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GRIP AND GRP PROVIDE AN ALTERNATIVE CROP INSURANCE CHOICE TO KANSAS WHEAT GROWERS SUFFERING WITH A REDUCED APH¹

Introduction. Many Kansas wheat farmers have suffered from recent poor crops, primarily caused by drought. These low yields have caused a reduction in their Actual Production History (APH), which effectively lowers their crop insurance guarantees. In addition, when their guarantees decline their APH, CRC, IP, and RA premium rates increase. Wheat farmers will also pay higher revenue insurance premiums for wheat this year because the market price is higher but that also means higher revenue guarantees.

Some farmers have suggested their guarantees are so low and their premium rates are so high that it no longer makes sense to buy crop insurance and are thinking about dropping their crop insurance coverage. Before one does that one should at least consider one of the group policies, which may provide better coverage than a reduced APH contract. However, that decision will depend on the county where the farm is located because the analysis of individual counties shows substantial differences in expected indemnity payments under the county yield based group contracts.

The Group Risk Plan (GRP) has been available on Kansas wheat since 1997. This has not been a popular choice because it is based on the RMA expected county yield rather than the farmer's individual yield. Under this plan, payments are based solely on the county yield as published by the National Agricultural Statistics Service (NASS) and it

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does not matter what happens on the individual farm. It is possible to have a total crop failure due to hail or some other spot loss and receive no payment under a group policy. It is also possible to receive an indemnity payment under a group policy but suffer no individual loss.

Effectively, GRP is a put option on expected county yield. The Group Risk Income Protection (GRIP) is a put option on expected county revenue. In addition, GRIP insured farmers are offered an additional endorsement that will provide harvest revenue coverage in the event prices increase causing a reduction in indemnity payments under the GRIP policy. This endorsement is very similar to the Harvest Price Option on the Revenue Assurance policy.

Farmers who select one of the group policies are taking on the yield basis risk and it can be severe. This is similar to buying a Kansas City put option on wheat to cover price risk that also contains a basis risk. The price basis risk is the difference between the Kansas City price and the local cash price. If the basis is out of line, one has the alternative of moving the grain to another market location where the basis is stronger however, one must pay the transportation cost to move the grain. The yield basis risk in the GRIP\GRP policy is defined as the difference between the percent county yield loss and the percent individual farm yield loss but there is no way for farmers to enforce the yield basis as there is with a price basis risk.

Methods for reducing yield basis risk depend on the size of the farm. At the extreme, if one is farming the entire county then the farm yield and the county yield are the same and the relationship is a perfect fit with no yield basis risk. Therefore, the larger the farm operation, the more likely the farm yield will be highly correlated with the county yield. In addition, the more spread out the farm is across the county the more likely it is to track with the county yield and therefore transfer risk. However, if the farm is simply a quarter section, as is often the case with a landlord, then there may be considerable yield basis risk in the GRIP/GRP policy and it simply will not track with the county yield. In addition, landlords may not fully grasp the effect of the yield basis risk or they simply can not afford to take the yield basis risk because they depend on the rental income for living expenses. Farmers who elect to utilize a GRIP/GRP policy and understand they are taking on this additional yield basis risk probably will not want to encourage their landlords to sign up for this type of coverage. Growers will need to know the risk tolerance and financial needs of their Landlords before discussing the issue because often times Landlords ask the tenant to sign up their farm under the same crop insurance plan as the farmer has purchased. Under GRIP\GRP it may work for the farmer but not the Landlord because of size.

Growers can reduce their yield basis risk by buying a 150 percent scaler that allows the producer to increase their crop coverage or liability by 150 percent. One would expect a larger percentage farm yield loss than a percentage county yield loss, because one would expect the individual farm yields to vary more than the county yield. However, multiplying the larger dollar amount of coverage (liability) by a smaller percent county loss often times will generate the same indemnity payment that is being generated by an

individual farm APH policy. In the RMA GRIP\GRP rating model located on the RMA WEB site, the maximum liability that is quoted has the 150 percent scaler already included.

In addition, the 90 percent coverage GRIP/GRP policies are subsidized with 55 percent of the premium being paid by RMA indicating RMA considers 90 percent GRIP/GRP coverage to be the equivalent of 75 percent APH based coverage at the farm level. The lower deductible also reduces the yield basis risk.

The next step is to consider the historical county experience with these policies on Kansas wheat and does it fit your farm before making the decision. GRIP/GRP may be a good buy in your county but it still may not cover your risk because your farm is highly concentrated in a local area with little geographic dispersion. Small farm size and concentration increases the yield basis risk relative to a large farm that is geographically dispersed.

Analysis was completed for Cheyenne and Rawlins County Kansas winter wheat. The GRP/ GRIP policies have no practice specified in these counties. Therefore, the county yield is the total bushels produced in the county divided by planted acres. In addition, RMA takes these historical county yields and then does a trend adjustment to generate the RMA expected county yield. The GRIP\GRP guarantee is based off the RMA expected county yield. For example, on Cheyenne County wheat the 2005 RMA expected county yield is 25.2 bushels (table 1). In previous years, RMA has set the expected yield at a much higher level. For example in 1999, the expected Cheyenne County yield was 44.4 bushels. Comparing the 2007 expected county yield to the largest historical RMA expected county yield represents a 43.2 percent reduction in expected yield for 2007 in Cheyenne County (Table 1).

In addition, the GRP rates were increased in 2005, 2006 and again in 2007. Notice that the rates for the GRIP and GRIP-HRO were reduced from 2006 to 2007 (Table 1). There were no GRIP rates prior to 2006 because the contract was not offered on Kansas wheat.

The next step in the analysis was to download the historical county yields from the NASS web site (NASS county yields and GRIP\GRP analysis for all Kansas counties will be (have been) posted on AgManager.info). Table 1 contains the historical county yields on a planted acre basis. Yields are typically lower on a planted acre basis especially in a dry year because there is a large amount of acreage abandonment.

The next step in the comparison was to simply take the expected county yield 25.2 bushels set by RMA and calculate what the indemnity payments would have been over the past 33 years using the 2007 RMA expected yield and premium rates for 90 percent coverage. Over this period of time the expected indemnity payment per dollar of premium paid by farmers under the GRP policy was 97 cents. This means Cheyenne County wheat growers who purchase this contract would expect to receive back only 97 cents for every dollar paid in premiums. If one were to assume a 2004 disaster yield will not occur again and then replaced the 2004 disaster yield with the RMA expected yield

the estimated return would be 39 cents per dollar of premium paid. At the industry level the grower paid premium plus RMA premium subsidies dollar would only return 17 cents in indemnity payment, when the target is one dollar. This suggests growers would expect to get back none of the subsidy.

While this analysis represents the odds for 2007, it does not indicate this will be the expected long run payout if one purchases this contract for the next 10 years. RMA has over the years drastically changed their expected yield and premium rates as the data in table 1 demonstrates. In addition, when one compares the RMA expected county yield against the 20 year simple average yield or the 33 year simple average yield, the RMA expected county yields are substantially lower in this county. Notice the 20 year wheat average yield is 40 bushels and the 33 year average wheat yield is 33.4 bushels in Cheyenne County. Both yields are substantially higher than the RMA 2007 expected wheat yield of 25.2 bushels. RMA has reduced the expected county yield from a high of 44.4 bushels in 1999 to 25.2 bushels in 2007 or 43.2% reduction in the RMA Cheyenne County expected wheat yield. By contrast Rawlins County generated a 20 year average yield of 36.7 bushels and a 33 year average yield of 33.2 bushels. Both of Rawlins County's simple average wheat yields were lower than the same simple average in Cheyenne. However the RMA expected Rawlins County wheat yield is higher (31.0 bushel) than the RMA Cheyenne expected county yield (table 1).

Rawlins and Cheyenne are located in the same part of the state. Both counties have similar 20 year and 30 year simple average wheat yields and similar standard deviations. Both counties had similar disaster yields in 2004 and both have very few irrigated acres. Yet RMA has set the Rawlins expected county wheat yield almost 6 bushel or 23% higher than the expected county yield in Cheyenne (table 2). Does this make sense?

Some insurance professionals have suggested when GRIP\GRP premium rates generated expected underwriting losses it is caused by the 150 percent scaler. If the scaler is capped at 100% the loss ratio will not change because the premiums collected are also lower. The point is the coverage is reduced by 50 percent but the premiums are also reduced by 50 percent and the loss ratio remains unchanged.

Starting in 2007, RMA also decided to split some counties wheat yields between irrigated and non-irrigated under the GRIP/GRP plans. There is no historical RMA expected county yield data or historical rates to work with in those counties. However, it is reasonable to expect RMA will make changes as they have done in the no practice specified counties.

Prior to 1970, NASS yields were not separated between irrigated and non-irrigated. Therefore, irrigated and non-irrigated yields prior to 1970 had to be estimated based on the combined practice yield for the county.

CRC Prices. RMA adapted the CRC price discovery period for GRIP on corn and soybeans but not wheat. Therefore, the plant price and harvest price are the same on corn and soybeans for CRC and GRIP. The Nebraska wheat planting price for GRIP is the

September average closing price of Kansas City new crop September 2007 wheat futures contract. The volatility will be measured over the 5 trading days prior to October 1. RMA then has until October 10 to announce the base price and volatility that will set the 2007 Nebraska GRIP coverage and premiums. There is only one problem, sales closing is September 30. RMA is telling Nebraska wheat farmers they will tell them the premium cost after they sign a purchased policy. Needless to say this will likely limit sales in Nebraska. Fortunately, Kansas wheat farmers will know the cost for GRIP at the same time they know the cost for CRC and RA.

How do I use this information? One simply looks up their county to determine, if there is an offer in their county. There are 6 Kansas counties that do not have a GRIP/GRP wheat offer. Secondly, one would look at the historical payouts in relationship to the RMA expected 2007 wheat yield. One would then want to look at the farmer paid loss ratio and if it is less than 1.00 then farmers would expect their premiums paid to exceed their indemnity payments. A farmer paid loss ratio of 1.00 or less would suggest GRIP/GRP is not a good buy and farmers would only buy GRIP/GRP if the APH offers were worse. Analysis for each Kansas county is posted on AgManager.info under this same menu location.

The next step is to check industry loss ratio for the county and if this loss ratio is less than 1.00 then farmers over the long-run would not expect to collect all of the premium subsidies in the GRIP/GRP contract but their indemnities would be expected to exceed their farmer paid premiums. For example, Cheyenne County has a GRP expected farmer paid loss ratio of 0.97 meaning farmers would pay in \$1.00 and only expect to get back 97 cents while Rawlins had an expected farmer paid loss ratio of 1.87. In addition, the Rawlins County industry expected loss ratio equals 0.84, which means over the long-run these farmers are expected to capture most of the subsidy².

Using the RMA expected yield being offered in 2007 will generate an entirely different expected payout than if one had used an earlier RMA expected yield. The expected yield, under GRIP/GRP policies have been reduced and in some cases severely reduced over the past several years (table 1). This reduces the effectiveness of this tool for helping growers that have had multiple year droughts causing a reduction in their APH.

Does it make any sense to have wheat yields trending down? Kansas is normally the number one wheat producing state in the country. While improving wheat yields has not kept pace with corn, it is hard to believe there has been negative wheat technology. Why would one expect wheat yields to trend down due to negative technology? A more likely scenario causing these declining yields is short run weather issues. GRIP/GRP is the one product which could accommodate a longer run look at yields and remove the short run effect of weather.

²The long-run industry loss ratio must equal 1.00 or less or the generated underwriting losses will need to be covered with RMA taxpayer funds. The industry loss ratio can not be sustained over the long-run.

In addition, some analysts have questioned whether it makes sense to trend adjust for technology at the county level. They have argued any trend adjustment for technology should be applied at a much higher aggregate level, for example district yields or even state yields. The argument simply is applying trend adjusted yields at a higher aggregate level removes both the positive and negative impacts caused by short run weather issues. It is exactly the opposite situation on Illinois corn, where RMA trend yields have been trending up at a significant pace. If those trend yields do not represent long-run expected yields then indemnity payments will exceed premiums causing underwriting losses. The same thing could be argued on Kansas wheat but with the reversed argument caused by RMA estimated downward trending wheat yields. It is very unlikely farmers in those counties projecting underwriting gains will purchase the product while some farmers will buy in counties that are generating underwriting losses causing the entire book of business to have underwriting losses.

GRIP\GRP Could Provide a Real Alternative to APH. RMA is projecting lower yields than the simply average yield over an intermediate period of 20 years or even a longer period of 33 years in Rawlins and Cheyenne Counties. Using a simple average assumes no improvement in technology. An expected yield that is lower than the long run average yield assumes yields are declining caused by negative technology or change in production practices on a wide scale, for example a reduction in irrigated acres. One can rule out irrigation because less than 5% of the wheat acres are under irrigation in these two counties (table 2). It is true improved wheat technology has not kept pace with corn but why would one assume a negative technology trend on Kansas wheat? It is more likely RMA's mathematical models are picking up recent weather events that have caused abnormally low yields.

If there was ever a product that could be based on a long-run expected yield and remove short term weather phenomenon, this is the product. As often has been pointed out under the APH program after a claim the next's years guarantee is lower, unlike normal property/casualty insurance. If an insured has a car wreck the new car will be insured at the full value not at some reduced value because the insured had an auto claim on the previous car, however premium rates might increase.

That same principle could be applied to county yields since RMA is no longer dealing with an individual grower. The data suggests some of the earlier guarantees were too high relative to the long-run expected payout and the reverse is probably true today. In addition, some of the projected loss experience even with these reduced yields suggests the rate maybe insufficient to make this product actuarially sound. The point is growers will simply tend to buy the product in counties that generate expected payouts exceeding their dollars of premium paid and in counties that do not generate payments in excess of their premium dollars they will not buy. This will further increase any bad loss experience.

If RMA is going to simply reduce GRIP\GRP expected yields following short run trends, as clearly demonstrated by the data in table 1, then there is little to be gained by offer

GRIP\GRP (RMA is working with 35 years of data but because of their trend adjusting method the effect is following short run yield trends). If RMA would set expected yields base on long run yields, then growers would have an alternative when they are caught in a multiple year drought.

In addition, RMA needs to provide the final price and volatility used to set GRIP premiums before sales closing. Currently Kansas wheat farmers are provided these values about 10 days before sales closing but the Nebraska GRIP premiums are not set until after sales closing. The Nebraska wheat GRIP price discovery period is the 30 day average closing price of September 2007 KCBOT wheat and the most recent 5 trading days average volatility prior to October 1 that will be announced after September 30 (RMA has until October 10 to make the Nebraska wheat GRIP base price and volatility announcement) but sales closing in Nebraska is September 30 (this also true in other states, such as Illinois). RMA changed the GRIP corn\soybean prices to match the CRC prices but they did not follow the same procedure on wheat, which would have been a simple fix.

GRIP/GRP County Analysis. The historical county yields and expected GRIP\GRP rates for each county are posted on AgManager.info under a separate document.

Table 1. Historical RMA Estimated Expected County Yields and Rates for Cheyenne and Rawlins County, Kansas Wheat with No Practice Specified

| Cheyenne County, Kansas Wheat | | | | | | |
|---|--|--------------------------------------|-----------------|-------------------|------------------|--------------------------|
| Year | NASS County Planted Yield | Expected County Yield | GRP RATE | Volatility | GRIP Rate | GRIP-HRO Rate |
| 1997 | 27.4 | 43.2 | 7.50 | | | |
| 1998 | 44.2 | 43.8 | 7.50 | | | |
| 1999 | 51.9 | 44.4 | 7.50 | | | |
| 2000 | 24.8 | 40.6 | 6.50 | | | |
| 2001 | 31.5 | 40.9 | 6.50 | 0.20 | | |
| 2002 | 19.6 | 41.3 | 6.50 | 0.18 | | |
| 2003 | 30.9 | 39.1 | 6.50 | 0.22 | | |
| 2004 | 7.8 | 39.4 | 6.50 | 0.19 | | |
| 2005 | 17.6 | 35.5 | 6.83 | 0.19 | | |
| 2006 | 23.7 | 32.0 | 7.95 | 0.18 | 16.23 | 17.83 |
| 2007 | | 25.2 | 8.13 | 0.20 | 14.57 | 16.12 |
| Maximum Yield from 1997-2007 | | | | | 44.4 | |
| 2007 Yield | | | | | 25.2 | |
| Percent Reduction in Expected Yield from the Maximum | | | | | 43.2% | |
| Rawlins County, Kansas Wheat | | | | | | |
| Year | NASS County Planted Yield | Expected County Yield | GRP RATE | Volatility | GRIP Rate | GRIP-HRO Rate |
| 1997 | 35.2 | 36.9 | 8.30 | | | |
| 1998 | 47.5 | 37.2 | 8.30 | | | |
| 1999 | 47.9 | 37.5 | 8.30 | | | |
| 2000 | 28.8 | 35.0 | 7.10 | | | |
| 2001 | 40.2 | 35.1 | 7.10 | 0.20 | | |
| 2002 | 28.7 | 35.2 | 7.10 | 0.18 | | |
| 2003 | 40.9 | 36.8 | 7.10 | 0.22 | | |
| 2004 | 5.5 | 37.0 | 7.10 | 0.19 | | |
| 2005 | 30.0 | 36.4 | 7.10 | 0.19 | | |
| 2006 | 18.2 | 33.3 | 7.81 | 0.18 | 9.19 | 11.22 |
| 2007 | | 31.0 | 8.48 | 0.20 | 10.45 | 12.53 |
| Maximum Yield from 1997-2007 | | | | | 37.5 | |
| 2007 Yield | | | | | 31.0 | |
| Percent Reduction in Expected Yield from the Maximum | | | | | 17.3% | |

Table 2. Comparison of GRIP/GRP Offers on Cheyenne and Rawlins County Wheat in Northwest Kansas and No Practicctice Specified.

| | Cheyenne | | | Rawlins | | |
|---|--------------|-------------|-----------------|--------------|-------------|-----------------|
| RMA Expted County Yield | 25.2 | | | 31.0 | | |
| Year with Largest Yield loss | 2004 | | | 2004 | | |
| Largest Disaster Year County Yield | 7.8 | | | 5.5 | | |
| 5 Year Average Percent of Planted Wheat Acres under Irrigation | 5.1% | | | 2.0% | | |
| NASS 20 Years Simple Average Planted Yield | 40.0 | | | 36.7 | | |
| NASS 20 Yr Standard Deviation of Planted Yield | 11.2 | | | 10.9 | | |
| NASS 20 Yr Coefficient of Variation | 28.0% | | | 29.8% | | |
| NASS 33 Years Simple Average Planted Yield | 33.4 | | | 33.2 | | |
| NASS 33 Yr Standard Deviation of Planted Yield | 9.9 | | | 9.8 | | |
| NASS 33Yr Coefficient of Variation | 29.6% | | | 29.5% | | |
| GRP Rate | 8.1% | | | 8.5% | | |
| GRIP Rate | 14.6% | | | 10.5% | | |
| GRIP-HPO Rate | 16.1% | | | 12.5% | | |
| | GRP | GRIP | GRIP-HPO | GRP | GRIP | GRIP-HPO |
| KSU Estimated Farmer Paid Loss Ratio | 0.97 | 0.66 | 0.65 | 1.87 | 1.97 | 1.75 |
| KSU Estimated Frequency of Claim | 12% | 18% | 21% | 21% | 38% | 41% |
| KSU Estimated Industry Loss Ratio | 0.44 | 0.30 | 0.29 | 0.84 | 0.81 | 0.89 |
| KSU Estimated Farmer Paid Loss Ratio, Assuming 2004 Disaster Yield Replaced with RMA Expected Yield | 0.39 | 0.39 | 0.36 | 0.94 | 0.93 | 1.15 |
| KSU Estimated Industry Loss Ratio, Assuming 2004 Disaster Yield Replaced with RMA Expected Yield | 0.17 | 0.17 | 0.16 | 0.42 | 0.42 | 0.52 |