

MMM 456

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GRP Rainfall Index Insurance for Pastures: When does it Pay?

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The USDA Risk Management Agency is testing two insurance products to help livestock producers manage their hay and pasture production risk. Management Marketing Memo 453 describes the GRP Rainfall Index insurance product available for some South Carolina producers. Managers need to understand the cost of this insurance product and the potential indemnities they could receive.

This memo describes the potential net indemnities and the cost of the insurance for pastures for an example farm in Laurens County. The insurance premiums are based on costs for 2008 assuming a 100% productivity factor. The weather variability is based on 59 years of precipitation data from 1948 to 2006 for a 12 mile by 12 mile grid in Laurens County.

Table 1 describes the net indemnity received after paying the insurance premium for the example farm in Laurens county for the first insurance interval (February 1 – March 31).

Table 1. Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval I (February 1 – March 31) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$1.87	\$1.59	\$1.23	\$1.01	\$0.75
Average Positive Payout ^{b/}	\$7.71	\$7.63	\$7.19	\$6.99	\$5.61
Probability Positive Payout ^{c/}	37%	31%	25%	20%	19%
Average Negative Payout ^{d/}	-\$1.60	-\$1.06	-\$0.80	-\$0.51	-\$0.36
Probability Negative Payout ^{e/}	63%	69%	75%	80%	81%
Maximum Net Indemnity ^{f/}	\$21.53	\$19.98	\$18.23	\$16.49	\$14.61
95th Percentile ^{g/}	\$13.74	\$12.18	\$10.44	\$8.69	\$6.81
80th Percentile ^{h/}	\$5.52	\$3.97	\$2.22	\$0.48	-\$0.36
Minimum Net Indemnity ^{i/}	-\$1.61	-\$1.12	-\$0.82	-\$0.52	-\$0.36

^{a/} The average indemnity less premium for 59 years of weather data.

^{b/} The average indemnity less premium when the net indemnity is greater than zero for 59 years of weather data.

^{c/} The probability of receiving a net indemnity that is greater than zero for 59 years of weather data.

^{d/} The average indemnity less premium when the net indemnity is less than zero for 59 years of weather data.

^{e/} The probability of receiving a net indemnity that is less than zero for 59 years of weather data.

^{f/} The largest indemnity less premium for the 59 years of weather data.

^{g/} Ninety-five percent of the net indemnities will be this value or less based on 59 years of weather data.

^{h/} Eighty percent of the net indemnities will be of this value or less based on 59 years of weather data.

^{i/} The smallest indemnity less premium for the 59 years of weather data. This is the insurance premium for 2008.

Producers can insure at the 90%, 85%, 80%, 75% and 70% coverage level (Table 1). The average net indemnity is the average indemnity less premium for the 59 years of weather data. On average, purchasing this insurance

provides a positive return above the cost of the insurance due to the government's subsidy of the insurance premium (Table 1). The probability of receiving an indemnity that is greater than the premium ranges from 19% to 37% (Table). When an indemnity is paid that covers the premium, the amount ranges from \$5.60 - \$7.71 per acre (Table 1). However, there is a 63% to 81% probability that no indemnity will be paid or the indemnity will not cover the cost of the insurance (Table 1). The largest net indemnity paid based on 59 years of weather data ranges from \$14 - \$21 per acre. The ninety-fifth and eightieth percentiles are listed in Table 1 to illustrate that 95 percent and 80 percent, respectively, of the net indemnities will be equal to or less than these values (Table 1). Managers need to understand that this insurance product will not provide an indemnity every year and there is a risk of paying an insurance premium with not receiving an indemnity. The minimum net indemnity is the cost of the insurance premium on a per acre basis.

Table 2 through Table 6 describes the net indemnities for Interval II through Interval VI. Each table is interpreted the same as Table 1. Notice that the cost of the insurance varies by the interval and the coverage level. You pay less for a lower coverage level but receive less risk protection.

Table 2. Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval II (April 1 – May 31) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$2.12	\$1.85	\$1.46	\$1.18	\$0.78
Average Positive Payout ^{b/}	\$8.99	\$8.32	\$6.61	\$4.97	\$4.27
Probability Positive Payout ^{c/}	37%	34%	34%	34%	27%
Average Negative Payout ^{d/}	-\$1.96	-\$1.47	-\$1.18	-\$0.77	-\$0.52
Probability Negative Payout ^{e/}	63%	66%	66%	66%	73%
Maximum Net Indemnity ^{f/}	\$16.33	\$14.85	\$13.13	\$11.50	\$9.70
95th Percentile ^{g/}	\$13.19	\$11.71	\$10.00	\$8.36	\$6.57
80th Percentile ^{h/}	\$8.22	\$6.73	\$5.02	\$3.38	\$1.59
Minimum Net Indemnity ^{i/}	-\$2.07	-\$1.51	-\$1.18	-\$0.77	-\$0.52

See Table 1 for explanation of footnotes.

Table 3. Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval III (June 1 – July 31) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$1.94	\$1.72	\$1.38	\$1.17	\$0.82
Average Positive Payout ^{b/}	\$9.60	\$9.12	\$7.38	\$5.75	\$4.99
Probability Positive Payout ^{c/}	34%	31%	31%	31%	25%
Average Negative Payout ^{d/}	-\$1.99	-\$1.53	-\$1.25	-\$0.84	-\$0.60
Probability Negative Payout ^{e/}	66%	69%	69%	69%	75%
Maximum Net Indemnity ^{f/}	\$22.25	\$20.77	\$19.03	\$17.40	\$15.59
95th Percentile ^{g/}	\$15.03	\$13.55	\$11.81	\$10.18	\$8.38
80th Percentile ^{h/}	\$8.52	\$7.04	\$5.30	\$3.67	\$1.86
Minimum Net Indemnity ^{i/}	-\$2.12	-\$1.56	-\$1.25	-\$0.84	-\$0.60

See Table 1 for explanation of footnotes.

Table 4 Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval IV (August 1 – September 30) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$1.89	\$1.72	\$1.39	\$1.20	\$0.89
Average Positive Payout ^{b/}	\$10.14	\$9.11	\$7.89	\$7.22	\$6.30
Probability Positive Payout ^{c/}	32%	31%	29%	25%	22%
Average Negative Payout ^{d/}	-\$2.03	-\$1.52	-\$1.24	-\$0.85	-\$0.64
Probability Negative Payout ^{e/}	68%	69%	71%	75%	78%
Maximum Net Indemnity ^{f/}	\$27.95	\$26.42	\$24.68	\$23.03	\$21.19
95th Percentile ^{g/}	\$16.02	\$14.48	\$12.75	\$11.09	\$9.25
80th Percentile ^{h/}	\$8.29	\$6.75	\$5.02	\$3.36	\$1.52
Minimum Net Indemnity ^{i/}	-\$2.06	-\$1.55	-\$1.24	-\$0.85	-\$0.65

See Table 1 for explanation of footnotes.

Table 5. Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval V (October 1 – November 30) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$2.69	\$2.50	\$2.08	\$1.85	\$1.44
Average Positive Payout ^{b/}	\$11.27	\$9.90	\$8.69	\$7.99	\$6.60
Probability Positive Payout ^{c/}	39%	39%	37%	34%	32%
Average Negative Payout ^{d/}	-\$2.79	-\$2.23	-\$1.85	-\$1.29	-\$1.00
Probability Negative Payout ^{e/}	61%	61%	63%	66%	68%
Maximum Net Indemnity ^{f/}	\$24.11	\$22.73	\$21.08	\$19.57	\$17.83
95th Percentile ^{g/}	\$17.17	\$15.79	\$14.14	\$12.63	\$10.89
80th Percentile ^{h/}	\$10.96	\$9.58	\$7.93	\$6.42	\$4.68
Minimum Net Indemnity ^{i/}	-\$2.92	-\$2.25	-\$1.86	-\$1.32	-\$1.02

See Table 1 for explanation of footnotes.

Table 6. Net Indemnity Received after Paying Premiums for GRP Rainfall Insurance for Pastures for Interval VI (December 1 – January 31) for Example Farm in Laurens County Assuming 100% Productivity Factor (\$/acre).

Coverage Level	90%	85%	80%	75%	70%
Average Net Indemnity ^{a/}	\$1.71	\$1.39	\$1.00	\$0.92	\$0.74
Average Positive Payout ^{b/}	\$7.41	\$7.33	\$9.36	\$9.39	\$7.52
Probability Positive Payout ^{c/}	39%	32%	20%	17%	17%
Average Negative Payout ^{d/}	-\$1.93	-\$1.42	-\$1.14	-\$0.81	-\$0.64
Probability Negative Payout ^{e/}	61%	68%	80%	83%	83%
Maximum Net Indemnity ^{f/}	\$29.56	\$28.04	\$26.29	\$24.61	\$22.75
95th Percentile ^{g/}	\$18.68	\$17.17	\$15.42	\$13.74	\$11.88
80th Percentile ^{h/}	\$3.38	\$1.86	\$0.11	-\$0.82	-\$0.64
Minimum Net Indemnity ^{i/}	-\$2.01	-\$1.48	-\$1.19	-\$0.82	-\$0.64

See Table 1 for explanation of footnotes.

You can see that the higher coverage levels (85% or 90%) have the larger average net indemnities and greater probability of receiving a positive payout than the lower coverage levels (75% or 70%). Of course, the insurance premiums at the higher coverage levels are greater than those at the lower coverage levels. The 90% coverage level will provide greater risk protection than the 70% coverage level but will be a more costly risk management product.

There is a decision tool available on the internet to help you evaluate the potential benefits and costs of insuring your acreage. By evaluating the insurance product over several years, you can understand the effectiveness of GRP Rainfall Index insurance in mitigating production risk. The decision tool can be found at: <http://agforceusa.com/ri/prf/dst>.

The sales closing date is November 30, 2007. See your local insurance agent for more information.