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When Is GRIP the Right Choice for Crop Insurance?

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When Is GRIP the Right Choice for Crop Insurance?

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The Risk Management Agency has greatly expanded availability of Group Risk Income Protection (GRIP) for 2006. Covered crops now include corn, soybeans, grain sorghum, wheat, and cotton in most major production regions. Now that GRIP is widely available, many farmers and their crop insurance agents are considering whether GRIP could be the right crop insurance choice for 2006. As we will show, the answer varies by farm and production region.

What Is GRIP and How Does It Work?

GRIP provides protection against unexpected declines in county revenue. This contrasts with Revenue Assurance (RA) and Crop Revenue Coverage (CRC), which provide protection against declines in revenue at the farm level. Thus, a farmer who buys GRIP could suffer a loss and not receive an insurance payment. This would occur if his or her farm yield is low but the county yield is not. However, many farmers find that their farm yield is rarely low unless the county yield is low. These are the farmers who are most likely to find GRIP beneficial.

First, a few program details and definitions will help in understanding how GRIP works. GRIP pays an indemnity whenever actual county revenue falls below a trigger revenue level. Actual county revenue equals the product of the harvest price and the county average yield. The trigger revenue equals the product of the selected coverage level (90, 85, 80, 75, or 70 percent) and expected county revenue. Expected county revenue equals the product of expected county yield and expected price. Expected county yield is simply the trend yield for a county. The expected price is based on the futures price before sales closing date for crop insurance.

An often-confusing aspect of GRIP is that, unlike RA and CRC, the amount of insurance that a farmer buys is not equal to the trigger revenue. Rather, farmers select an amount of insurance between 90 and 150 percent of expected county revenue.

When actual county revenue falls below the trigger revenue, an indemnity is paid. The amount of the indemnity equals the product of the amount of insurance and the percent loss, where the percent loss is computed as the difference between the trigger revenue and the actual county revenue divided by the trigger revenue.

Finally, just as RA and CRC offer farmers extra protection when the harvest price climbs above the expected price, so too does an optional endorsement to GRIP. The endorsement is called the Harvest Revenue Option (HRO). If a farmer selects this endorsement (and pays the addition premium), then if the actual harvest price is greater than the expected harvest price, the amount of protection and the trigger revenue are multiplied by the ratio of the actual price to the expected price.

Comparing GRIP to Other Products

To illustrate how GRIP is likely to perform in the future relative to RA and CRC, we calculated what GRIP would have cost and what it would have paid out from 1980 to 2004 had it been available during that time. The results are shown in Figure 1.

Figure 1. Net indemnities for 90 percent GRIP-HRO and 75 percent RA-HPO for Poweshiek County, Iowa, corn coverage, 1980-2004
time. We assumed that the maximum amount of insurance was obtained with GRIP-HRO at the 90 percent coverage level. For comparison, we also estimated what the cost and average payout for RA (with the harvest price option) and CRC would have been over the same period at the 75 percent coverage level. These coverage levels were chosen to equalize the premium subsidy percentage among the insurance products.

Net indemnities (insurance payout minus producer-paid premium) are shown in Figure 1 for corn in Poweshiek County, Iowa; Figure 2 for wheat in Barnes County, North Dakota; and Figure 3 for dryland cotton in Lubbock County, Texas. A positive number indicates that indemnities paid out exceed what the producer would have paid in premium.

Figure 1 shows that GRIP-HRO pays out much more often and a higher amount than does RA in Poweshiek County. There are two reasons for this. The first is that GRIP-HRO has a 90 percent trigger and RA has a 75 percent trigger, which means that a price drop like we saw in 2004 will more readily trigger a payout under GRIP than under RA. The second reason is that losses at the farm level are highly correlated with losses at the county level. This means that whenever there are significant farm-level losses, there will also be significant county-level losses. The technical terms describing this situation are that losses on corn in Iowa are primarily driven by systemic factors such as widespread drought or excess rainfall (factors affecting many farms in the area at the same time) and not by poolable factors such as wind, hail, or disease (factors affecting only individual farms).

The results in Figure 2 and Figure 3 show that insurance losses on North Dakota wheat and Texas cotton are driven by both systemic and poolable factors. The years in which GRIP pays out a large amount are also the years when RA and CRC pay out a large amount, which shows that systemic risk is important in both regions. But note the number of years in which RA or CRC pay out but GRIP does not. For both the wheat and cotton examples, we estimate that there would have been positive net average payouts for RA but negative net payouts for GRIP in 6 out of the 25 years. This illustrates that for these crops, poolable risk is much more important than it is for Iowa corn.

These illustrations show that whether GRIP is the right crop insurance choice for a farmer depends in part on whether a farmer’s losses are driven primarily by poolable risk or systemic risk. One way to estimate the importance of the two is to graph a farm’s histori-
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cal yield against the county average yield. If the scatter plot forms close to a straight line with a positive slope, then farm yields and county yields are highly correlated and GRIP may provide good risk management benefits. If the scatter plot is widely variable with no real discernable pattern, then poolable risk is important and the farmer ought to think twice before buying GRIP.

Besides the risk management benefits, crop insurance products can boost average farm incomes because of the premium subsidies. Farmers pay only 45 percent of the total premium if they buy RA or CRC at the 75 percent coverage level or GRIP at the 90 percent coverage level. The Risk Management Agency tries to set the total premium at a level that would generate sufficient premiums to just cover losses over the long term. That is, they hope that if many farmers buy their products over many years, then the indemnities paid out would about equal the total premium. In other words, the total premium is supposed to represent an actuarially fair premium.

If premiums are actuarially fair, then farmers who buy RA or CRC at the 75 percent coverage level or GRIP at the 90 percent coverage level should receive $100 in indemnity for every $45 they pay in premium, for a net return of $55. That is, the expected rate of return from investments in farmer-paid premiums should be 122 percent (1.22 = .55/.45) if premiums are actuarially fair.

Table 1 reports the historical rates of return for the products and time periods illustrated in Figures 1, 2, and 3. The average rate of return for GRIP over this period across the three examples equals 123 percent. Given the way that GRIP premium rates were developed, all three crops would have generated approximately 122 percent rates of return if the historical period had been extended back to 1957.

The rates of return to RA and CRC are all positive, indicating that farmers should expect to receive more in indemnities than they pay in premiums. But they are also all less than 122 percent, which could indicate premium rates that are in excess of actuarially fair levels. Furthermore, the expected returns (net indemnities) to GRIP are substantially greater than for RA and CRC. This reflects both the higher expected rate of return and (for corn and wheat) the higher liability and premium per acre. Poweshiek County corn producers would have received $17/acre more in net indemnities for GRIP than for RA over the historical period.

Recommendations
The large rates of return for GRIP are to be expected because of the large premium subsidies. Putting the GRIP decision into gambling terms, farmers get to bet $55 of house money for every $45 they bring to the table. With those odds, it is no wonder that GRIP pays out in the long run.

But crop insurance is more than a gamble: it also keeps farmers in business. The real danger in using GRIP for crop insurance is that even with good odds, catastrophes do happen. A hailstorm or localized flooding can destroy a farmer’s crop when the county has a bumper crop. Or a regional drought can devastate a farmer who operates at the edge of a county, while leaving farms in the rest of the county untouched. From a risk management perspective, GRIP is ideally suited for farmers who are well diversified geographically in a county. For these farmers, GRIP can provide both a high rate of return on premium dollars as well as efficient risk management benefits.

Note of disclosure: Bruce Babcock helped develop GRIP, GRIP-HRO, and RA as a private consultant. He has no current financial interest in any of these products.

<table>
<thead>
<tr>
<th></th>
<th>Corn in Poweshiek County, Iowa</th>
<th>Wheat in Barnes County, North Dakota</th>
<th>Non-irrigated Cotton in Lubbock County, Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GRIP-RO</td>
<td>RA-HPO</td>
<td>GRIP-RO</td>
</tr>
<tr>
<td>Total Premiums</td>
<td>36.71</td>
<td>14.05</td>
<td>14.83</td>
</tr>
<tr>
<td>Producer-Paid Premium</td>
<td>16.52</td>
<td>6.32</td>
<td>6.67</td>
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<tr>
<td>Net Indemnity</td>
<td>21.98</td>
<td>4.61</td>
<td>8.25</td>
</tr>
<tr>
<td>Rate of Return</td>
<td>133%</td>
<td>73%</td>
<td>124%</td>
</tr>
</tbody>
</table>

* The product of the 2006 premium rate and the amount of insurance that would have been available in each year.
* Total premium multiplied by 0.45.
* Average indemnity paid out minus producer-paid premium.
* Net indemnity divided by producer-paid premium.