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## INSURING CORN IN SOUTH DAKOTA

by

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Crop insurance is an important component when managing production and yield risks. Corn, as the largest cash crop in South Dakota, is commonly covered by insurance. South Dakota producers insured a record 5.8 million acres of corn in 2012. The pre-harvest statewide level of liability coverage in 2012 was \$3.1 billion on corn. That averages out to about \$525 per insured acre in liability protection. Producers paid about \$21.00 per acre in premiums for the coverage.

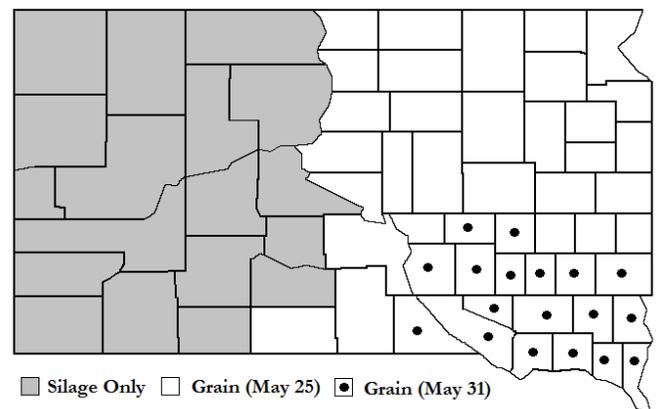
The purpose of this manuscript is to highlight common features of crop insurance relevant to corn. There are relatively small program changes for the coming year. The addition of specialty corn coverage (high amylase type and blue type) is new. There will also be higher premium rates on corn in South Dakota, presumably on the full cost. The effect will likely be mixed in with price level and volatility level changes. There is still some uncertainty at the national level on the insurance subsidy level. These changes, however, are not likely to affect the routine choices that corn producer must make related to choices of insurance policy type and coverage levels.

### Available coverage

Information about crop insurance is commonly obtained from a crop insurance agent or the USDA-Risk Management Agency (RMA). Corn coverage details as discussed here are outlined in the “Common Crop Insurance Policy,” the “Coarse Grains Crop Provisions,” and the “Commodity

Exchange Price Provisions,” or CEPP. Copies are available from crop insurance agents and on the RMA website ([www.rma.usda.gov](http://www.rma.usda.gov)). The RMA also has a factsheet on corn for states in the Billings, MT regional office.

Standard coverage for corn for grain is available in eastern South Dakota counties (Fig. 1). In other counties, coverage is only available for irrigated acres or for silage.



**Figure 1. Corn counties in South Dakota.**

Several dates are critical to assure the proper coverage is chosen and in place when needed. For corn, the insurance must be purchased or changed by March 15 and the earliest planting date is April 10. The final planting dates, necessary for full coverage, vary slightly. For silage the final date is May 31 regardless of the county or irrigation practice. Corn for grain has a final planting date on irrigated and non-irrigated ground of May 25; except for counties in the southeast where it is May 31 (Fig. 1). After the final planting date, there is a 25-day late planting period with reduced coverage levels. In the event of a loss, producers typically have 72 hours to notify their insurance agent of a potential claim. The latest the coverage lasts is December 10.

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There is substantial variability in how much coverage is available across counties. Specific to corn for grain counties the highest transition or “T” yield is in Moody County at 156 bushels per acre. The “T” yields generally decline out to Campbell County at 81 bushels per acre and to Todd County at 35 bushels per acre.

Policy dates match up fairly well with South Dakota cropping and marketing patterns as reported by the National Agricultural Statistics Service (NASS). The range of common planting dates for corn is from April 30 through June 20. The range of common harvest dates is from September 30 through November 20. Historically, the percentage of corn marketed peaks after harvest, commonly in November. Additional higher monthly marketings are also common in January.

### **Policy types and coverage levels**

The main policy types are: Revenue Protection (RP), Yield Protection (YP), Revenue Protection with the Harvest Price Exclusion (RP-HPE), and Catastrophic Risk Protection (CAT). Revenue insurance products have dominated the coverage type choice for corn in recent years. Statewide, 92% of insured corn acres in 2012 were covered by RP. Another 5% of acres were covered by YP. The remaining acres were covered by RP-HPE and CAT.

Some details are presented here and additional details can be found in Diersen (2012). With RP, there is a fixed guarantee level and either lower yields and/or lower prices may trigger an indemnity payment. RP is designed to cover price increases and is ideal when producers forward price. With YP, a producer receives an indemnity payment at the fixed per bushel price if the resulting yield falls below the yield coverage level. RP-HPE is limited to downside revenue protection at a slightly higher cost than YP. RP-HPE costs less than RP and may be preferred if little forward pricing is expected.

Once a policy type has been selected, the coverage levels need to be chosen. With RP and RP-HPE there is no price election option; one must use 100% of the projected price. For YP, a producer can select less than 100% of the projected price. To minimize the insurance premium, a producer could use a price election that closely aligns the insured price with the

expected cash price. For example, if expected basis implies a cash price below an RMA projected price, a price election of less than 100% may match well and reduce the cost of price protection accordingly.

Coverage level most often refers to the yield coverage level or percent of the producer’s actual production history insured. Across policy types the yield coverage level must be chosen. The elections range from 50% to 85% coverage. Corn producers in South Dakota used 75% and 70% yield coverage levels most often in 2012. The optimal level depends on a producer’s willingness and ability to self-insure the deductible amount and on the cost of different coverage levels. The best choice is a farm-specific decision and may also be influenced by any forward pricing or protection strategies employed.

### **Marketing considerations**

The RMA price discovery periods use the CBOT December Corn futures contract. The average of the futures closes during the discovery periods sets the respective prices. The projected price discovery period is February 1 to February 28. The Projected Price is used in YP to determine the price level at which indemnities are paid. The Projected Price sets the minimum coverage level for RP and RP-HPE.

The harvest price discovery period is October 1 to October 31. The Harvest Price is combined with the actual yield to determine harvest revenue in RP-HPE. The Harvest Price is also used in RP to determine whether higher coverage is relevant at harvest. The unbiased nature of futures prices is evident based on the past ten years (Table 1). The average change has been \$0.08 per bushel with 5 years of increases and 5 years of decreases. Extreme moves are also evident as the price increased \$1.82 in 2012 and decreased \$1.27 in 2008.

RP and RP-HPE insurance premiums are a direct function of the corn price volatility. The volatility factor, measured in late February, was at a historically low level in 2012 (Table 2). Producers responded by purchasing high yield coverage levels. When the volatility was relatively high in 2008 and 2009, the premium levels were also high, limiting coverage.

**Table 1. Corn Insurance Price Levels.**

Year	Projected Price (\$/bushel)	Harvest Price (\$/bushel)	Change (\$/bushel)
2003	2.42	2.26	-0.16
2004	2.83	2.05	-0.78
2005	2.32	2.02	-0.30
2006	2.59	3.03	0.44
2007	4.06	3.58	-0.48
2008	5.40	4.13	-1.27
2009	4.04	3.72	-0.32
2010	3.99	5.46	1.47
2011	6.01	6.32	0.31
2012	5.68	7.50	1.82

Source: USDA-RMA

**Table 2. Corn Insurance Factors.**

Year	Volatility Factor	October Cash Price (\$/bushel)	Basis (\$/bushel)
2003	0.20	1.95	-0.31
2004	0.21	1.92	-0.13
2005	0.21	1.60	-0.42
2006	0.23	2.37	-0.66
2007	0.26	3.09	-0.49
2008	0.30	3.99	-0.14
2009	0.37	3.31	-0.41
2010	0.28	4.02	-1.44
2011	0.29	5.67	-0.65
2012	0.22	6.61	-0.89

Sources: USDA-RMA and USDA-NASS.

Basis, defined as the difference between a cash price and a futures price, reveals a disparity between insurance coverage and local conditions. Basis is not factored into the projected nor harvest prices for crop insurance. As such, the RMA prices likely exceed the expected and actual local cash prices. The insurance settles to a fixed or static month that may not always line up with harvest or crop sales. For example, November is typically the month with the greatest percent of corn marketed in South Dakota.

For reference, the statewide price received by farmers (from NASS) is shown for October along with the basis relative to the harvest price (Table 2). Basis variability is evident, ranging from -\$0.13 per bushel in 2004 to -\$1.44 per bushel in 2010. For

planning purposes, a five-year moving average of historical basis seems reasonable.

**Early 2013 Example with Basis**

Here is an example of the mechanics of how crop insurance works when considering basis (see Table 3). There are subtle differences across product types, with not-so-subtle implications for effectiveness in managing different risks. Assume a producer has a proven yield of 120 bushels per acre. The yield coverage level is chosen at 75%, implying that a yield below 90 bushels would trigger an indemnity (depending on the coverage type). The projected price is assumed to be \$6.25, within the recent range for the December 2013 futures price. The base guarantee is thus \$562.50 per acre (90 x 6.25). With a conservative harvest basis of -\$0.75, the expected cash price at harvest,  $C_H$ , is \$5.50 per bushel. If the actual yield at harvest,  $Y_H$ , equals the proven yield, there would be no indemnity payment and the expected return is \$660.00 per acre (120 x 5.50). In general, the Return =  $(C_H \times Y_H) + \text{Indem}$ , which is before production and insurance costs.

When yield and/or price are low enough the projected and harvest price ( $P_H$ ) are also necessary to figure the respective indemnity payments. Following the method of Woodard, Sherrick and Schnitkey (2010) for earlier insurance products, the respective indemnity calculations are as follows:

$$\text{Indem}_{YP} = \max[0, \text{Projected price} \times (\text{Trigger yield} - \text{Actual yield})]$$

$$\text{Indem}_{RP} = \max[0, \text{Trigger yield} \times \max(\text{Projected price}, \text{Harvest price}) - (\text{Harvest price} \times \text{Actual yield})]$$

$$\text{Indem}_{RP-HPE} = \max[0, (\text{Projected price} \times \text{Trigger yield}) - (\text{Harvest price} \times \text{Actual yield})]$$

Indemnity payments and returns under different types of coverage are shown in Table 3. In scenario A, the price increases and the yield is high enough that no indemnity payments are made. In scenario B, the yield is low triggering payments across types. In scenario C, the price is low enough to trigger indemnity payments for the revenue types. In scenario D, the disparity across types is evident as the price increase drives up the indemnity payment for RP coverage. Specific to RP is the 200% limit on price changes by harvest. This caps the indemnity

payment and should be managed by covering any sales with call options.

**Table 3. South Dakota Corn Example.**

Assume: Proven yield = 120 bu., Coverage level = 75%; Trigger yield = 90 bu.; Projected price = \$6.25; Cash price = \$5.50; Base guarantee = \$562.50

	A: $Y_H = 120$ ; $P_H = \$6.75$ ; $C_H = \$6.00$		
	YP	RP	RP-HPE
Indem	\$0	\$0	\$0
Returns	\$720.00	\$720.00	\$720.00

	B: $Y_H = 80$ ; $P_H = \$5.75$ ; $C_H = \$5.00$		
	YP	RP	RP-HPE
Indem	\$62.50	\$102.50	\$102.50
Returns	\$462.50	\$502.50	\$502.50

	C: $Y_H = 90$ ; $P_H = \$5.75$ ; $C_H = \$5.00$		
	YP	RP	RP-HPE
Indem	\$0	\$45.00	\$45.00
Returns	\$450.00	\$495.00	\$495.00

	D: $Y_H = 80$ ; $P_H = \$6.75$ ; $C_H = \$6.00$		
	YP	RP	RP-HPE
Indem	\$62.50	\$67.50	\$22.50
Returns	\$542.50	\$547.50	\$502.50

**Final thoughts**

While the decisions related to crop insurance are fairly standard, there are enough date and policy details to warrant an annual look to assure the

coverage chosen matches the risk management needs. The type of coverage chosen will likely continue to be dominated by RP, as it provides the best coverage when pricing grain or when using grain for feed. The level may vary depending on the cost of the coverage and the level desired. With the recent prices observed in the futures market, producers in South Dakota can expect slightly higher premiums, but more coverage in 2013. The premium rate adjustment will likely increase costs too, but likely not to the point of diminishing use.

**Additional information and references**

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