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Tool helps gauge monetary risk of operations change

Partial budgeting can be helpful in evaluating management decisions for any agricultural operation. The technique examines potential changes in costs or returns associated with adjustments in strategy or business operations.

Using estimates (such as potential prices or yields) that are themselves best guesses is one of the pitfalls of standard budgeting. Using these approximations can become problematic if major decisions are made without properly accounting for the inherent uncertainty of these values.

The Risk Scenario Planning (RSP) tool from RightRisk.org, is an Excel-based risk analytics tool that helps agricultural producers use a range of values when making budget projections or production decisions. The RSP tool can help a manager include the risk associated with a particular decision or change and may help eliminate some of this uncertainty by assigning a range of probable outcomes associated with the selected variables.

Risk Scenario Planning and the RI-PRF Decision

Crook County producers Andy and Annette Evans* have been using Pasture, Rangeland and Forage Insurance-Rainfall Index (RI-PRF) to cover some of the precipitation risk for their ranch. The Evans, like many cattle producers this year, are looking to trim costs wherever possible. They have been purchasing the maximum coverage available on 2,000 acres in their grid area.

While they would like to keep their RI-PRF coverage, they are considering whether the potential financial benefit of cutting back the coverage outweighs the decreased insurance coverage and associated increased risk.

Using the PRF Decision Support Tool (rma.usda.gov), the Evans map out their prospective coverage by selecting their grid point, acres, and coverage level. Visit RightRisk.org for a detailed explanation of how RI-PRF could work in your operation, as well as instruction on the Decision Support Tool and example producer profiles.

Using the coverage level from the previous year of 90 percent and a productivity factor of 150 percent (90/150), applying 60 percent of the coverage to the April-May interval and 40 percent to the June-July interval, RI-PRF would provide $22,680 in total coverage ($11.34/acre) in exchange for a premium of $1,509 ($0.75/acre), after subsidies.

If the Evans reduce RI-PRF coverage to 70 percent and a productivity factor of 100 percent (70/100), total coverage would be $11,760 ($5.88/acre) at a premium cost of $276 ($0.14/acre).

Using the Risk Scenario Planning

The RSP tool follows a partial budget framework; with this example we are examining the Evans' decision whether or not to lower their RI-PRF coverage. Last year's 90/150 coverage is entered as a reduced return and a reduced cost, where this level of coverage is not purchased. Conversely, the 70/100 level of coverage is entered as an increased return and an increased cost, where this level of coverage would be purchased in place of the 90/150 level. Keep in mind there are other approaches for entering the details for this decision; this approach seems the most straightforward for this example.

The reduced premium cost of $0.61/acre is entered where the Evans propose not to purchase the 90/150 level of coverage for the coming year. In addition, under the reduced returns section, we enter the expected value of the 90/150 coverage of $11.34 per acre and include the allocation details for the April-May and June-July intervals. We also enter the expected index value of 100 for each interval, as well as a formula used to calculate the RI-PRF indemnity where the index falls below the coverage level selected (90 percent). See RightRisk.org > Risk Management Tools > Risk Scenario Planner for other examples of using of the RSP tool.

An added premium cost of $0.14/acre is entered where the Evans propose to purchase the 70/100 level of coverage for the coming year. In addition, under the added returns section, we enter the expected value of the 70/100 coverage of $5.88 per acre and include the allocation details for the April-May and June-July intervals. We also enter the expected index value of 100 for each interval, and a formula to calculate the RI-PRF indemnity where the index falls below the coverage level selected (70 percent).

The initial tally of positive and negative effects for the change in coverage shows a net benefit of $0.61 per acre (Table 2): reduced premium cost of $0.75 per acre (90/150 coverage), and an increased

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Table 1. Evans Ranch PRF-RI Coverage Summary

Scenario	Coverage Level (%)	Productivity Factor (%)	Total Coverage	Coverage Per Acre	Total Premium	Premium Per Acre
Maximum	90	150	$22,680	$11.34	$1,509	$0.75
Reduced	70	100	$11,760	$5.88	$276	$0.14

Table 2. RSP Entries for the Proposed Reduction of RI-PRF Coverage

RightRisk — Partial Budget For: *Reduce RI-PRF Coverage from 90/150 to 70/100*

Positive Effects: Added Returns	Quantity	Value	Total
Grid ID: #29202 insurable value		$ 5.88	$ -
April-May interval: index value	100		$ -
April-May interval: coverage level (%)	70		$ -
April-May interval: percent of value (%)	60		$ -
April-May interval: indemnity payment	0	$ 5.88	$ -
			$ -
June-July interval: index value	100		$ -
June-July interval: coverage level (%)	70		$ -
June-July interval: percent of value (%)	40		$ -
June-July interval: indemnity payment	0	$ 5.88	$ -
Total Added Returns			$ -
Reduced Costs	**Quantity**	**Value**	
RI-PRF per acre premium, 90/150 coverage	1	$ 0.75	$ 0.75
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total Reduced Costs			$ 0.75

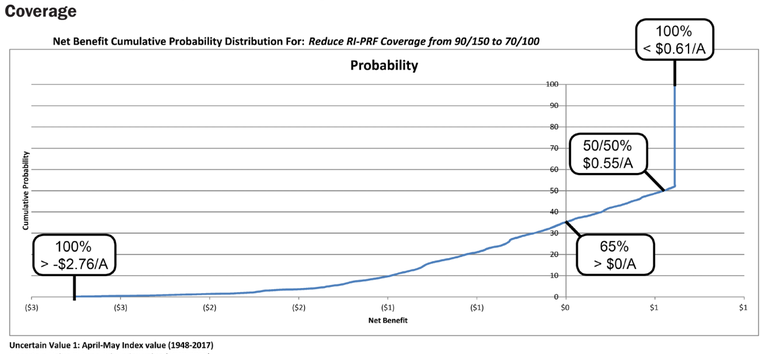
Negative Effects: Added Costs	Quantity	Value	
RI-PRF per acre premium, 70/100 coverage	1	$ 0.14	$ 0.14
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total Added Costs			$ 0.14
Reduced Returns	**Quantity**	**Value**	
Grid ID: #29202 insurable value		$ 11.34	$ -
April-May interval: index value	100		$ -
April-May interval: coverage level (%)	90		$ -
April-May interval: percent of value (%)	60		$ -
April-May interval: indemnity payment	0	$ 11.34	$ -
			$ -
June-July interval: index value	100		$ -
June-July interval: coverage level (%)	90		$ -
June-July interval: percent of value (%)	40		$ -
June-July interval: indemnity payment	0	$ 11.34	$ -
Total Reduced Returns			$ -

Total Positive Effects (Added Returns + Reduced Costs)	$	0.75	**Total Negative Effects** (Added Costs + Reduced Returns) $ 0.14
Net Benefit of: Reduce RI-PRF Coverage from 90/150 to 70/100	$	0.61	

Table 3. RSP Uncertain Value Entries for the Proposed Reduction of RI-PRF Coverage

Risk Scenarios				
Uncertain Value 1		☑ Include	**Uncertain Value 2**	☑ Include
Description	**Cell**		**Description**	**Cell**
April-May Index value (1948-2017)	C8		June-July Index value (1948-2017)	C13
Current Value (Most Likely)	100		Current Value (Most Likely)	100
Minimum Value	35.6		Minimum Value	26.5
Maximum Value	216.2		Maximum Value	204.8

Table 4. RSP Probability Graph Describing the Net Benefit from the Proposed Reduction of RI-PRF Coverage



Uncertain Value 1: April-May Index value (1948-2017)
Uncertain Value 2: June-July Index value (1948-2017)

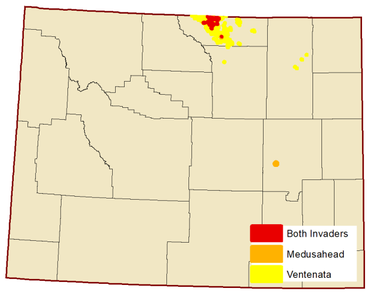
New invasive annual grasses in Wyoming: Why you should care

When many in Wyoming think of invasive winter annual grasses, they think cheatgrass (downy brome, *Bromus tectorum*) and/or Japanese brome (*Bromus japonicus*).

Every county has at least some of these species, but unfortunately, these are no longer the only winter annual invasive grasses for which to be on the lookout. Two new invasive winter annual grasses, medusahead (*Taeniatherum caput-medusae*) and ventenata (*Ventenata dubia*), have been identified in the state.

Much like our winter annual grasses, both are able to germinate in the fall allowing them to effectively utilize early spring moisture, possibly to the disadvantage of native species. The result is, in highly invaded areas, a decline from desirable vegetation ranging from perennial grasses to flowering forbs to shrubby species, greatly reducing the diversity and value of the land. These impacts are reported by some to be worse than cheatgrass. Imagine a species worse then cheatgrass!

Because of their early-season lifecycle, they, much like cheatgrass, are limited to very early-season grazing. Unfortunately, both also have high silica content, which makes them less desirable as livestock forage. Their high silica content not only makes them less desirable as forage than cheatgrass, this also means they can create a thatch layer that persists longer than cheatgrass, creating a fire hazard.



Map 1. Statewide distributions of ventenata and medusahead.

The majority of positively identified ventenata and medusahead populations is restricted to the northeast portion of the state (Map 1). Ventenata is more widespread than medusahead; however, a population of medusahead was found in Converse County, in central Wyoming, nearly 170 miles away along the 1-25 corridor. This newly identified population is a reminder that, although the prevalence of these species is in northeast Wyoming, nowhere is completely immune, and diligence is required to find them before they spread to a scale too large to manage.

Identification

Both invaders are **annual** grasses. This means they only persist for a single year and create a shallow, easy-to-pull root system. This is a relatively rare trait for most of our native grasses and can be helpful for identification.

Neither species can be easily differentiated from our current invasive annual grasses from afar. Getting up close is needed to correctly identify.

Medusahead – Seeds have long spines (awns) that make it look similar to foxtail barley (*Hordeum jubatumi*) and bottlebrush squirreltail (*Elymus elymoides*) (both are perennial). However, unlike these species, the awns are variable lengths. The awns become longer at the top of the seedhead than at the base (Image 1).

Ventenata – This is more difficult to identify via the seedhead. The seeds are much more widely spaced on an open panicle and rarely droop, as is the case for cheatgrass. The spines (awns) on the tip of the seeds are short (approximately 1/2 inch) and are often bent halfway up (Image 2).

For more visualizations of identification characteristics, please visit http://bit.ly/wyoweedwatch.

Please contact your region's University of Wyoming Extension educator or county weed and pest control district office if you believe you have identified either of these invaders.

*Image 1. Medusahead (*Taeniatherum caput-medusae*)*

*Image 2. Ventenata (*Ventenata dubia*)*

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Tools, continued

premium cost of $0.14 per acre (70/100 coverage). The Evans now wonder what they should enter for index values for the two intervals selected. Fortunately, the RMA Decision Support Tool provides the index values for 1948 to present: April-May index values ranged from 35.6-216.2, while the June-July interval index values ranged from 26.5-204.8.

Probability/Risk Analysis

A unique feature of the RSP tool is that it allows for up to two uncertain variables in the analysis to help account for risk. These variables are entered in the form of a range (minimum, maximum, and most likely).

To account for the range in uncertain index values, we enter 100 as the most likely value for the April-May and June-July intervals (Table 3). We also enter the minimum and maximum values provided by the RMA Decision Support Tool for each interval. The RSP tool generates results based on repeated random draws (1,000 total draws) from the distributions of the uncertain values entered, allowing the index values for each interval to vary within the ranges. The result is a probability graph describing the results the Evans should expect if they were to reduce their RI-PRF coverage.

Table 4 shows the results of the RSP risk analysis. From this the Evans see the initial estimate of net benefit from reducing RI-PRF coverage to 70/100 ($0.61 per acre) calculated in Table 2 would occur nearly 50 percent of the time. In fact, there is a 50/50 chance the net benefit would be $0.55 per acre and greater than $0 per acre about 65 percent of the time.

Entering alternative values for index estimates on one or both intervals, alternative coverage values or premium costs, would generate differing probability graphs. The Evans found this analysis helpful in making the choice about which RI-PRF coverage level to select for the coming year.

** The Evans operation is a case study example created to demonstrate RightRisk tools and their applications. No identification with actual persons (living or deceased), places, or agricultural operation is intended nor should be inferred.*

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