

Pasture, Rangeland, and Forage Insurance: A Risk Management Tool for Hay and Livestock Producers

**Monte Vandaveer, Otoe County Extension Educator
University of Nebraska-Lincoln
Institute of Agriculture and Natural Resources**

Introduction

Nebraska farmers and ranchers who depend on grazing and hay production have a relatively new insurance product that can help them when drought conditions affect forage production. This insurance product is called Pasture, Rangeland, and Forage, or PRF coverage.

In 2013 PRF coverage in Nebraska will be based on a rainfall index for a given local area. The insurance works by paying an indemnity if the rainfall index for the insured's area falls below some guaranteed level, specified as a percent of average rainfall. This type of coverage has been pilot tested in several locations across the U.S. and will be used in Nebraska for the first time next year. Formerly, the Nebraska PRF coverage used a vegetation index, measured as the "greenness" of a grid area as seen from satellites in space. In 2013 the vegetation index will only be used in some western states.

Some features of PRF coverage will be familiar to producers who have used multiple peril crop insurance before. Just like MPCI, it is backed by the USDA Risk Management Agency and sold through local insurance agents. The premiums are subsidized at a significant level, with the federal government paying from 51% to 59% of the total premium for PRF coverage. Producers sign up before the season begins and pay their premiums later in the season. The sign-up deadline, or sales closing date, for insuring 2013 forage production is November 15, 2012.

Coverage Based On Rainfall Index

PRF coverage is different from traditional crop insurance in one very important aspect: Its coverage is based on a rainfall index for a local area rather than on an individual operator's

production. A primary reason for using a rainfall index is that pasture production is seldom, if ever, measured as precisely as crop yields, so no yield history exists. Thus, another indicator of production loss is required. Rainfall is used as a proxy for grazing or hay output, since forage production is expected to vary closely with rainfall. Other causes of loss, such as fire, hail, frost, freeze, or insect or disease damage, are not covered by PRF.

PRF coverage in Nebraska for 2013 will use a rainfall index calculated by the federal government's National Oceanic and Atmospheric Administration (NOAA). NOAA's Climate Prediction Center combines rain gauge, satellite, and radar information to develop rainfall maps. PRF rainfall index coverage is based on rainfall over a grid area measuring 0.25 degrees in latitude and 0.25 degrees in longitude. This results in an area about 13 miles from east to west, and about 17 miles from north to south.

The rainfall index value calculated for this area reflects that year's observed experience as a percent of a historical average using data going back to 1948. For example, if this year's rainfall for a particular period and area was 88% of the historic average, the rainfall index would have a value of 88. Exactly average rainfall would produce an index value of 100. It is important to remember that the index is based on rainfall across the entire grid; it is not based on rainfall on individual farms or ranches or at a specific weather station in the area.

At sign-up, an insured plot of land is matched to its particular grid on RMA maps. (These can be found on RMA's website.) If a producer insures a contiguous piece of land which straddles a grid line, the land may be insured in just one of the grids, or it may be insured as separate units with the appropriate portion assigned to the specific grids. Non-contiguous land parcels in different grids must be insured separately, matched to the grid where each is located.

What Land Is Eligible?

Both perennial grazing land and hay land may be insured, but not land that is not planted annually. Overseeding into existing forage crops or pastures is permitted. Producers can choose to insure just a portion of their grazing or haying land.

Grassed waterways around row crop fields which are cut for grass hay may be designated as hay land and thus may be insured. Neither Conservation Reserve Program (CRP) land nor Wetlands Reserve Program land is eligible for PRF coverage. Farm Service Agency maps can be used to determine acreage for the policies.

When producers sign up for insurance, they must indicate whether they will use the land for grazing or haying that year. Actual use of that land then must correspond to the use specified in

the insurance coverage. No designated parcel may be insured for both haying and grazing in one season. However, the grazing or haying designation may be changed from one year to the next, so long as the insurance agent is notified and makes appropriate changes to the policy in subsequent years.

Coverage Levels and Liability

Producers must make two selections at sign-up regarding coverage levels. The first selection is the guarantee level, which indicates the percentage of average rainfall at which insurance payments are triggered. Producers may select coverage levels ranging from 70% to 90% of this value, in 5% increments. The 90% coverage level, for example, means that indemnity payments are triggered whenever rainfall is below 90% of average.

The second selection is the productivity factor. This factor adjusts the dollar value of the grazing or hay production being insured. RMA assigns each grid area a base dollar value per acre for both grazing and haying which reflects typical production in that area. The productivity factor then adjusts the base dollar value up or down, from 60% of the base up to 150% of the base value.

For example, suppose the grazing base value for a particular grid is set by RMA at \$20 per acre. Producers could thus select a production value as low as \$12 per acre (60% of the base) or as high as \$30 per acre (150% of the base). This feature is useful if the producer thinks their own productivity is higher or lower than average, or if they simply want a different dollar level of coverage.

The liability is the maximum payout of the policy, the amount that would be paid if there were a complete loss. On a per-acre basis, the liability is calculated as the value of production (including the productivity factor adjustment) times the guarantee level (expressed as a percentage). For example, grazing land with a base dollar value of \$20 per acre and a productivity factor of 150% would have a production value of \$30 per acre ($\$20/\text{acre} \times 150\%$). If 90% coverage is selected, the total liability or policy protection is \$27 ($\$30/\text{acre} \times 90\%$) per acre.

Coverage Periods and Allocating Protection

At sign-up producers also must select the time periods, called index intervals, which will be covered by insurance. Index intervals are two months long. Producers must insure each parcel of land for at least two intervals during the season. For example, land could be insured for the

May-June and July-August intervals. Producers may elect to insure more than two intervals; for example, a producer could select coverage for April-May, June-July, and August-September.

Producers must then allocate the total dollar value of protection across the index intervals they have chosen to insure. Suppose the producer allocates 60% to the May-June interval and 40% to the July-August interval. The liability per acre for the May-June period would be \$16.20 ($\$27/\text{acre} \times 0.6$), and the liability for July-August is \$10.80 ($\$27/\text{acre} \times 0.4$).

Some restrictions apply to these allocation percentages. If an index interval is selected, at least 10% of the dollar value of coverage must be assigned to that time period. Similarly, the maximum allocation for any index interval is 60% of the total dollar coverage.

Premiums and Subsidies

The premiums for PRF coverage are calculated as the premium rate (expressed as a percentage) times the dollar coverage, or liability, of the policy. Premiums are calculated separately for each index interval, since each interval has its own dollar value of coverage and a separate rate reflecting the variability of rainfall in that time period.

In our example, suppose the rate for the 90% coverage level in the May-June interval is 0.12; the premium would be \$1.94 per acre ($\16.20×0.12, rounded). A similar calculation is performed using the rate for the July-August interval.

The premium calculated in this fashion is referred to as the total premium. This amount is then divided into the producer premium and the premium subsidy paid by the government. The subsidy rates paid by the government are substantial. The government will pay 51% of the total premium for the 90% coverage level, 55% of the premium for 85% and 80% coverage levels, and 59% for the 75% and 70% coverage levels.

Continuing with our earlier grazing example, the producer who buys \$16.20 of liability per acre for the May-June interval has a total premium of \$1.94 per acre, but pays only 49% of this, or \$0.95, as the government pays the remaining \$0.99.

Losses and Indemnities

Recall that under PRF coverage, an indemnity is paid only when the rainfall index for the entire grid area falls below the guaranteed level during an insured index interval. The producer's actual production is not considered. A producer may experience a production loss but not

receive an indemnity under PRF coverage or, conversely, receive an indemnity payment but not have a production loss.

The size of the indemnity reflects the difference between the actual rainfall index over the period and the guaranteed level selected, should a shortfall occur. A percentage loss value, called the payment calculation factor, is calculated as the difference between the guaranteed or trigger index level and the actual index level. This difference is expressed as a percentage of the trigger index value. This payment calculation factor is then multiplied by the liability amount to determine the indemnity.

To illustrate this, recall the previous example where a producer has 90% coverage for the May-June interval, with a liability of \$16.20 per acre. An indemnity payment is thus triggered when the rainfall index falls below 90. Suppose the actual rainfall index value for the period turns out to be 65. The payment calculation factor is $(90-65)/90$ or 0.277. Calculate the insurance indemnity per acre by multiplying this factor times the liability or dollar coverage per acre ($\$16.20 \times 0.277 = \4.49 [rounded]).

The rainfall index is calculated for each index interval after the period ends, and an indemnity payment is calculated and paid if a loss has occurred. Thus, an indemnity can be paid for one index interval even if a loss does not occur in another interval, or multiple indemnity payments can be made if rainfall continues to be low over the periods insured.

NOAA collects the weather data and calculates the rainfall index values. While NOAA does post daily weather observations for rainfall for various weather stations, it does not post the rainfall index values for the grid areas. RMA will post these rainfall index values at the end of each index interval.

Effectiveness and Cost of PRF Coverage

Producers should consider several issues to determine whether PRF coverage can provide useful risk management for their operation. The effectiveness of PRF coverage will depend on how closely the rainfall index value mirrors one's own forage production, and how well PRF coverage compensates when a loss occurs. The remaining sections discuss the effectiveness of PRF coverage and which coverage options might be the most useful.

One challenge associated with PRF coverage has already been mentioned, namely that the insurance is based on a rainfall index over an area much larger than most individual operations. Since any indemnity payment is based on the rainfall experience of the entire grid, the rainfall index value for the grid may not exactly reflect the individual producer's experience.

Timing of rain events is also an issue. Each index interval lasts two months, and one large rainfall occurring near the end of the interval may still push the index value above the trigger level even though grazing or hay production may have suffered up until that point. Similarly, large rains with significant runoff can create a gap between the rainfall index value and the actual production realized.

Even so, PRF coverage should prove effective in most cases. While the rainfall index for the entire grid area may not exactly match a producer's experience, the grid areas are small enough that rainfall experience should still be similar. Also, lack of rain in one part of the grid will be taken into account when calculating the area-wide index value.

In addition, PRF coverage should be relatively cheap, particularly considering the premium subsidies. The producer premium for PRF grazing coverage for most places in Nebraska should be in the neighborhood of \$1/acre or less, depending on the coverage levels and time periods chosen. The premiums for haying will be higher, reflecting the higher dollar value of production (and hence the higher insurance liability) per acre.

Which Kind of Coverage?

One coverage choice that affects the dollar coverage per acre is the choice of production practice, namely grazing or haying. Practically speaking, this choice only matters for land such as hay pastures which could be either grazed or hayed in the upcoming season. Land insured for hay production receives much higher dollar coverage per acre than does grazing land, as hay land is assumed to be more productive. In fact, for most Nebraska locations the base dollar value of production for haying land is several times that of grazing land. For 2013 grazing land across the state has been assigned a value of \$10 to \$25 per acre per season, while haying land in many locations has a base production value over \$200 per acre. The premiums on haying land are correspondingly higher.

Selecting Index Intervals

Another coverage issue is that of allocating the coverage over the grazing or haying season. As mentioned earlier, at least two index intervals must be used, and each interval lasts two months, with a minimum of 10% of liability and a maximum of 60% of liability allocated to each interval selected.

To make PRF a more effective risk management tool, the producer should select those periods in which rainfall is most closely correlated to their grazing or hay production. In most years, the

best choice would seem to be those months when the forage is actually being grazed or hayed. However, pre-season rainfall also may be important if soil moisture needs to be recharged after a drought year.

On average, rainfall is highest and least variable in Nebraska in late spring and early summer. The premium rates for PRF coverage reflect this, with rates for the colder months usually higher than those for the warmer months. In most years, insuring the periods when most of the haying and grazing occurs should be the most effective and least expensive option.

How Much Coverage Should You Buy?

Each year RMA establishes the base dollar amounts per acre for the production value. As described above, a producer may adjust this base value up or down with the productivity factor, from 60% to 150% of the base value, to come up with their own dollar amount. A producer who feels their land is more (or less) productive than the grid average can thus adjust the dollar value accordingly.

Another approach to choosing a dollar level of coverage is the expected value of production coming from the insured land. For hay ground, this would be the expected value of hay production; that is, hay output, usually measured in tons per acre, times the price per ton. For example, land that produced 3 tons of grass hay per acre at \$120/ton would have expected output valued at \$360 per acre. If the base value of production was \$220/acre, a producer could select the 150% productivity factor to increase the production value to \$330/acre. Selecting 90% coverage on this amount would result in a total liability or maximum dollar coverage of \$297/acre.

For grazing land, productivity measured in tons of forage may not be known and a dollar value of production may be more difficult to determine. One proxy for this value could be pasture rental rates, which could be thought of as the value of the forage harvested by livestock. Another perspective in the case of grazing land is the cost of replacement forage. This may be a more serious issue for livestock producers who need to buy replacement forage if their production fails. The example below illustrates one possible situation.

An Example for Grazing Land and Replacement Forage

Consider the earlier example of grazing land with a base dollar value of \$20 per acre. If the producer chooses the 150% productivity factor and the 90% coverage level, the liability or maximum payout for the 2 two-month index intervals would be $\$20 \times 150\% \times 90\% = \27 per acre. Suppose that no rain fell during this period and the grid area suffered a complete loss.

(This is extremely rare in the historical data.) The indemnity would equal the liability, or \$27 per acre.

Suppose, too, that the pasture stocking rate was five acres per cow-calf pair. This means that the insurance proceeds from the five acres — in this case, \$135 (= \$27/acre x 5 acres) — would be available to buy replacement forage to feed that cow-calf pair for part or all of this period. Would this \$135 indemnity be an adequate substitute for the lost grazing?

Assuming that cattle eat 2.5% of their body weight each day, measured in dry matter terms, a 1300 lb cow and a 300 lb calf would together consume 40 lb of dry matter per day. If purchased hay is 85% dry matter, the as-fed weight is 47.1 lb per day for the pair, or 1,413 lb for every 30 days on feed. Using \$200/ton as a price for good quality alfalfa hay, this means replacement forage would cost about \$141 per cow-calf pair for each 30 days on feed. Less expensive, lower quality hay and a protein supplement also might be obtained. These calculations suggest that even the maximum payout for grazing coverage might only pay for about one month of replacement forage in a fairly typical grazing scenario.

Producers need to consider their own stocking rates, feed consumption and costs, and grazing productivity to make this type of comparison. The previous example suggests that for many grazing situations, a higher productivity factor and a higher guarantee level might be needed to raise the dollar value of coverage to reflect the cost of replacement feeds.

Online Decision Aids

RMA has a number of web pages which provide details on the PRF coverage. A producer can review basic information and a wide variety of links at <http://www.rma.usda.gov/policies/pasturerangeforage/>

In addition to the policy information on the RMA website, more decision tools are available on a website operated by a private company which cooperates with RMA on PRF coverage. The first of these pages can help a producer match their land's location to a particular grid value on a map. The URL for this site is: <http://agforceusa.com/rma/ri/prf/maps>

From this page, a producer can click on links to related decision tools which calculate total dollar coverage and premiums for each coverage level. Users also can obtain rainfall index values by index interval for each year going back to 1948 and determine how frequently the index fell below the respective PRF coverage levels. These other decision tools are at <http://agforceusa.com/rma/ri/prf/dst>

Sales Closing Date in the Fall

The deadline in Nebraska to buy PRF coverage is in the fall preceding the year of coverage. For 2013 PRF coverage, the deadline is November 15, 2012. If you are interested, contact your crop insurance agent soon for more information.