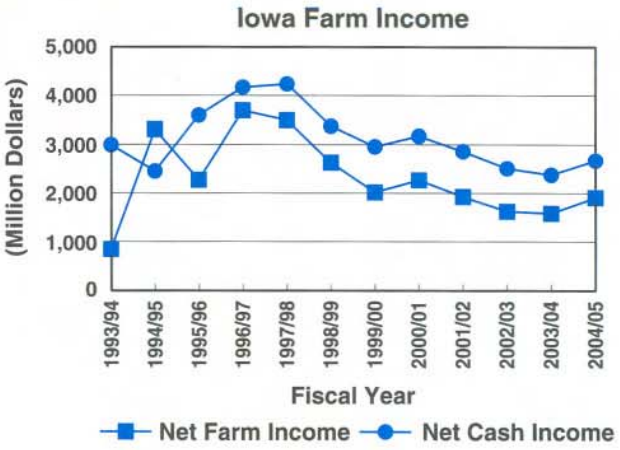
Iowa crop and livestock receipts will both break $6 billion in 1996 for the first time in history. Also for the first time crop receipts in 1996 exceed livestock receipts in Iowa. When crop prices begin to fall in the U.S. in 1998, receipts in Iowa for crops will dip below $6 billion, but are projected to rebound by the end of the period. Livestock receipts continue to hover around the $6 billion level. Net cash income peaks this year at $4.2 billion because of high crop and hog prices. Compared to an average of $2.2 billion the last three years, net farm income also peaks this year at $3.7 billion and then is projected to gradually return to the $2 billion level by 1999 and after. ◆

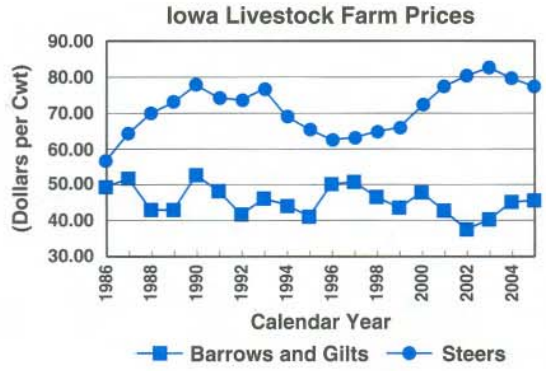


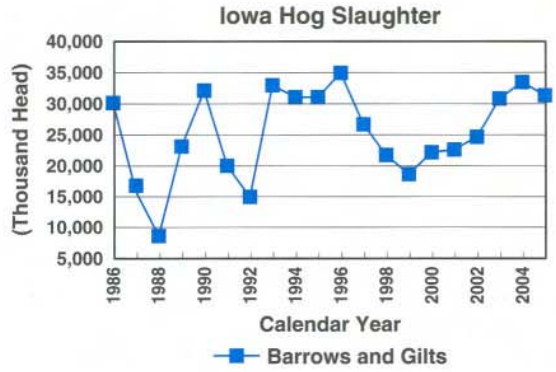


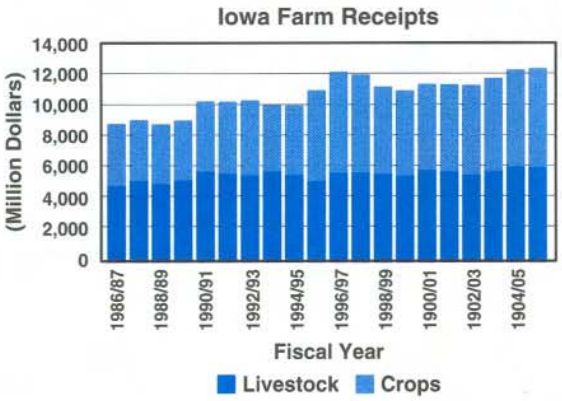












Would Revenue Insurance Have Paid During the 1993 Flood?

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This year has seen the emergence of two new crop revenue insurance products: Income Protection (IP) and Crop Revenue Coverage (CRC). With emphasis on revenue, the new products depart from traditional multiple-peril crop insurance (MPCI), that provides protection only against yield shortfalls.

One way to make comparisons of traditional and new products is to see how they would have performed over the recent past. In this article, performance of these three insurance packages for Iowa corn over the period of 1988 to 1994 is examined. Effectively, if revenue insurance had existed in the late 1980s and early 1990s, how would expected indemnities have compared with MPCI?

The data includes yield records of farms that insured corn through federal-sponsored crop insurance from 1985 to 1994. This data was made available by the Federal Crop Insurance Corporation. Only non-irrigated farms with an average insured corn acreage above 25 acres are covered in this research. Also, only selected farm records from counties in which there were at least 50 farms in the data set are included. Thus, the data consists of a select group of Iowa corn farms. To test how this impacts the study, MPCI results were compared with the actual Iowa corn MPCI performance over the period.

The price data used in this study are the actual prices that would have been incorporated into the revenue

insurance packages. The MPCI price elections are based on the maximum price elections allowed each year. Insurance performance is measured here by the average per acre indemnity under each of the products. The actual performance history (APH) yields for the farms are determined by the average corn yield of the farm over previous years. For example, the 1988 APH yield is the average of 1985-87 yields and the 1994 APH yield is the average of 1985-93 yields.

The price and yield data employed in the analysis are summarized in Table 1. The yield shortfall represents the average difference between a farm's APH and actual yields for the given year. A negative yield shortfall indicates that actual yield is above the APH yield. All figures presented are state averages of the farm-level variables. The yield data shows two low-yield years (due to the 1988 drought and the 1993 flood) and two high-yield years (1992 and 1994). The February and November monthly average Chicago Board of Trade (CBOT) settlement prices of the December corn futures contract are used in the revenue insurance calculations. In all years except 1988 and 1993, the February price is higher than the November price. This price pattern plays a very important role in the presented ranking of these products.

Table 1: Price and Yield Data

Year	Feb Price of CBOT Dec Corn Contract	Nov Price of CBOT Dec Corn Contract	MPCI Max Price Election	Iowa Corn Yield Shortfall
	($/bu)	*($/bu)*	*($/bu)*	*(bu)*
1988	2.17	2.69	2.00	46.3
1989	2.71	2.38	2.60	3.8
1990	2.47	2.26	2.30	-3.5
1991	2.59	2.43	2.30	1.1
1992	2.70	2.12	2.30	-34.4
1993	2.40	2.74	2.30	49.2
1994	2.68	2.16	2.40	-34.8
Average	2.53	2.40	2.31	4.0

The calculated average per acre indemnities computed in the study and the actual reported MPCI per acre indemnities are reported in Table 2. The yield coverage level assumed in the analysis is 70 percent. The actual MPCI figures represent per acre indemnities at roughly the 68 percent coverage level which is the average coverage over the period. Given the assumptions, this study's calculated numbers compare rather well with the actual MPCI indemnities. Thus, it seems the select sample has not severely biased these results.

Table 2: Average Per Acre Indemnities for Iowa Corn

Year	Computed CRC Indemnity	Computed IP Indemnity	Computed MPCI Indemnity	Actual MPCI Indemnity
	($/acre)	*($/acre)*	*($/acre)*	*($/acre)*
1988	45.59	23.20	33.33	28.72
1989	11.21	11.80	7.81	6.97
1990	2.27	2.39	1.68	2.23
1991	4.26	4.48	3.01	5.69
1992	1.02	1.07	0.43	1.36
1993	48.49	32.80	42.85	39.40
1994	1.06	1.12	0.60	0.45
Average	15.84	10.98	12.82	12.12

Two clear patterns can be seen in the tables. In extremely low yield years (1988 and 1993), IP pays out the lowest indemnities followed by MPCI and CRC, respectively, and the difference in payout is substantial: between $10 and $20 per acre. These years also correspond with the years where the corn price increased throughout the growing season. In years where yields are near or above average, MPCI pays out the lowest indemnities followed by CRC and IP, respectively. Even so, averages of indemnities by insurance type are strongly dominated by the low-yield years. Overall, IP has the smallest average indemnity and CRC has the largest.

These results can be partially explained by looking at the specifics of each insurance product. The CRC and IP revenue insurance packages use the same initial market prices in their computations. The differences lie in the percentage of price used (95 percent for CRC versus 100 percent for IP) and which price is employed in the revenue guarantee (the maximum of the February and November CBOT prices for CRC and the February CBOT price for IP). In every case, the MPCI price election is below these prices. Also, in years of near average or above average yields, corn prices have fallen during the growing season. Thus, the corn price under MPCI is the lowest, followed respectively by CRC and IP. This price behavior directly impacts the per acre indemnity estimates.

In 1988 and 1993, yields were sharply below average and corn prices rose throughout the growing season. CRC's use of the maximum of the two market prices pushed its corn price well above the IP corn price. This helped elevate CRC indemnities above those of IP in 1988 and 1993. Also, since the November CBOT

corn price was higher than the February price, the price gain helped offset some yield losses enough to drop IP indemnities below those for MPCI. This illustrates that an IP type of revenue insurance may pay lower or higher indemnities than yield insurance, depending on market conditions and intra-year price movements. A CRC insurance, with replacement cost coverage and a two-tiered price structure, generally pays at or above MPCI.

This article provides an historically based examination of the indemnity performance of the two new revenue insurance products, Crop Revenue Coverage and Income Protection. The study poses the question: if these products had existed in the recent past, how would they have performed? Their likely performance was also compared to that of traditional yield insurance. The results are that the indemnity structure for these packages varies from year to year, but distinct patterns can be discerned coinciding with realized yields. Even though this analysis is based on historical data, the patterns displayed should shed light on the future performance of these products. It is hoped that this information, along with a farmer's knowledge about his/her risk structure and insurance premium information, can provide guidance in selecting the most appropriate crop insurance product. ◆

Special Articles

Will Freedom to Farm Harm the Environment?

Bruce A. Babcock, 515/294-5764

While the effects of the new farm program vary dramatically by location, overall environmental effects from the new legislation are small (primarily because key environmental provisions were continued in the new farm bill). This conclusion appeared in a recent study (*RAPS 1996: Agricultural and Environmental Outlook*) conducted by researchers at the Center for Agricultural and Rural Development (CARD), Iowa State University.
Researchers who examined the likely environmental impacts of the new farm legislation believe their conclusions will help dispel the worry that increased farmer freedom might lead to increased environmental degradation.

The first task for researchers was to evaluate how farming practices will change with the new farm legislation. Farming strategies, including how farmers till their land, rotate their crops, and use soil conservation practices, have a large impact on indicators of environmental quality. The CARD environmental outlook study examines the likely effects of the new farm program on five indicators of environmental quality in a 12-state region of the Upper Midwest, ranging from Kansas in the southwest to North Dakota in the north, and Ohio in the east. The five indicators are: wind and water erosion rates, nitrate-nitrogen lost to surface runoff and leaching, and the level of soil organic carbon, which serves as a broad indicator of soil health.

Under the 1996 farm legislation, we should expect farmers to plant fewer acres in crops that received large subsidies from the old program, and more acres in crops, such as soybeans, that did not. But the old farm program also restricted how much of these crops a farmer could plant. So the government was encouraging production with its subsidies and discouraging production with the accompanying planting restrictions.

Under the old program, the government further restricted production with the Conservation Reserve Program (CRP), which pays farmers to not plant crops on environmentally sensitive acreage. The new program allows many farmers to take their land out of the CRP and grow crops on it. The projected net effect of removing planting restrictions, allowing farmers to plant their CRP land, and eliminating crop subsidies is that farmers in the Upper Midwest will plant more corn, wheat, and soybeans, but less barley and oats.

Logically, increased acreage of corn, wheat and soybeans should lead to increased use of fertilizer, higher levels of soil erosion and, because of the conversion of CRP land, lower rates of soil organic carbon. That is, environmental damage from agriculture should increase under the new farm program. However, there are certain countervailing forces at work which will help reduce the environmental damage.

For example, farmers who receive the fixed government payments must continue to follow their Conservation Compliance plans, and these plans can substantially reduce soil erosion rates on susceptible lands while simultaneously lowering farmers' costs. Moreover, all land removed from CRP must be cropped according to an approved plan. These provisions should help limit increases in soil erosion rates.

Farmer decisions play a role as well. Now that they no longer have an incentive to grow crops that receive heavy subsidies, farmers should respond to the new farm program by increasing their use of crop rotations.

In general, crop rotation reduces average chemical use, increases yield, and can reduce soil erosion rates. For example, corn acreage is projected to increase, but so too is the proportion of corn planted in a corn-soybean rotation. Such a rotation actually reduces nitrogen fertilizer applications, and a corn-soybean rotation encourages adoption of no-till systems, which also reduces soil erosion. Thus, the net environmental effects of the new farm program are not easy to estimate.

Results from the CARD study indicate large regional and intra-regional differences in the net environmental impact of the new farm legislation. For example, water erosion rates are projected to increase modestly by an average of about 4 percent over 1992 rates in the 12-state region. But in the Cornbelt states of Illinois, Indiana, Iowa and Missouri (which contain most of the highly erodible land), erosion rates are projected to increase by an average of less than 2 percent.

These averages mask large projected changes within the states. Erosion rates in parts of southern and western Iowa, southeastern Wisconsin, and northwestern Missouri — areas that are prone to high erosion rates — are projected to increase by 10 to 40 percent. These increases are countered by significant decreases in erosion rates in some major crop producing areas of northern Iowa and southern Missouri, southern Kansas, eastern Illinois, and Indiana. The geographical disparity in erosion rates illustrates the different forces at work in determining soil erosion rates.

Tillage practices are projected to move towards soil-saving, reduced, and no-till practices, and away from traditional fall and spring tillage in all regions. In areas that are not prone to high erosion rates, such as the major production areas just mentioned, this movement more than offsets the soil erosion increases from reduced CRP land and increased crop acreage. In other areas, the movement toward reduced tillage is not enough to counter the forces that increase soil erosion.

Changes in the other environmental indicators also show large regional and intra-regional differences. Average wind erosion rates are projected to decrease by more than 3 percent across the 12-state region. But, much of the decrease in average rates is a result of increased adoption of conservation practices and greater use of high-residue management in the Cornbelt and Lake States, two regions that are not susceptible to wind erosion. The average wind erosion rates in North and South Dakota, Nebraska, and Kansas, are projected to increase by about 2 percent, in part because of the increased use of summer fallow in some wheat-growing areas.

Nitrogen fertilizer use is projected to increase by 15 percent in the 12-state region because of additional corn and wheat acreage. But, because of projected increases in soybean-based rotations, the projected increase is smaller than what might be expected given the increased corn and wheat acreage. Will increased nitrogen use lead to more nitrate runoff and leaching? The relationship between nitrogen applications and nitrogen loss is too complex to make such an unqualified conclusion. Management and land conditions both play a critical role in determining nitrate losses.

The CARD study projects a small decrease in per-acre loads even with the increase in nitrogen fertilizer applications. Average nitrate runoff rates meanwhile, are projected to decrease by about 14 percent below the 1992 level. These surprising results are due to two factors. First, projected changes in crops and crop locations are favorable in terms of matching high fertilizer-using crops to areas where runoff and leaching are less of a problem. Second, continued enforcement of Conservation Compliance results in reduced nitrate runoff that is associated with high water erosion rates.

Continuation of Conservation Compliance under the new program is also responsible for a projected decline in the rate that soil carbon is lost to the atmosphere. Under a continuation of 1992 practices, 14.8 terra grams of soil organic carbon would be lost annually. Under the new farm bill, projected annual losses are reduced by about 30 percent in the Cornbelt, 26 percent in the Lake States, and by about 7 percent in the Northern Plains.

CARD's findings support the idea that agriculture's impact on the environment depends upon complex interactions between government policy, farmer decisions, and land and climate characteristics. Good estimates of the environmental effects of the major change in agricultural policy that occurred this past spring can only be obtained by carefully tracking farmer decisions and the resulting environmental changes at many locations in the region.

RAPS 1996: Agricultural and Environmental Outlook, which includes many full-color maps showing the location of environmental changes, can be viewed on the World Wide Web at this address:

http://www.ag.iastate.edu/card/RAPS ◆

Emerging Issues

Iowa Farming: Evolving Risk and Risk Management

John D. Lawrence, 515/294-6290
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A prominent Iowa row-crop producer recently commented, "There isn't much risk to crop farming in Iowa today."

Considering the floods of 1993, below normal yields in 1995, the changes in the federal farm income safety net, not to mention recent price volatility, this statement sounds odd at first glance. However, given the variety of marketing and risk management tools available, and the existing market conditions, midwestern farmers who manage carefully can hedge a great deal of short run risk in a cost effective manner. Alternatively, livestock producers may be finding increasing risk due to volatile feed costs and weak market conditions.

In this column we delineate basic risk management approaches, discuss how changes in market conditions affect performance of management instruments, and provide a summary overview of what the future might hold.

Risk Management Instruments

Whereas economic theory has a focus on profit maximization, a sound risk management approach involves optimization. This means that enterprises accept a slightly lower profit in return for hedges against catastrophic events. For example, crop yield insurance is not usually purchased to increase or maximize profits, but to hedge against unusual events such as droughts and floods. The premium paid reduces expected income, but it also reduces financial uncertainty.

Alternatively, the objective of speculative activities is to enhance income, as opposed to reducing risk. Some of today's marketing tools employed, ostensibly, as risk management instruments have the potential to increase rather than decrease financial risk. Some hedge to arrive contracts and futures-market positions are examples of tools that have the potential, possibly a high potential, for adverse risk-increasing side effects. Arguably, the intermingling of speculative and hedging activities underlies recent problems associated with hedge-to-arrive contracts. Thus, a sound management plan would, at least implicitly, structure risk-management tools differently than tools to increase profit.

For financial optimization purposes, "pure" risk reducing tools can be delineated from those that also aim to increase or maximize profit. Examples of pure risk reducing tools are federal crop insurance (hedge-for-yield reductions), commodity price options (hedge-against-adverse-price movements), and revenue insurance (hedge-for-revenue reductions whether yield or price induced). With these tools there is a known cost associated with risk hedges, and the financial obligations are clearly defined.

Tools and strategies that attempt to maximize gains are not, generally, efficient risk management tools, as the degree to which risk has actually been reduced (or possibly increased) can be difficult to define. Also, the actual cost of risk management may be difficult to predict, as this will vary depending on final market conditions and ending contract settlements. An important guiding principle is that a financial tool cannot both maximize gains and reduce uncertainty — this contradiction is responsible for many failures attributed to financial instruments.

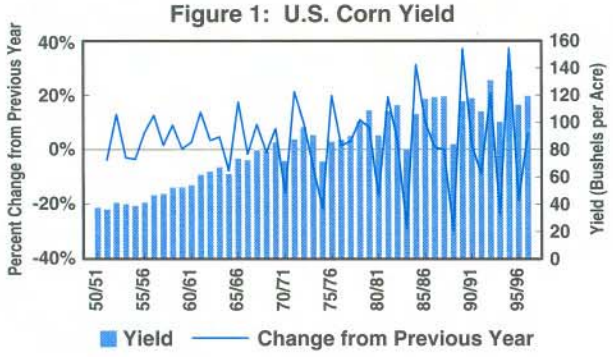
Current Market and Policy Situation

As stated in previous editions of the *Iowa Ag Review*, the extremely low world stockholding situation has significantly affected feed grain and soybean price behavior. Prices are expected to be more volatile and more responsive to yield shocks throughout the growing season, especially with regards to yield shocks in major producing regions.

In other words, for any given change in expected average U.S. yield, prices will adjust more rapidly than historical behavior might indicate. Also, because realized average U.S. yield is tending to be more and more dominated by yield changes in the major producing regions, the correlation between changes in expected corn-belt yields during the growing season and market price movements over the same period is expected to increase.

Yield variability is also on the rise. As actual yields have increased over time, the potential effects on average U.S. yield of a severe drought, flood, or disease has also increased. This is demonstrated in U.S. corn yield in Figure 1.

Figure 1: U.S. Corn Yield



Thus, now and in the future, not only is the price reaction to a given yield shock greater than what has been observed over most of this century, but the yield shocks themselves have been increasing in size. This implies that volatility of speculative intruments, because they depend on yield and price movements, is now greater than previously under a much different market environment.

The bottom line is that for Midwestern corn and soybean producers, careful use of today's marketing tools is required. Short run revenue risk can be managed, even though both yield and price volatility are continuing to increase, however, as long as pure risk management tools are utilized.

Implications for Livestock Producers

The record high corn prices of 1996 have reduced profits for livestock and poultry producers. In response, Iowa cattle and hog producers have reduced production while the state's poultry production has been less effected. Cattle feeding has been relatively unprofitable since 1993 due to large beef supplies and low cattle prices, but the higher corn prices increased feedlot losses. Feeder cattle placements in leading states during the second quarter were down 21 percent from the previous year, falling to one of their lowest levels in 20 years.

While placement rates into Iowa's larger feedlots were comparable to other states, there is reason to believe that smaller farmer-feeders reduced their feedlot inventories. The lower than expected feedlot returns and higher feedlot cost of grain has caused cattle feeders to bid less for feeder cattle. Cow herds suffered very large losses on 1995 calves and are expected to show losses on the 1996 calf crop as well. However, beef herd liquidation has begun and cow herd profits will return in future years.

Unlike cattle producers, hog producers thus far in 1996 have earned small profits in spite of higher feed costs thanks to the highest hog prices since 1990. However, some producers are reducing their breeding herds. Iowa's breeding herd on June 1996 was 13 percent below June 1995 compared to a 2.5 percent average decline in the remaining 49 states.

Most of Iowa's cattle and hogs are produced on diversified grain and livestock farms where farmers have the option of selling the livestock or selling the grain at the current higher prices. As a result, Iowa's feedlot and hog inventories have declined more than other leading states.

Over time, increased grain and feed price variability will place a greater premium on risk management strategies for livestock producers. The greater risk in grain, and likely in livestock prices, is expected to produce greater profit opportunities for well-managed operations. However, feeder pig and feeder cattle producers whose selling price is inversely related to feed costs will be particularly vulnerable to volatile grain prices.

For decision-making analysis, producers providing their own feed needs should determine a consistent procedure for pricing grain sold from the crop enterprise to the livestock enterprise. For example, is the grain priced at harvest, when used, or at cost of production? Livestock producers purchasing their feed should develop a strategy for dealing with greater price risk. Such strategies include integrating back into grain production, increased grain storage, contracting for feed, or the use of grain futures and options.

A commonly used strategy by many Iowa diversified farms is to retain the flexibility to shut down the livestock enterprise when grain prices are high and use livestock to add value to produced grain when grain prices are low. A smaller and decreasing segment of the livestock industry has this flexibility. As a result, Iowa livestock inventories — particularly feedlots — may fluctuate more in the future. While this strategy can be profitable for the producer, it places a greater burden on allied industries that carry extra capacity which may be underutilized at times.

Strategies to manage increased risk associated with greater grain price and probable livestock price volatility will be important for Iowa livestock producers. Those producers buying grain will face increased profit risk resulting from fluctuating grain prices. ◆

How Iowa Stacks Up Under the 1996 Freedom to Farm Payments

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Production Flexibility Contract (PFC) acres enrolled for fiscal year (FY) 1996 were released by USDA on August 19, 1996. From these data, and what we know about the payment stream, we calculated the payment rates by bushel, acre, and state. Total payments by state under the 1996 FAIR Act were also calculated. These figures provide a comparison by state and commodity.

Iowa had the fifth highest enrollment rate with 99.4 percent of the eligible acres enrolled. North Dakota led the nation with 99.7 percent enrolled and Pennsylvania had the lowest at 91.6 percent. The highlights of selected states are in Table 1. Iowa ranks third in total payments at $346 million, behind Texas ($513 million) and Kansas ($429 million).

Table 1: Estimated PFC payments, selected states.*

	1996 Payments		Area Enrolled	
	$/Ac.	$/State	Acres	Percent
		(,000)	*(,000)*	
Iowa	23.46	346,444	14,767	99.4
Arizona	79.95	54,718	684	99.0
California	75.50	259,041	3,431	98.3
Kansas	22.65	429,121	18,948	99.5
Maine	10.69	665	62	97.3
N. Dakota	18.21	314,829	17,292	99.7
Penn.	18.02	17,951	996	91.6
R.I.	17.67	23	1	94.5
Texas	26.91	513,317	19,078	99.0

*Values may not sum to the total due to rounding.

Iowa also ranks behind other states in payments per acre due to commodity mix and to high payments per acre for cotton and rice. Arizona has the highest average payment per acre because more than half of enrolled area is in cotton with a $97 payment per acre. California, with both cotton and rice enrollment (rice payments are $160/acre) ranks second in average payment per acre enrolled.

By commodity, the national average payment per acre in order from highest to lowest are: rice ($113), cotton ($46), wheat ($26), corn ($22), sorghum ($16), barley ($13), and oats ($1).

For corn PFC payments, Iowa, with the seventh highest program yield, has the seventh highest payment per acre ($24) shown in Table 2. Because it has the highest program yield of 126 bushels per acre in the country, Arizona receives the highest corn payment of $26 per acre.

Table 2: Estimated Iowa PFC payments and acres in FY1996.*

	PFC Payments			Area Enrolled	
	$/Bu	$/Ac.	$/State	Acres	Percent
			(,000)	*(,000)*	
Wheat	0.88	27.94	2,122	76	98.1
Corn	0.24	24.34	343,157	14,101	99.4
Sorghum	0.31	19.45	111	6	98.8
Barley	0.33	12.77	75	6	98.8
Oats	0.03	1.69	979	579	98.3
Total		23.46	346,444	14,767	99.4
National Rank		21	3	4	5

*Values may not sum to the total due to rounding.

Ninety-five percent of Iowa's PFC payments are derived from corn program history. The corn FY1997 per bushel payments should go from $0.24 to $0.47. So total PFC payments to Iowa contract holders are estimated to double next year.

Although Iowa was not the national leader in the categories listed, the state compares quite well in terms of total payments and payment per acre within the corn belt. In addition, FY 1997 payment rates for corn will be higher, indicating continuation or improvement in Iowa's PFC payment ranking. For a full breakdown of payments by state and commodity, see CARD Briefing Paper No. 12, "Production Flexibility Contract Payments; Fiscal Year 1996." ◆

Meet The Staff

Chad Hart

As a graduate student working towards a Ph.D., in both economics and statistics, **Chad Hart** faces a lot of challenges. When he isn't busy on his dissertation, he is busy with project research and writing at the Center for Agricultural and Rural Development (CARD).

"Chad is an amazing resource for specialized research within FAPRI", states Darnell Smith, FAPRI managing director. Because his research abilities are so adaptable, he has had an important role in studies ranging from sophisticated production modeling, to environmental impact analysis, to evaluation of agricultural risk and insurance.

Because of the breadth of his research and writing skills, he has been an excellent resource for articles in **Iowa Ag Review**. Articles such as "A Review of the New Corn Yield Insurance Futures and Options" (June 1996) and "Would Revenue Insurance Have Paid During the 1993 Flood?" (this issue), have provided valuable insight for agribusiness and farmers facing a changing investment culture.

The focus of Chad's dissertation is optimal investment in agriculture. "My dissertation," Chad explains, "deals with farm level data. Since economic theory suggests that financial variables (such as cash flow, debt, etc.) don't effect investments in machinery or other farm assets, I want to examine the available data to see how much these variables might impact farm investments, if at all." He has been working with data gathered from farms across the State of Iowa. Chad is looking at investments and debt held by these farmers, to build an econometric model that will explore various investment issues.

Originally from Stark City, MO, a small farming community about 60 miles west of Branson, Chad has felt a close connection to Iowa and the farming community here. Chad said, "At CARD, for the past several years, I've been asked to put my attention in the area of agricultural insurance, which is a dramatically changing field. I have a good combination of skills and experience to examine that area, so the challenge was an excellent choice for me. Working with the folks at CARD and FAPRI has been a good experience."

Iowa Ag Review is published by the Food and Agricultural Policy Research Institute (**FAPRI**) at Iowa State University, a program of the Center for Agricultural and Rural Development (**CARD**). FAPRI is organized cooperatively by CARD at Iowa State University and the Center for National Food and Agricultural Policy at the University of Missouri-Columbia. It provides economic analysis for policymakers and others interested in the agricultural economy. Analysis that has been conducted jointly with the University of Missouri is identified here as FAPRI analysis. This publication presents summarized results that emphasize the Iowa implications of ongoing agricultural policy analysis, analysis of the near-term agricultural situation, and discussion of new agricultural policies currently under consideration.

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Iowa Ag Review
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