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Margin Protection Crop Insurance for Idaho Corn Growers

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Introduction

Crop producers have faced high input costs and volatile commodity prices over the past few years. While output price risk can be effectively managed using hedging and marketing tools, limited options are available when it comes to managing input price risks. Since 2016, margin protection (MP) policies have been offered for selected crops in selected states, allowing farmers to insure the operating margin (margin = revenue – costs) on eligible crops. This publication aims to discuss margin protection crop insurance for corn growers in Idaho that will be available for the 2024 crop year.

Eligibility for Idaho Producers and Timeline

Margin protection is an area-based insurance plan that protects producers from a decline in operating margins due to high input costs, low county yield, low commodity prices, or any combination of those. Coverage availability depends on the crop and state. Before 2023, the MP plan was available mostly for states in the Midwest. In 2023, the United States Department of Agriculture (USDA) expanded the MP plan for corn and soybean farmers.

Currently, the MP plan is available for all corn farmers in the United States except for Alaska and Hawaii; for soybean farmers in thirty-four states; for rice farmers in six states; and for wheat farmers in four states (Minnesota, Montana, North Dakota, and South Dakota). In Idaho, only corn farmers from twenty counties are eligible to purchase the MP policy, starting from the 2024 crop year (for crops to be harvested in 2024). Figure 1 shows the eligible Idaho counties.

The life cycle of an MP policy typically spans three years. Figure 2 shows the timeline for crop year 2024. Producers can purchase margin protection by September 30 of the year before the crop year. Payouts occur in the year following harvest after final county data is available. The harvest period for silage corn in Idaho typically spans from the end of August to mid-October, while for grain corn it typically occurs from late October to as late as the next calendar year depending on end use and weather (Stokes and Hines 2020).

Mechanics of MP Policy

The MP policy insures producers based on the USDA’s estimated **expected margin** per acre at the county level. Using the preseason expected corn prices and input costs, the USDA Risk Management Agency (RMA) determines the *expected revenue* and *expected cost* to compute the *expected margin*. A **trigger margin** is computed for each producer depending on the expected margin, expected revenue, and coverage level, which can range from 70% to 95% with 5% increments.

After the season, an actual **harvest margin** for the county is calculated using actual price, yield, and cost data for that season. This is compared against the *trigger margin* to decide if an indemnity payment will be made. The indemnity amount depends on the **margin loss** and the **protection factor** selected by the producer. In the subsections below, we review each element of the MP policy. An illustration of this is also included in Figure 3.

Expected Revenue

Expected revenue is *projected price* × *projected county yield* for the crop. The **expected county yield (ECY)** is derived from a linear trend of historical yields and is released by the RMA. Table 1 shows the expected corn yield for 2024 in eligible Idaho counties.

For corn, the **projected price** is derived from the average daily prices of the December corn futures contract traded on the Chicago Board of Trade (CBOT) for the insured crop year during the preseason price discovery period (August 15–September 14), as shown in Table 2, panel A. For the 2024 crop year, the expected price is the average price of the December 2024 corn futures contract between August 15, 2023, and September 14, 2023.

If a farmer chooses to use the harvest price option (MP-HPO), the harvest price will be used to recalculate the expected margin if the harvest price is higher than the projected price. Effectively, this increases the insured margin for the producer.

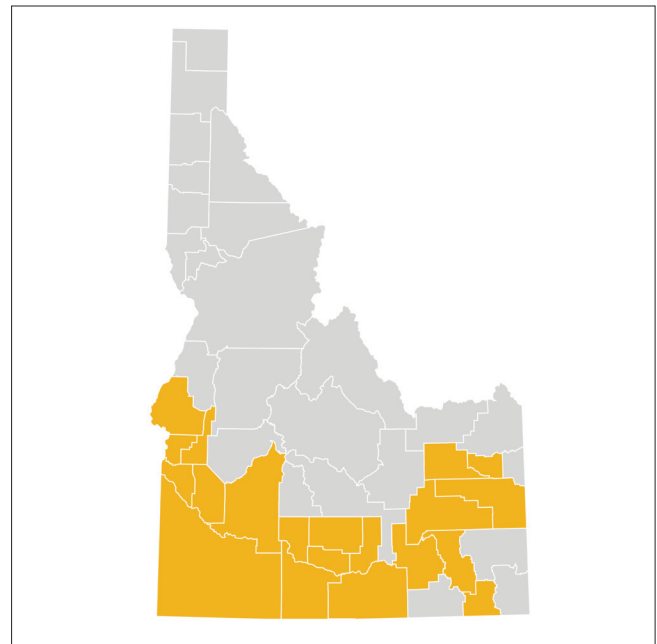


Figure 1. Margin protection plan availability in Idaho. Source: United States Department of Agriculture (USDA) Risk Management Agency.

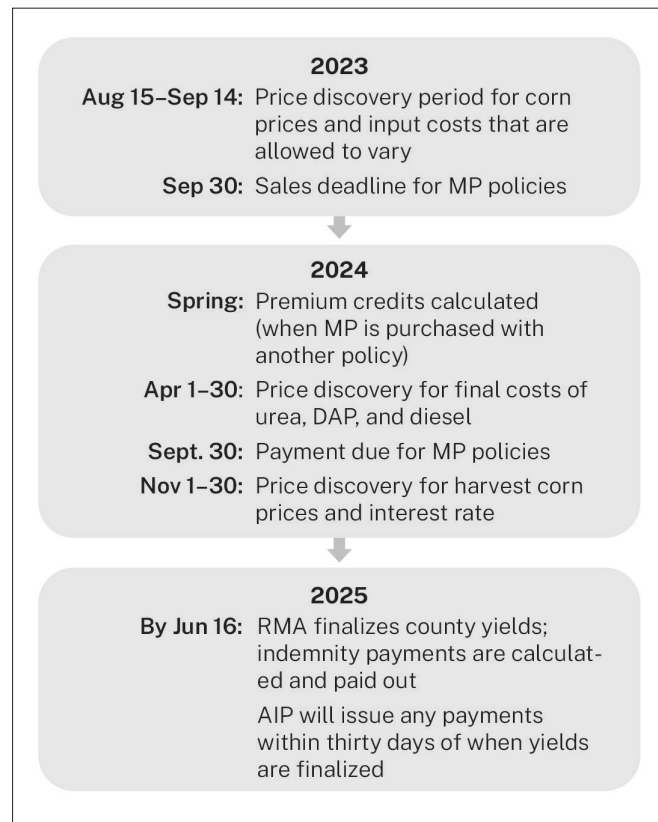


Figure 2. Timeline for 2024 crop-year margin protection policies, Idaho corn producers. DAP, diammonium phosphate price; RMA, risk management agency (USDA-based); AIP, approved insurance provider. Source: Authors’ derivation based on USDA Risk Management Agency and Swanson et al. (2022).

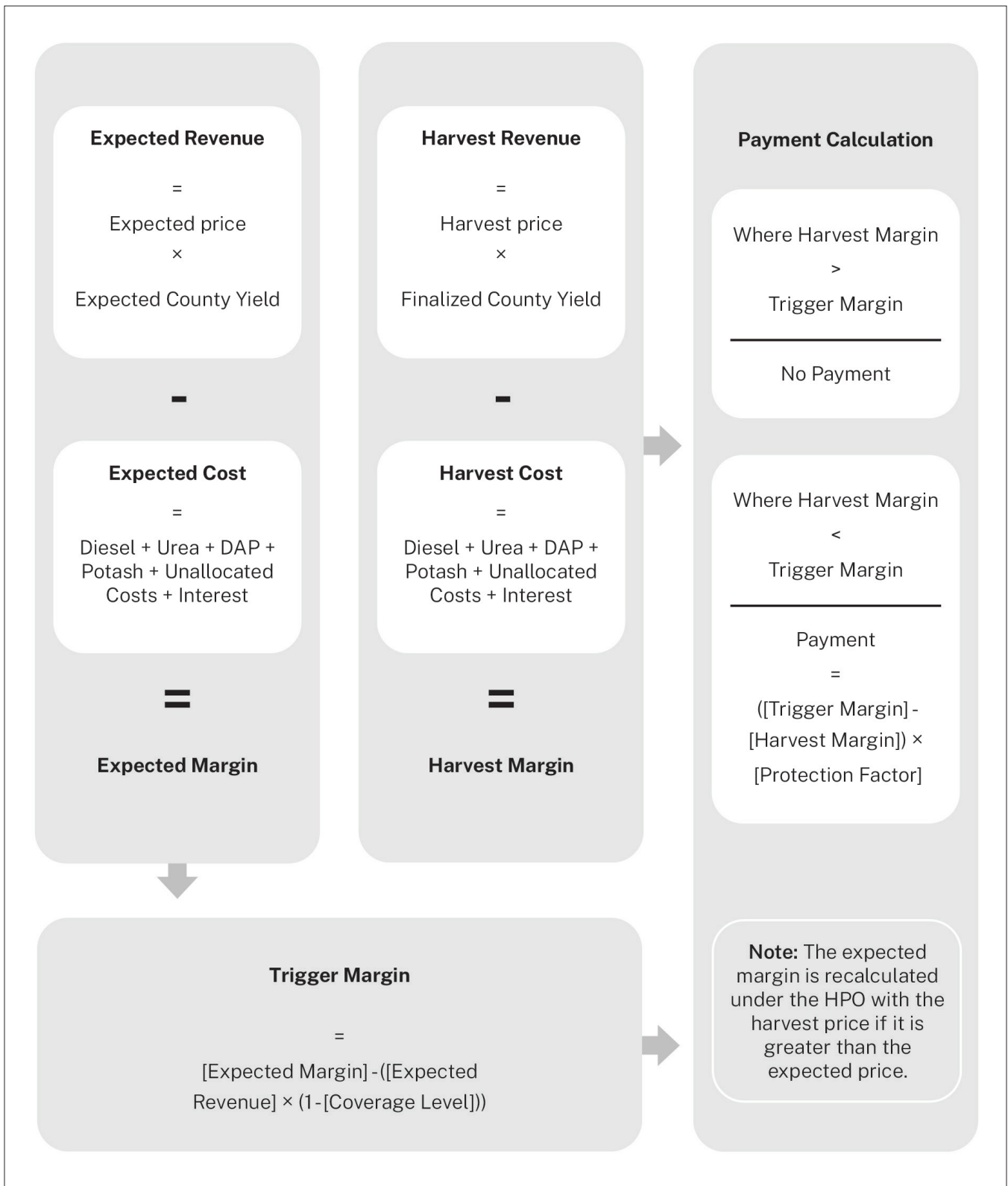


Figure 3. Visualization of margin protection policy mechanisms. DAP, diammonium phosphate; HPO, harvest price option. Source: Authors' derivation based on USDA Risk Management Agency documentation.

Table 1. Expected county yields (bushels per acre) for corn in Idaho, 2024 crop year.

County	Expected Yield
Ada	221.6
Bannock	186.5
Bingham	184
Bonneville	163.7
Canyon	229.7
Cassia	187.7
Elmore	225.3
Franklin	197.1
Gem	207.3
Gooding	218.8
Jefferson	183.5
Jerome	212.5
Lincoln	209
Madison	162.5
Minidoka	201.2
Owyhee	233
Payette	221.50
Power	180.7
Twin Falls	200.4
Washington	224.2

Source: <https://www.marginprotection.com/>.

Table 2. Revenue and cost price determination for margin protection policy, corn in Idaho.

Item	Pricing	Price Discovery Period	
		Projected Price	Harvest Price

Panel A. Revenue Component

Corn Price	CBOT December corn futures contract	8/15–9/14 before crop year	11/1–11/30 of crop year
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Panel B. Cost Component

Diesel	NYMEX NY Harbor ULSD May futures contract	8/15–9/14 before crop year	4/1–4/30 of crop year
Interest	CME 30-Day Federal Funds Rate November futures contract	8/15–9/14 before crop year	11/1–11/30 of crop year
DAP	CME DAP FOB NOLA May futures contract	8/15–9/14 before crop year	4/1–4/30 of crop year
Urea	CME Urea (Granular) FOB US Gulf May futures contract	8/15–9/14 before crop year	4/1–4/30 of crop year
Potash	USDA AMS Cash Price - FOB Distributor Central Illinois	8/15–9/14 before crop year	Same as projected
Unallocated Cost	USDA RMA	By Sep before crop year	Same as projected

Notes: NYMEX refers to New York Mercantile Exchange. CME refers to Chicago Mercantile Exchange. Information compiled by the authors based on USDA Risk Management Agency and <https://www.marginprotection.com/>.

Expected Costs

Expected costs are divided into unallocated costs and costs that are allowed to fluctuate. The unallocated cost, determined by the RMA, represents the total other costs and does not vary across counties or over the crop year. For corn growers, the costs allowed to fluctuate include diesel, urea, diammonium phosphate (DAP), potash, and interest expenses. These are national numbers, published at the end of the price discovery period. Table 2, panel B shows the specific data source used to determine these costs. Except for interest expenses, the quantities used to compute the expected cost vary by county and are a function of expected county yield (Schnitkey 2017).

- Diesel: The expected price is set using the average daily settlement price for the NYMEX ULSD May futures contract for the crop year during the preharvest price discovery period. Quantity is calculated as $(ECY \times .10) + 2.5$ gal/acre.
- Urea: The expected price is the average daily settlement price for the CME Urea (Granular) FOB US Gulf May futures contract for the crop year during the preharvest price discovery period. Quantity is calculated as $(ECY \times .83) / .46$ lb/acre.
- DAP: The expected price is the average daily settlement price for the CME DAP FOB NOLA May futures contract for the crop year during the preharvest price discovery period. Quantity is $(ECY \times .35) / .46$ lb/acre.
- Potash: The expected price is the average price as reported by the USDA for Illinois in the report that is closest to the price discovery period start date. Quantity is $(ECY \times .25) / .46$ lb/acre.
- Interest: Interest cost is calculated as interest rate \times all costs except interest $\times 6/12$. Interest rate is set using the CME fed funds November futures contract for the harvest year during the price discovery period. Additionally, an increment of six percentage points is added to the federal funds rate.

The *expected margin* is calculated as the *expected revenue* minus the *expected costs*. To determine if a payout will occur, compare it to the *harvest margin* and *trigger margin*, as explained in the next two sections.

Harvest Margin

The harvest margin is calculated using the final revenue and costs, derived from final prices and actual county yield.

- Harvest price: This is determined using the CBOT December corn futures contract for the harvest year during the crop year price discovery period, as shown in Table 1, panel A. For the 2024 crop year, the harvest price is the average price of December 2024 corn futures contract during 11/1/2024–11/30/2024. This is later than the price discovery period for midwestern states (the month of October 2024).
- Harvest yield: The harvest yield is taken from the final county yields published by the RMA. Typically, these are published on or before June 16 following the crop year.
- Harvest costs: Harvest costs for diesel, urea, and DAP are assessed using the same data sources as for the expected costs, but with the price discovery period April 1–30 of the crop year. The harvest price of potash is the same as its expected price. The same quantities used in the expected margin are used when calculating the harvest margin. Interest expenses are based on the CME November fund futures contract for the price discovery period of November 1–30 of the crop year.

Trigger Margin and Determining Payouts

An indemnity payment is triggered if the expected margin falls below the trigger margin, which is computed as follows:

$$\text{Trigger Margin} = [\text{Expected Margin}] - ([\text{Expected Revenue}] \times (1 - [\text{Coverage Level}]))$$

For the MP-HPO policy, the expected revenue and margin will be recomputed using the higher of the projected price and the harvest price. When calculating the trigger margin, the amount defined by $[\text{Expected Revenue}] \times 1 - [\text{Coverage Level}]$ is considered the deductible. The coverage level is chosen by the producer and can range from 70% to 95% with a 5% increment. The harvest margin must be less than the expected margin by the deductible to trigger a payment.

The indemnity payment is computed as

$$Payment = \frac{([Trigger\ Margin] - [Harvest\ Margin])}{margin\ loss} \times Protection\ factor$$

The protection factor is chosen by the producer when purchasing the policy. The protection factor can range from 80% to 120% with a 1% increment. A higher protection factor means a higher payment, but it also incurs a higher premium.

As an example, given an expected margin of \$550, expected revenue of \$950, and a coverage level of 80%, the trigger margin would be

$$Trigger\ Margin = \underbrace{\$550}_{\text{expected margin}} - \underbrace{[\$950 \times (1 - .80)]}_{\text{deductible} = \$190} = \$360/acre$$

Assuming a harvest margin of \$350 per acre and a protection factor of 90%, the payment will be

$$Payment = \frac{(\$360 - \$350)}{margin\ loss} \times 0.90 = \$9/acre$$

Example of MP Policy

The following section provides an example of MP for a hypothetical corn grower in Ada County insuring for the crop year 2024. Table 3 shows the expected margin based on the prices observed during the price discovery period (August 15, 2023–September 14, 2023).

At the end of the season, calculate the harvest margin and compare it with the trigger margin to determine whether to make an indemnity payment. Tables 4 and 5 provide two hypothetical scenarios. In Table 4, the final county yield, harvest prices, and final input costs are all lower than the expected numbers. Note in this case that since the harvest price is lower than the projected price, the payout is the same regardless of whether or not the harvest price option (MP-HPO) is purchased.

In Table 5, the harvest price option is selected for the MP policy and the harvest price is higher than the projected price. In such a case, adjust the expected revenue and expected margin to account for the higher harvest price.

Table 3. Hypothetical expected margin for corn farmer in Ada County, Idaho, for the 2024 policy.

Expected County Yield	221.60 bu/acre		
Margin Projected Price	\$5.09/bu		
Expected Revenue/Acre	\$1,127.94		
	Unit	Projected Price	Item Cost/Acre
Urea	399.85 lb/acre	\$353.41/ton	\$70.66
DAP	168.61 lb/acre	\$485.68/ton	\$40.95
Potash	92.34 lb/acre	\$492.80/ton	\$22.76
Diesel fuel	24.66 gal/acre	\$2.74/gal	\$67.57
Unallocated cost	\$206.90		
All costs, excluding interest	\$408.84		
Interest cost	10.35%	\$21.35	
Expected Cost/Acre	\$430.19		
Expected Margin/Acre (expected revenue – expected cost)	\$697.75		

Trigger Margin for Different Coverage Levels

Coverage Level	Trigger Margin
70%	\$359.37
75%	\$415.77
80%	\$472.17
85%	\$528.56
90%	\$584.96
95%	\$641.36

Notes: All numbers are for irrigated grain corn. All prices are taken after the discovery period (8/15/2023–9/14/2023). The units for urea are computed as (ECY*.83)/.46, for DAP as (ECY*.35)/.46, for potash as (ECY*.25)/.46, and for diesel as (ECY*.10) + 2.5, per RMA. Interest expense is computed as interest rate × all costs excluding interest × 0.5. The trigger margin is computed as expected margin – (1-coverage level) × expected revenue. For an MP with a harvest price option, use the higher of the projected price and harvest price when computing expected revenue. The expected county yield is taken from <https://www.marginprotection.com/>.

Table 4. Hypothetical harvest margin and indemnity payment per acre when harvest price is lower than projected price, MP policy with harvest price option.

Expected County Yield	221.60 bu/acre
Margin Projected Price	\$5.10/bu
Expected Revenue/Acre (expected county yield × higher of projected and harvest prices)	\$1,127.90
Expected cost per acre	\$430.19
Expected margin per acre (expected revenue – expected cost)	\$697.75
Harvest County Yield	200 bu/acre
Harvest Price	\$5.00/bu
Harvest revenue per acre	\$1,000.00

	Unit	Final Price	Item Cost
Urea	399.85 lb/acre	\$340/ton	\$67.97
DAP	168.61 lb/acre	\$450/ton	\$37.94
Potash	92.34 lb/acre	\$492.80/ton	\$22.75
Diesel Fuel	24.66 gal/acre	\$2.6/gal	\$64.12

Unallocated Costs	\$206.90
All Costs Excluding Interest	\$399.68
Interest Cost	8.35% \$16.68
Harvest Cost per acre	\$416.37
Harvest Margin per acre (harvest revenue – harvest cost)	\$583.63

Trigger Margin and Indemnity Payment for Different Coverage Levels and Protection Factors

	Coverage Levels		
	85%	90%	95%
Trigger Margin	\$528.56	\$584.96	\$641.36
Margin Loss	\$0.00	\$1.33	\$57.73

Protection Factor	Indemnity Payment		
0.8	\$0.00	\$1.06	\$46.18
0.9	\$0.00	\$1.19	\$51.95
1	\$0.00	\$1.33	\$57.72
1.1	\$0.00	\$1.46	\$63.50
1.2	\$0.00	\$1.59	\$69.27

Notes: All prices and yields are hypothetical numbers. The units for urea are computed as (ECY*.83)/.46, for DAP as (ECY*.35)/.46, for potash as (ECY*.25)/.46, and for diesel as (ECY*.10) + 2.5, per RMA. Interest expense is computed as interest rate × all costs excluding interest × 0.5. The trigger margin is computed as expected margin – (1-coverage level) × expected revenue. Indemnity payment is computed as ((Trigger Margin) – [Harvest Margin]) × Protection Factor.

Table 5. Hypothetical harvest margin and indemnity payment per acre when harvest price is higher than projected price, MP policy with harvest price option.

Expected County Yield	221.60 bu/acre
Margin Projected Price	\$5.09/bu
Expected Revenue/Acre (expected county yield × higher of projected and harvest prices)	\$1,329.60
Expected cost per acre	\$430.19
Expected margin per acre (expected revenue – expected cost)	\$899.41
Harvest County Yield	200 bu/acre
Harvest Price	\$6.00/bu
Harvest revenue per acre	\$1,200.00

	Unit	Final Price	Item Cost
Urea	399.85 lb/acre	\$340/ton	\$67.97
DAP	168.61 lb/acre	\$450/ton	\$37.94
Potash	92.34 lb/acre	\$492.80/ton	\$22.75
Diesel Fuel	24.66 gal/acre	\$2.60/gal	\$64.12

Unallocated Costs	\$206.90
All Costs Excluding Interest	\$399.68
Interest Cost	8.35% \$16.69
Harvest Cost per acre	\$416.37
Harvest Margin per acre (harvest revenue – harvest cost)	\$783.63

Trigger Margin and Indemnity Payment for Different Coverage Levels and Protection Factors

	Coverage Levels		
	85%	90%	95%
Trigger Margin	\$699.97	\$766.45	\$832.93
Margin Loss	\$0.00	\$0.00	\$49.30

Protection Factor	Indemnity Payment		
0.8	\$0.00	\$0.00	\$39.44
0.9	\$0.00	\$0.00	\$44.37
1	\$0.00	\$0.00	\$49.30
1.1	\$0.00	\$0.00	\$54.23
1.2	\$0.00	\$0.00	\$59.16

Notes: All prices and yields are hypothetical numbers. The units for urea are computed as (ECY*.83)/.46, for DAP as (ECY*.35)/.46, for potash as (ECY*.25)/.46, and for diesel as (ECY*.10) + 2.5, per RMA. Interest expense is computed as interest rate × all costs excluding interest × 0.5. The trigger margin is computed as expected margin – (1-coverage level) × expected revenue. Indemnity payment is computed as ((Trigger Margin) – [Harvest Margin]) × Protection Factor.

Conclusion

Margin protection helps manage risks during times of fluctuating input prices. For instance, when input prices surged during the Covid-related supply disruptions, an MP policy would have been advantageous. Currently, it's available only for corn growers in select Idaho counties. It is important to note that while the MP policy considers a range of factors that may impact producers' margin (e.g., decline in yield, higher input costs, lower commodity prices), cost data is calculated at the national level and the yield is calculated at the county level. It does not insure against events specific to the producer's operation that are not part of larger trends. The policy will, however, protect producers against national trends in input costs, harvest prices, and county-wide changes in yield.

The MP policy can be purchased as a stand-alone policy or combined with other insurance policies, such as revenue protection or yield protection. Combining MP with another policy will affect the MP policy in two ways. First, the MP policy premium will be reduced. Second, the indemnity payment the producer receives will net the highest owed payout among all of the policies they hold. By coupling MP with another policy, however, a producer can insure against national trends while also obtaining operation-specific protection.

Further Reading

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