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Cornhusker Economics

Agricultural Economics Department

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February 2003

## **Crop Revenue Coverage and Forward Pricing: A Case Study Under Irrigated Corn**

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# Cornhusker Economics

February 12, 2003  
Cooperative Extension

Institute of Agriculture & Natural Resources  
Department of Agricultural Economics  
University of Nebraska – Lincoln

## Crop Revenue Coverage and Forward Pricing: A Case Study Under Irrigated Corn

Market Report	Yr Ago	4 Wks Ago	2/7/03
<b><i>Livestock and Products,</i></b>			
<b><i>Average Prices for Week Ending</i></b>			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt .....	\$70.97	\$77.69	\$80.03
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt .....	90.78	88.71	82.79
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg .....	93.91	89.04	88.84
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt .....	110.66	119.52	121.07
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt .....	38.37	*	31.50
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd .....	45.00	*	*
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt .....	107.80	85.47	96.54
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt .....	*	86.75	91.25
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt .....	134.90	164.83	165.52
<b><i>Crops,</i></b>			
<b><i>Cash Truck Prices for Date Shown</i></b>			
Wheat, No. 1, H.W. Omaha, bu .....	3.01	3.52	3.79
Corn, No. 2, Yellow Omaha, bu .....	1.87	2.21	2.33
Soybeans, No. 1, Yellow Omaha, bu .....	4.14	5.35	5.48
Grain Sorghum, No. 2, Yellow Kansas City, cwt .....	3.50	4.43	4.55
Oats, No. 2, Heavy Minneapolis, MN , bu .....	2.29	2.32	2.27
<b><i>Hay,</i></b>			
<b><i>First Day of Week Pile Prices</i></b>			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton .....	105.00	150.00	150.00
Alfalfa, Lg. Round, Good Northeast Nebraska, ton .....	65.00	80.00	80.00
Prairie, Sm. Square, Good Northeast Nebraska, ton .....	105.00	117.50	115.00

\* No market.

The forward pricing of grain typically obligates the producer to purchase replacement bushels when production falls short of the contract. If the production shortfall is due to area weather conditions, prices would be expected to rise and the price of replacement grain could exceed the preharvest contract price. Crop Revenue Coverage (CRC) multi-peril crop insurance provides a revenue guarantee. The minimum revenue guarantee for corn is determined by multiplying the coverage elected times projected revenue. Projected revenue is calculated using the historical yield (APH) for the farm and the February average of the CBT December futures contract. However, the final guarantee is based on the greater of the February and October averages of December futures. Therefore, if futures prices rise along with local prices, the CRC revenue guarantee will increase to provide protection against the rising cost of replacement bushels.

The University of Nebraska Agricultural Economics Department is currently offering "Winning the Game" workshops that are designed to provide producers with an opportunity to forward price grain and evaluate the use of CRC. One of the case histories used for the "Winning the Game" workshops was developed from farm records at the South Central Agricultural Laboratory located at Clay Center, NE. This case history is summarized in Table 1. Based on 75 percent coverage, CRC insurance indemnities would have been realized in 1993 and 1994. Yields were low in those years due to greensnap. As shown in Table 1, calculated premiums for the last 20 years would have averaged \$9.25 per acre (based on the current premium structure), while indemnities would have averaged \$7.68 per acre. The difference of \$9.25 minus \$7.68 or \$1.57 per acre was the average annual net cost of protection from the low revenues that would have otherwise been experienced in 1993 and 1994.

To evaluate the relationship between CRC and forward pricing, alternatives were considered that include forward pricing from 0 to 100 percent of expected production (spread over April-June) with CRC coverage at 0, 55, 65, 75 or 85 percent. The results are reported in Table 2 where C0F100, for example, represents zero CRC coverage and forward pricing 100 percent of expected production. The crop revenue per acre net of premiums and indemnities is reported in Table 2 for each alternative evaluated. Both the 1983-2002 average and the net revenue for the



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**Table 1. Corn Yields and CRC Guarantees, Premiums and Indemnities**

	CRC Base Price \$/bu	CRC Harvest Price \$/bu	Yield bu/ac	172 APH Revenue Guarante- e \$/ac	Irrigated Indemnity \$/ac	75 Percent CRC Pre- mium \$/ac
1983	2.88	3.49	152	450.21		9.96
1984	2.86	2.73	209	368.94		9.91
1985	2.66	2.38	193	343.14		9.50
1986	2.11	1.70	204	272.19		8.34
1987	1.69	1.83	191	236.07		7.47
1988	2.17	2.69	194	347.01		8.46
1989	2.71	2.38	181	349.59		9.60
1990	2.47	2.27	177	318.63		9.10
1991	2.59	2.44	190	334.11		9.35
1992	2.71	2.12	176	349.59		9.61
1993	2.39	2.77	95	357.33	94.66	8.93
1994	2.68	2.16	133	345.72	58.86	9.53
1995	2.57	3.29	173	424.41		9.30
1996	3.08	2.69	180	397.32		10.38
1997	2.75	2.76	206	356.04		9.68
1998	2.83	2.20	184	365.07		9.84
1999	2.40	1.96	170	309.60		8.95
2000	2.51	2.04	169	323.79		9.18
2001	2.46	2.08	208	317.34		9.08
2002	2.32	2.52	184	325.08		8.79
			Average	\$7.68	\$9.25	

worst year in the 20 years are shown in Table 2. Those strategies marked by an asterisk (\*) are best strategies, meaning no other strategy examined has both a higher average net revenue and a higher worst year. Those strategies not marked have both a lower average and a lower worst year than one or more strategies marked with an asterisk.

For example: C65F100=65 percent CRC and 100 percent of expected production forward priced.

The results in Table 2 are presented graphically in Figure 1. The strategies are grouped by coverage level, and the percent forward priced increases from 0 to 100 percent when moving upwards and to the right within each insurance coverage.

As Figure 1 illustrates, the most risk averse (those seeking the best of the worst years), should select high coverage levels and limit forward pricing. The less risk averse, the less insurance coverage needed, and the more aggressive the producer can be in forward pricing. The most aggressive would forward price the maximum (limited to 100 percent of expected production in this example) and not take crop insurance. As reported in Table 2 and shown in Figure 1, the 55 percent coverage is dominated (eliminated from consideration) by the other strategies.

**Table 2. Corn Receipts Net of Insurance Premiums, Indemnities**

Strategies Ranked by 1983-2002 Average Net Receipts		
	1983-2002 Average \$/acre	Worst Year \$/acre
C0F100	415.92	162.19
C75F100	414.30	247.44
C65F100	414.27	204.29
C0F75	414.04	187.67
C55F100	413.35	159.71
C75F75	412.42	272.92
C65F75	412.39	229.76
C0F50	411.79	212.25
C65F65	411.51	239.95
C55F75	411.47	185.19
C75F50	410.17	297.50
C65F50	410.14	254.34
C85F100	409.85	282.76
C0F25	409.37	233.42
C55F50	409.22	209.77
C85F85	408.78	298.05
C85R75	407.96	308.24
C75F25	407.76	318.67
C65F25	407.73	275.52
C0F0	406.96	254.60
C55F25	406.80	230.94
C85F50	405.72	332.82
C75F0	405.34	320.23
C65F0	405.31	278.93
C55F0	404.39	252.12
C85F25	403.30	340.04
C85F0	400.89	332.99

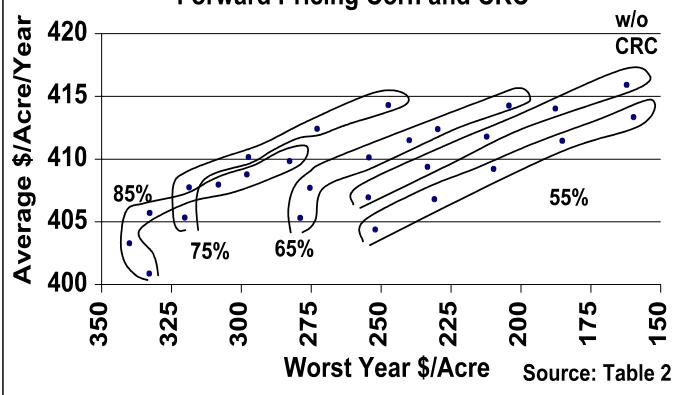
No indemnity would have been received in the 20 years if 55 percent coverage had been selected. The 65 percent coverage alternatives were also dominated by other alternatives. See the net cost of insurance reported in Table 3. The 75 percent coverage had a lower net cost in our example than 65 percent coverage and hence would be preferred.

**Table 3. 1983-2002 Average Per Acre Premiums**

	Premium	Indemnity	Net
85%	\$22.00	\$16.00	\$6.00
75%	9.25	7.68	1.57
65%	4.59	2.99	1.60
55%	2.57		2.57

The relationship between coverage levels would be expected to depend upon the specific distribution of yields. The general conclusions, however, that the more risk averse should limit their forward pricing of grain and increase insurance coverage, would be expected to apply to most, if not all situations. As discussed in earlier newsletters, our example producer could calculate net receipts per acre needed to cover minimum cash needs and locate that amount on the horizontal axis of Figure 1. The insurance/forward pricing alternative corresponding to the highest average achievable net revenue for that worst case should be a reasonable choice based on financial commitments (ability to bear risk) alone. Or find in Table 2 the alternative marked with an \* that has a worst year that is close to the minimum cash needs. For example, for minimum cash needs of \$250 per acre selecting C75F100 (75 percent CRC and forward pricing 100 percent) would be the choice indicated. Willingness to bear the risk may limit the choices further.

**Fig 1. Example Results 1983-2002  
Forward Pricing Corn and CRC**



Source: Table 2

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