

# Cornhusker Economics

## An Illustration of Farm Program Decisions and Impacts

| 10-4-19 Market Report  | Year Ago | 4 Wks Ago | 10-18-19 |
|--|----------|-----------|----------|
| <b>Livestock and Products.</b>   |          |           |          |
| <b>Weekly Average</b>  |          |           |          |
| Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .                             | *        | *         | *        |
| Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .                            | 174.48   | 161.24    | 156.18   |
| Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .                             | 160.45   | 152.97    | 150.88   |
| Choice Boxed Beef, 600-750 lb. Carcass. . . . .  | 205.74   | 218.75    | 217.93   |
| Western Corn Belt Base Hog Price Carcass, Negotiated . . . . .                             | 57.54    | *         | *        |
| Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean. . . . .                                  | 77.17    | 68.10     | 76.74    |
| Slaughter Lambs, woolled and shorn, 135-165 lb. National. . . . .                          | 138.21   | 150.16    | 149.15   |
| National Carcass Lamb Cutout FOB. . . . .  | 381.31   | 392.70    | 403.37   |
| <b>Crops.</b>  |          |           |          |
| <b>Daily Spot Prices</b>   |          |           |          |
| Wheat, No. 1, H.W. Imperial, bu. . . . .   | 4.45     | 3.55      | 3.74     |
| Corn, No. 2, Yellow <b>Columbus</b> , bu. . . . .  | 3.33     | 3.70      | 3.74     |
| Soybeans, No. 1, Yellow <b>Columbus</b> , bu. . . . .                                      | 7.39     | 7.93      | 8.41     |
| Grain Sorghum, No.2, Yellow Dorchester, cwt. . . . .                                       | 5.27     | 5.68      | 6.02     |
| Oats, No. 2, Heavy Minneapolis, Mn, bu. . . . .  | 3.20     | 3.08      | 3.09     |
| <b>Feed*0*0</b>  |          |           |          |
| Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . . | *        | *         | *        |
| Alfalfa, Large Rounds, Good Platte Valley, ton. . . . .                                    | 102.50   | 105.00    | 107.50   |
| Grass Hay, Large Rounds, Good Nebraska, ton. . . . .                                       | 87.50    | 105.00    | 95.00    |
| Dried Distillers Grains, 10% Moisture Nebraska Average. . . . .                            | 137.50   | 141.00    | 147.50   |
| Wet Distillers Grains, 65-70% Moisture Nebraska Average. . . . .                           | 48.00    | 42.50     | 52.50    |
| * No Market  |          |           |          |

When the 2018 Farm Bill was signed last December, producers could look ahead to implementation and the coming decision between enrollment under the Agricultural Risk Coverage (ARC) program or the Price Loss Coverage (PLC) program. While the ARC and PLC programs carried over from the 2014 Farm Bill with relatively modest changes, the substantial drop in market prices and outlook since 2014 pointed toward a widespread shift in enrollment away from ARC and toward PLC due to the increased relevance of the price safety net.

However, with this year's extreme weather events, concerns over crop production, and hopes for improved trade prospects, there has been some recovery in commodity prices, at least as reflected in the October supply and demand reports from USDA. That could affect expected farm program supports or even eliminate them if higher prices were sustained through the marketing year. That in turn could affect producer preferences between the revenue-based support of ARC and the price-based support of PLC by the time the initial enrollment decision is due in March 2020.

### Commodity Programs

The 2018 Farm Bill maintained the existing ARC program at both the county level (ARC-CO) and individual coverage level (ARC-IC) as well as the PLC program that were introduced in the 2014 Farm Bill. In 2014, producers faced a one-time election as to which program to use for the 2014 through 2018 crop years. The new farm bill made some improvements to the ARC program, including changes to the yield data and a trend-yield calculation that should improve the ARC guarantee. There were also modest changes to the PLC program, including a limited yield update and a formula to increase the reference price if market prices increase. However, the biggest feature of the new farm

bill for ARC and PLC has to be a new enrollment decision, first in 2019 for 2019 and 2020, and then annually beginning in 2021.

### Payment Yields

Before analyzing which commodity program is best, the first choice for producers is whether or not to update farm program payment yields, given that they affect potential PLC payments. Each farm (FSA farm by serial number) has a base acreage that can't be updated and a PLC payment yield that can be updated and established going forward for the farm regardless of whether PLC or ARC is chosen. The update itself is a choice between keeping the existing payment yield or updating it to 90% of the 2013-2017 average yield multiplied by a national factor equal to the ratio of the 2008-2012 national average yield divided by the 2013-2017 national average yield. This national factor allows a yield update to new yields, but adjusts everything backward for national yield growth since the last update in 2014. This effectively targets the benefits of an update to those producers that had below average yields or crop losses going into the 2014 update.

The national factor is limited to a range of 90% to 100% and the 90% factor holds for corn and soybeans according to data from USDA's Farm Service Agency (FSA). For grain sorghum and wheat, the factors are 90.77% and 95.45% respectively. Multiplying 90% of the 2013-2017 average yield times the yield factor essentially means the potential updated yield is equal to 81% (90% x 90%) of the 2013-2017 average yield for corn and soybeans (81.69% for grain sorghum and 85.91% for wheat). Using those percentages, producers can more readily assess the potential for updated yields by comparing the resulting percentage of 2013-2017 yields against existing PLC payment yields.

### PLC

With payment yields determined, a producer can better analyze the PLC or ARC-CO program choice on a farm-by-farm, commodity-by-commodity basis. The PLC program provides income support when the effective price (the higher of the national marketing year average price or the national average marketing loan rate) falls below the effective reference price (the higher of the legislated reference price or 85% of the 5-year Olympic average of the national marketing year average prices, limited to no more than 115% of the legislated reference price). In equation form, the PLC protection is equal to:

$$\text{Effective Reference Price} = \text{Min of } [\text{Max of (Reference Price or } 85\% \times \text{5-Year Olympic Average Price) or } 115\% \times \text{Reference Price}]$$

$$\text{Effective Price} = \text{Max of (National Marketing Year Average Price or National Average Marketing Loan Rate)}$$

$$\text{PLC Payment Rate} = \text{Max of } [(\text{Effective Reference Price} - \text{Effective Price}) \text{ or } 0]$$

$$\text{PLC Payment} = \text{PLC Payment Rate} \times \text{PLC Program Payment Yield} \times \text{Base Acres} \times 85\%$$

With lower corn prices in recent years, the 5-year Olympic average price is also lower and the effective reference price remains at the legislated level of \$3.70/bushel. Based on the October World Agricultural Supply and Demand Report from USDA, the projected price for the 2019 corn crop marketing year is \$3.80/bushel, a level that would preclude any PLC payments. However, there is a great deal of uncertainty remaining around that projection. The September report from USDA had projected the price at \$3.60/bushel, a level that would translate into a \$0.10 PLC payment rate. That would translate into a \$15 PLC payment rate given an average of 150 bushel/acre PLC program payment yield in Nebraska (before any updates) or a \$12.75 PLC payment/base acre given payments on just 85% of base acres.

With price projections hovering around the reference rate, the difference between a substantial PLC payment and no payment would be a relatively small shift in market price levels. If one considers a stochastic (probability-based) estimate of the marketing year average price around \$3.80 instead of a deterministic (certain) estimate of \$3.80, you would still get an average price of \$3.80, but would also get some expectation of prices falling below the \$3.70 reference price level and thus, PLC payments as much as 40% of the time. This is the reason why any stochastic farm bill analysis such as the online decision tools from FSA will indicate an average PLC payment even when the projected price is above the reference price. If there is at least some probability that prices will fall below the reference price, then there will be some possible outcomes with PLC payments and they will show up in the average over all simulated outcomes even when the average price is above the reference price.

Of course, potential price changes also impact the underlying crop revenue, so a thorough analysis should be about more than just expected PLC payments and should include crop revenue as well as the two should be inversely related. Projections for 2020 also matter for the second year of programs affected by the initial decision, so a forecast for higher or lower 2020 prices could swing the analysis further one way or the other. There would be more uncertainty in the PLC program going forward

based on price direction, but remember there will be an opportunity to revisit the decision annually beginning in 2021, so the long-term outlook is not particularly relevant.

### **ARC-CO**

ARC-CO works as it did in the previous farm bill to provide county-level revenue protection for crops in the farm's base acreage. There are some changes to the primary source of county yield data and more significantly, a new trend yield adjustment in the benchmark yield that determines the ARC-CO guarantee. The trend yield factor by county, crop, and practice is the same one used for crop insurance for the trend-adjusted yield option. With the move to an annual decision beginning in 2021, FSA chose to lag the history an additional year to ensure data and thus guarantees are known at the time of the expected March sign-up. Thus, the 2019 ARC-CO protection is based on the Olympic average benchmark trend-adjusted yield per planted acre and the Olympic average benchmark price from 2013-2017 multiplied together. The benchmark yield in each year of the history is the actual county yield per planted acre or 80% of the county transitional yield. The benchmark price for each year is the higher of the national marketing year average price or the effective reference price. The ARC-CO guarantee is then equal to 86% of that benchmark revenue and actual county-level crop revenue below the guarantee results in an ARC-CO payment up to a maximum of 10% of the ARC-CO benchmark. In equation form, the ARC-CO protection is equal to:

$$\text{ARC-CO Benchmark Yield} = 5\text{-Year Olympic Average of} \\ [\text{Max of (Trend-Adjusted} \\ \text{County Yield or 80\% of} \\ \text{County Transitional Yield)}]$$

$$\text{ARC-CO Benchmark Price} = 5\text{-Year Olympic Average of} \\ \text{Max of (National Marketing} \\ \text{Year Average Price or}$$

$$\text{ARC-CO Benchmark Revenue} = \text{ARC-CO Benchmark} \\ \text{Yield} \times \text{ARC-CO} \\ \text{Benchmark Price}$$

$$\text{ARC-CO Guarantee} = \text{ARC-CO Benchmark Revenue} \times 86\%$$

$$\text{ARC-CO Actual Revenue} = \text{Actual County Yield} \times \text{Max of} \\ (\text{National Marketing Year Average Price or National Average Marketing Loan Rate})$$

$$\text{ARC-CO Payment Rate} = \text{Min of [Max of (ARC-CO Guarantee} \\ \text{- ARC-CO Actual Revenue) or 0) or ARC-CO Benchmark Revenue} \times 10\%]$$

$$\text{ARC-CO Payment} = \text{ARC-CO Payment Rate} \times \text{Base Acres} \\ \times 85\%$$

Assuming projected yields equal to the trend-adjusted benchmark yields, the ARC-CO guarantee effectively protects revenue equal to trend yields multiplied by 86% of the benchmark price. For corn, the benchmark price based on the 2013-2017 history is equal to \$3.70 and the ARC-CO guarantee at 86% would kick in around \$3.18/bushel assuming production at trend-yield levels.

If the county had an average trend yield benchmark of 185 bushels/acre (consistent with a 150 bushel/acre PLC program payment yield), the benchmark revenue would be \$684.50/acre (150 x \$3.70). The guarantee would be 86% of the benchmark or \$588.67/acre and the maximum ARC-CO payment would be limited to 10% of the benchmark or \$68.45/acre. If the county produced exactly its trend yield of 185, then any price above \$3.18 would produce revenue above the guarantee (185 x \$3.19 = \$590.15) and the ARC-CO payment rate would be \$0.

Of course, ARC-CO protects revenue losses, so any combination of yield losses below average trend yield or price losses below the benchmark price would be covered once they fell below the 86% ARC-CO guarantee. In that way, ARC-CO provides more comprehensive revenue protection than PLC, but wouldn't kick in as quickly if prices fell below current projections.

The above example illustrates substantial differences between PLC and ARC-CO for corn if prices were to move below current expectations, but it isn't sufficient to answer the question of which is better. PLC would kick in faster under lower prices, but ARC-CO would actually protect the combination of price and yield declines, so the answer of which one is better is not a simple choice. The online analysis tools available under the resource section on the FSA website provide the most thorough analysis of projected PLC and ARC-CO payments.

### **ARC-IC**

A final option for producers is ARC-IC on a farm-by-farm (FSA serial number) basis. If selected, all of a producer's interests in any farms enrolled in ARC-IC are bundled together in a single pool for protection. ARC-IC generally works in the same manner as ARC-CO, but instead of the protection being tied to county results for the crop in the farm's base acreage, it is calculated from the farm's actual history by program crop in proportion to the farm's acreage mix in the current year. Thus, for example, a farm with a mix of corn and soybeans in 2019 would generate an ARC-IC benchmark revenue based on actual revenues (farm yields times the higher of national marketing year average prices or the reference price) for each of the years from

2013-2017. Those crop revenues by year would be prorated in proportion to the current acreage mix and the resulting weighted revenues by year would be used to calculate the Olympic average revenue that creates the farm's revenue benchmark.

From that point, the ARC-IC guarantee is equal to 86% of the benchmark, just like ARC-CO. Actual revenue per acre is calculated from the actual planted acres on the farm compared to the farm's ARC-IC per acre guarantee. Then, if any payments are due, they are paid on 65% of the base acres instead of 85% as with ARC-CO in part due to the expected increased frequency of a farm falling below its guarantee as compared to a county.

The ARC-IC calculations are more complex than either PLC or ARC-CO and are not illustrated here due to space constraints. Owing in part to the complexity of the ARC-IC program as well as the lower payment rate, ARC-IC was not a common choice in 2014, particularly given the one-time decision for the entire 2014-2018 period. However, under the new farm program, ARC-IC may be more relevant on a year-to-year basis and may be particularly relevant for some producers in the 2019-2020 election period given losses that have already occurred in 2019. For producers facing substantial yield losses or prevented planting in 2019, ARC-IC may provide substantial support. If a farm (FSA farm serial number) was completely prevented planting in 2019 and certified as such with crop insurance and FSA, the farm's per acre revenue is calculated as \$0 against the farm's ARC-IC guarantee along with the results on all of the producer's other farms enrolled in ARC-IC and the resulting payment could be rather large.

If for example, all of the producer's farms enrolled in ARC-IC were 100% corn and 100% prevented planting for 2019, the farm would have \$0 revenue to count against the ARC-IC guarantee and qualify for a maximum payment. If the farm happened to have the same benchmark revenue guarantee as the county at \$684.50/acre, the ARC-IC payment rate would max out at \$68.45 per acre on 65% of the base acres for an effective payment of \$44.49 per base acre.

However, if only some of the farm's acreage were prevented planting and some of the acres were planted, the results of just the planted acres would count in the revenue calculations, negating the losses on the prevented planting acres for purposes of ARC-IC. While that is a potential downfall, any substantial yield losses on the remaining acres could still result in large or even maximum ARC-IC payment rates for 2019.

The ARC-IC decision is complicated by the technical details of the prevented planting calculation as well as the reality that the decision covers both 2019 and 2020. Potential large payment rates for 2019 could overshadow the likelihood of no payments in 2020 and make ARC-IC

attractive, but would need to be compared to two years of potential support under PLC and ARC-CO. Depending on production conditions, ARC-IC could still be relevant in 2020 as well, so it may be premature to write of 2020 protection entirely.

### **Program Decisions**

With similar programs as the previous farm bill, but substantially lower market prices and outlook for the new sign-up period, there was a widespread expectation among producers and policymakers that enrollment decisions between PLC and ARC under the 2018 Farm Bill would be relatively simple and would lean strongly toward PLC. The example above for corn shows that PLC may in fact provide more downside risk protection than ARC-CO. But, the illustration also shows neither would pay at current projected price and yield levels and demonstrates the need for further information and analysis before enrollment decisions are made.

Producers can now visit FSA offices and make PLC and ARC enrollment decisions for 2019-2020. However, there are still a few months before the announced March 2020 deadline to analyze the programs and the outlook, and the time and analysis may be valuable to producers before making a decision. The online decision tools are available to producers on the FSA website at [https://www.fsa.usda.gov/programs-and-services/arcplc\\_program/index](https://www.fsa.usda.gov/programs-and-services/arcplc_program/index). Nebraska Extension and Nebraska FSA offices are also collaborating on a series of producer education meetings across the state in November and December to walk through program details and analysis and help producers make more informed decisions. Further details on the farm programs and the educational programs are available at <http://farmbill.unl.edu>.

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