



Economic Report

Office of Regulatory Policy
Agricultural and Economic Policy Team

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Summary

Weak corn prices and only modestly declining production costs are challenging U.S. corn producers. Despite record yields, the national average revenue from the 2016 crop is estimated at just \$552 per acre, or just 60 percent of the peak in 2011 and the lowest since 2006. For many corn producers, crop revenue plus county Agriculture Risk Coverage (ARC) payments will not cover total production costs for the fourth year in a row. The largest revenue losses might occur in states such as Ohio and South Dakota where yields are expected to be only modestly above trend.

Across all states, farm-level costs vary from less than \$3 per bushel to more than \$5 per bushel. At the expected farm price of \$3.15 per bushel (USDA's August forecast), approximately 88 percent of corn farms would cover their operating costs. A much smaller share of farmers (17 percent) would cover total costs.

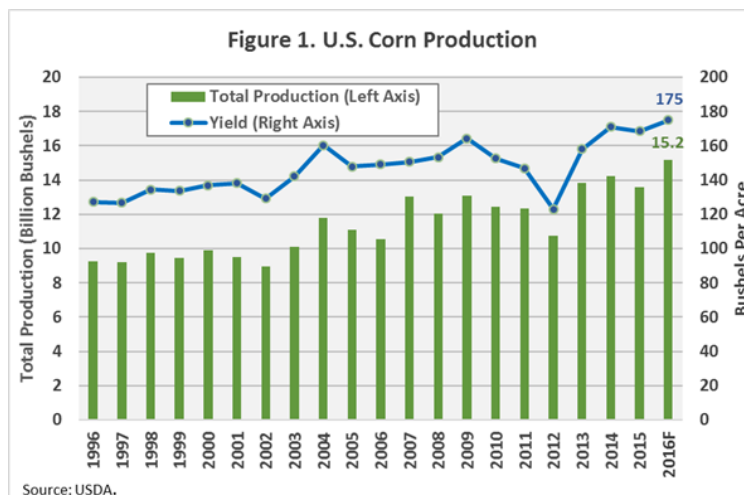
For 2017, the ARC guarantee will decline according to the statutory formula, providing less income protection than for 2016 corn. For crop insurance, if corn futures prices remain low through next spring, when the 2017 crop insurance guarantee is set, farmers should expect yet another year of relatively low revenue protection afforded by crop insurance. In the absence of unexpected price strength, 2017 could be even more challenging than 2016.

Authors: Steve Koenig and
Dennis A. Shields, Senior Economists
(703) 883-4056

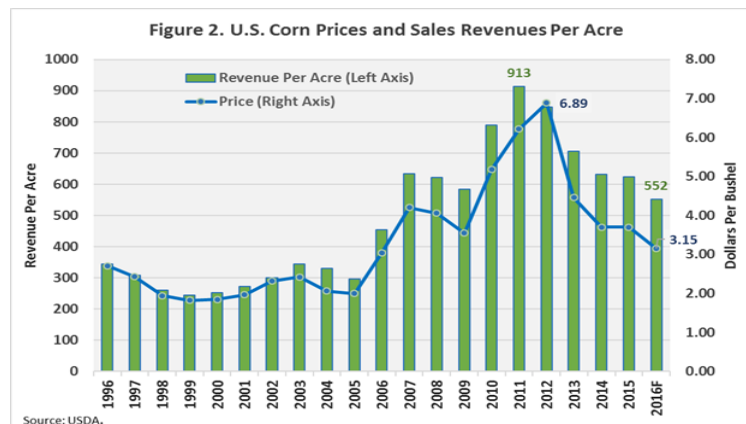
Understanding the Profit Outlook for the 2016 U.S. Corn Crop

The U.S. corn crop is the largest single crop by acreage and revenue. As such, its profitability has the largest single influence on the performance of Farm Credit System loans, especially for those originated within the AgriBank FCB district.

USDA's August crop production report estimated that U.S. producers could harvest a record 15.2 billion bushels of corn in 2016 (figure 1). If so, this would shatter the previous record of 14.2 billion bushels set in 2014. Production is up due to a record yield of 175.1 bushels per acre and a 6 million increase in harvested acres. Favorable growing conditions occurred across a wide swath of key production regions.



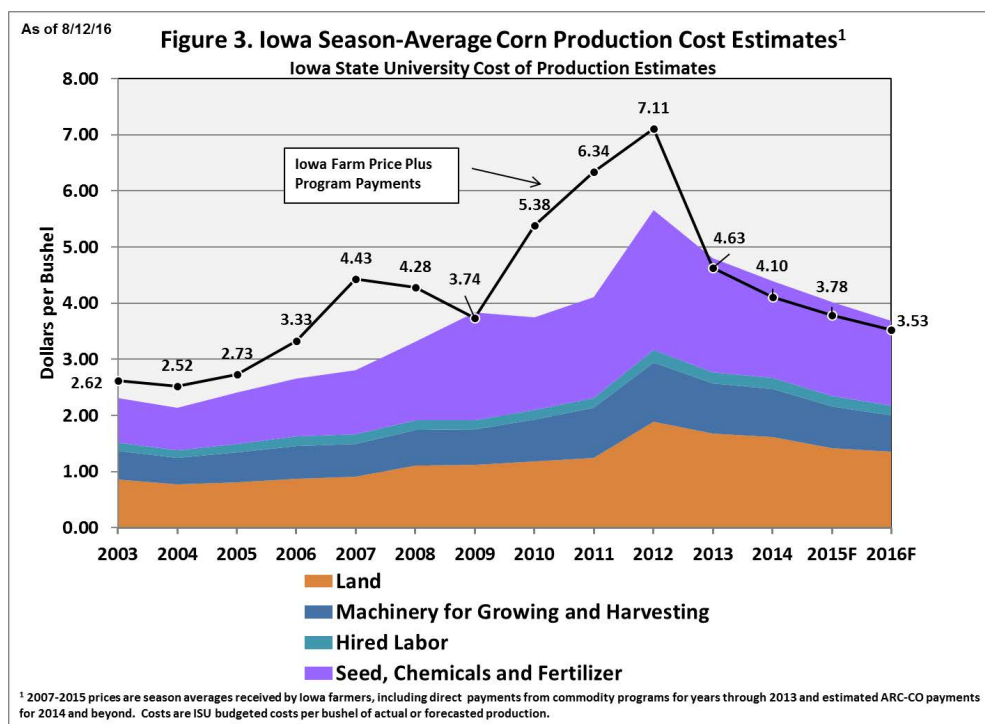
This large crop supply is overwhelming moderate increases in domestic and international demand. As a result, U.S. corn stocks are expected to build again during the 2016/17 marketing year. USDA is projecting that 2.4 billion bushels of corn will remain by the end of the marketing year, up 600 million bushels from 2015/16. This ending inventory of corn is equal to about 17 percent of expected use and is pulling down prices (figure 2).



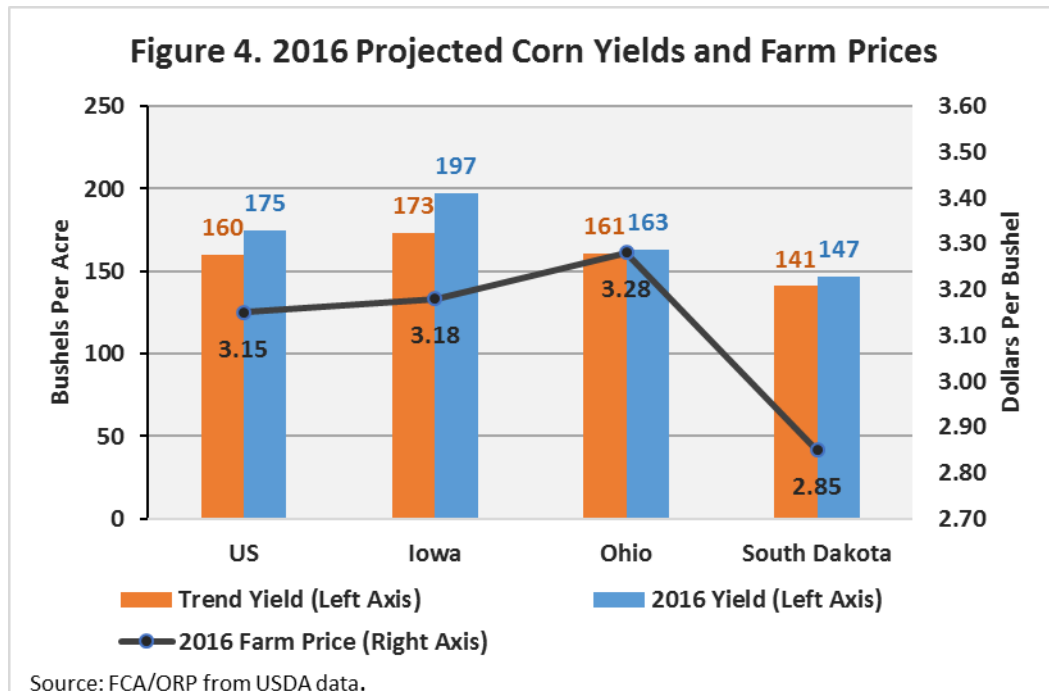
In the August WASDE Report, USDA estimated the national average corn price received by farmers in the 2016/17 marketing year would range from \$2.85 to \$3.45 per bushel. The midpoint of this range is \$3.15 per bushel, which compares to \$3.60 for the 2015/16 crop. If realized, this would be a 10-year low for corn prices. At this midpoint price, national average revenue from sales would total just \$552 per acre, which would be just 60 percent of the peak in 2011 and the lowest since 2006.

Profitability Will Remain a Challenge in 2016

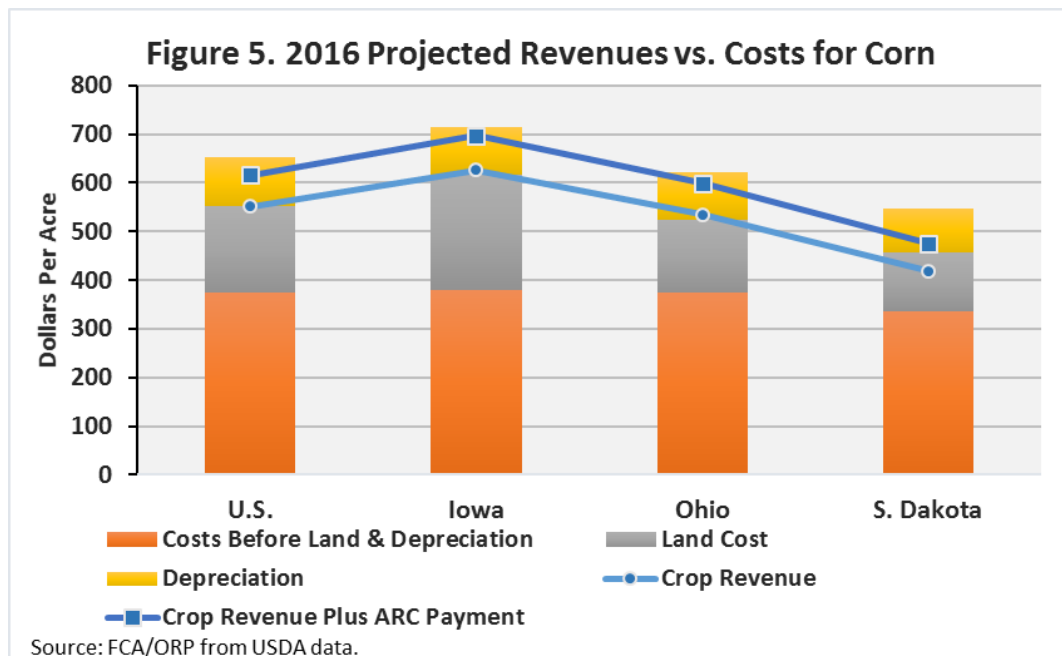
Even for those producers with good yields and relatively low costs, the current price outlook makes it difficult to both cover expenses and provide the operator with a return to labor and management. Production and cost data for Iowa, which is the largest corn-producing state, illustrates the profitability challenges for the crop harvested this fall. Figure 3 shows that revenue from crop sales (using the expected state average yield) and estimated income support provided by the Agriculture Risk Coverage (ARC) farm program will not cover total production costs for the fourth year in a row. These cost estimates for Iowa do not include farm operator labor or family living expenses.



While USDA is expecting record yields at the national level, some farming operations will experience subpar production and hence are likely to experience steeper income shortfalls. These operations will be more dependent on crop revenue insurance, ARC payments or superior marketing skills to meet their expenses. For example, a higher prevalence of farmers with steeper revenue losses might be expected in South Dakota and Ohio where dry conditions have reduced yield prospects (figure 4). While Ohio farmers typically benefit from higher corn prices relative to the national average due to their proximity to demand centers, South Dakota farmers are more likely to face lower corn prices due to their longer distances to demand centers.



The impact of low prices and lower yields on a farmer in South Dakota can be seen in figure 5, which shows how well average 2016 revenues might cover average production, land, and depreciation costs using USDA data. For the United States as a whole, and the states of Iowa and Ohio, forecasted revenue per acre roughly covers all costs except depreciation (shown in yellow). In South Dakota, revenues cover all non-depreciation costs (but not total costs) only when estimated ARC payments are included. Any ARC payments for the 2016 crop will be determined next year and made in October 2017. Farmers will receive any 2015 ARC payment in October 2016.

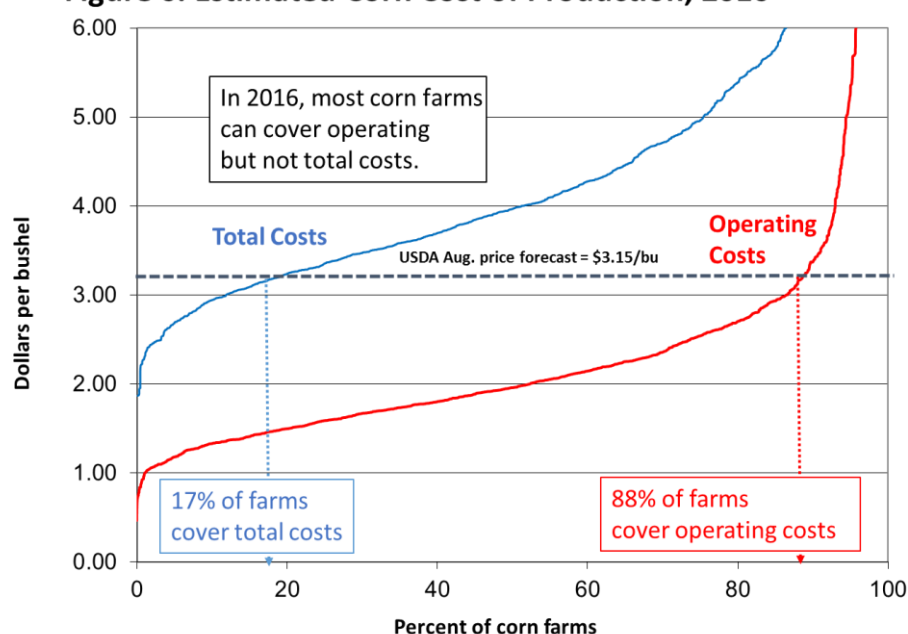


Costs of Production Vary Considerably Across Farmers

The estimated cost of production used in the analysis above is an average amount at the state or national level. At the individual grower level, though, costs can vary widely depending on the size of operation, management skill of the farmer, and many other factors. This variation implies that, for a particular farm price, some farmers will turn a profit while others will generate a loss.

The estimated cost of production across all corn farms in 2016 is shown in figure 6. Farm-level costs vary from less than \$3 per bushel to more than \$5 per bushel. The points on the curves indicate the cost of production (y-axis) that corresponds with the cumulative share of farms on the x-axis. For example, at the expected farm price of \$3.15 per bushel (USDA's mid-point forecast as of August 12, 2016), approximately 88 percent of corn farms have operating costs of \$3.15 per bushel or less, allowing them to cover all their operating costs (see dashed red line). A much smaller share of farmers (an estimated 17 percent—see dashed blue line) would cover total costs, which include land, machinery, and labor (paid and unpaid). These results indicate many farmers will be able to cover operating costs but only some portion of their overhead costs.

Figure 6. Estimated Corn Cost of Production, 2016



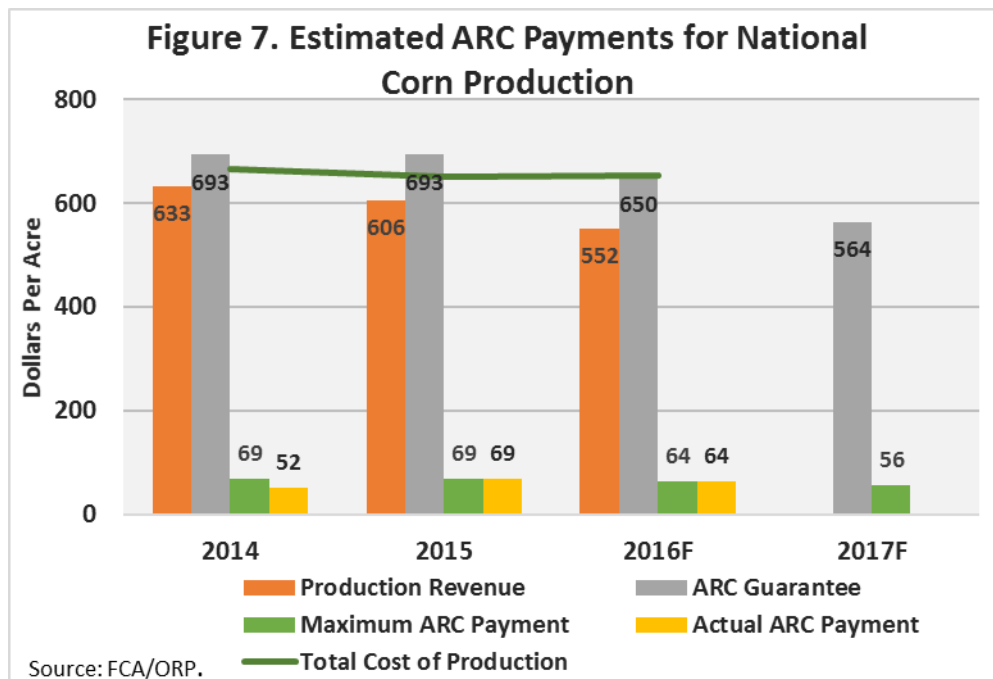
Source: FCA-ORP adapted from USDA-ERS analysis. Notes: Costs adjusted to 2016 from 2010 using national average change estimated by ERS (up 12 percent for total and up 8 percent for operating costs). Operating costs include seed, fertilizer, chemicals, custom operations, fuel, repairs; total costs include labor (paid and unpaid), machinery, land, and overhead.

Because of the distribution of costs (specifically the gentle uptrend in the center of the total cost curve), a small increase in the 2016 farm price could dramatically improve the profit prospects for many farms. For example, at \$4 per bushel, just over one-half of farms would cover total costs, and more than 90 percent would cover operating costs. Adding an expected ARC payment would also result in a larger share of farmers covering their costs.

ARC Guarantee to Decline Sharply in 2017

The Agriculture Risk Coverage program payments are made based on county revenue conditions, specifically the difference between the county ARC guarantee and the actual county revenue determined after the marketing year is completed. But a nationwide corn guarantee is calculated here for illustration. Farmers enrolled approximately 93 percent of the 97-million-acre corn base in the ARC program. The program makes payments on only 85 percent of the base acres enrolled, regardless of actual acres planted and harvested.

The gray bars in figure 7 show the estimated ARC revenue guarantees for 2014 through 2017 using national yields and prices and USDA forecasts. For the 2017 corn crop, under the program’s formula based on moving averages of historical prices and yields, the revenue guarantee (below which payments would be made) adjusts down to an estimated \$564 per acre from \$650 in 2016 and \$693 in 2014 and 2015. The maximum payment per acre that could be received also falls to \$56 per acre.



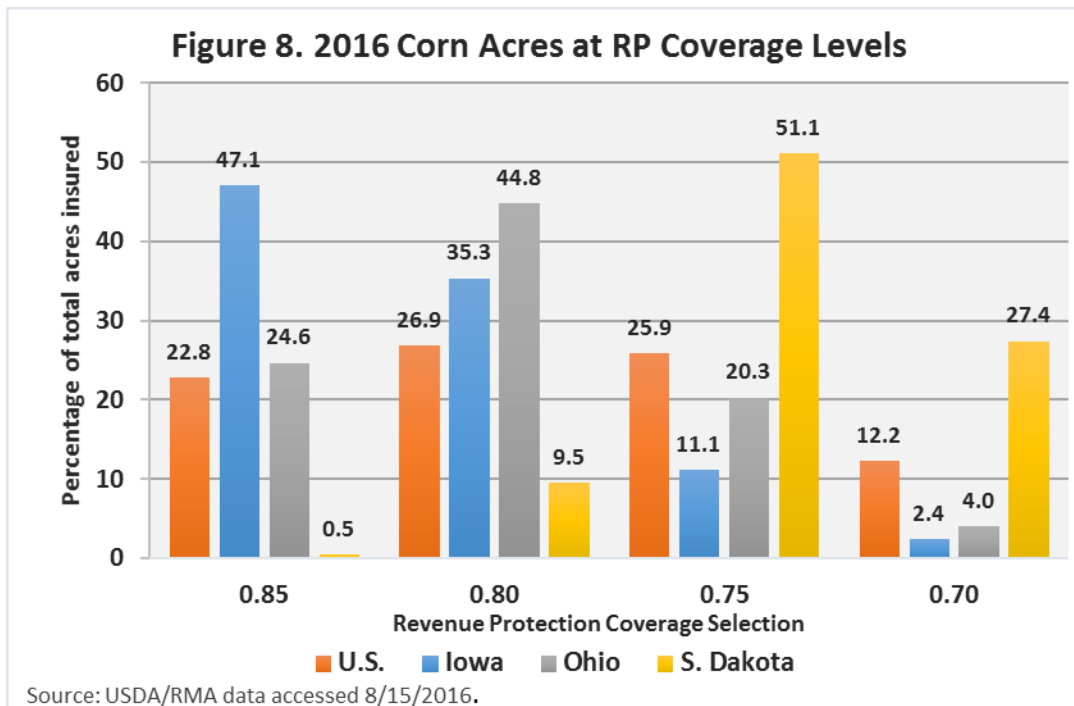
This estimated 2017 guarantee means that ARC payments would be zero until actual revenue falls below \$564 per acre. At this point, the per-acre payment rate would increase until the shortfall between the guarantee and the actual revenue reaches the maximum amount of \$56 per acre (payment cap is 10 percent of benchmark revenue, as calculated for each county). The estimated 2017 guarantee of \$564 is about \$100 below USDA’s 2016 estimate of average total production costs for the U.S. (excluding unpaid operator labor). In the absence of significant cost reductions, this suggests the ARC program will provide less of a buffer against revenue shortfalls in 2017.

Revenue Insurance Provides a Limited Revenue Safety Net in 2016

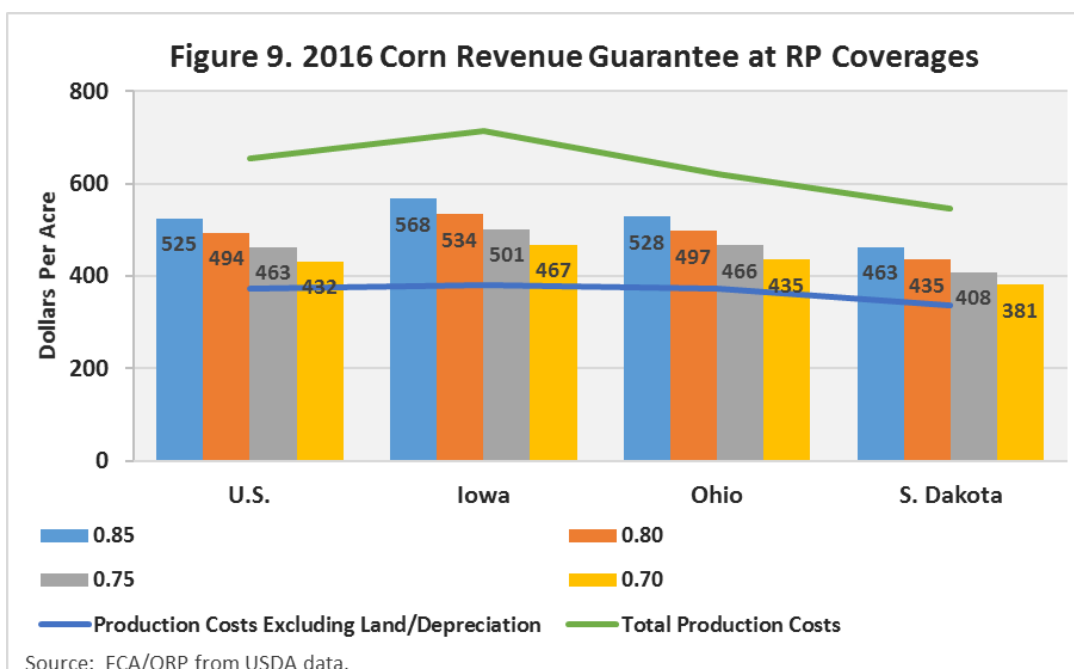
Separate from farm programs discussed above, federal crop insurance is the most common risk management tool used by farmers to guard against large yield or revenue shortfalls. Insurance indemnities are triggered separately from ARC payments, and farmers can receive both (or neither), depending on their circumstances.

Approximately 90 percent of corn acres this year will be covered by crop insurance. Roughly 90 percent of those insured acres will be covered with Revenue Protection (RP). RP insurance guarantees a percentage of revenue per acre at the farm level, with farmers selecting guarantee coverages ranging from 50 percent to 85 percent of expected crop revenue for their farm. An indemnity is paid when the actual revenue falls below the guaranteed revenue for the crop. The price portion of the revenue guarantee is reset each year prior to planting based on December futures prices. Because revenue insurance is based on expected or actual corn prices at harvest time, revenue guarantees increase or decrease each year with changes in prices for the upcoming season (which is in contrast to ARC, where the guarantee is based on historical prices). This year the insurance revenue guarantee is lower for corn and many other crops because of lower market prices.

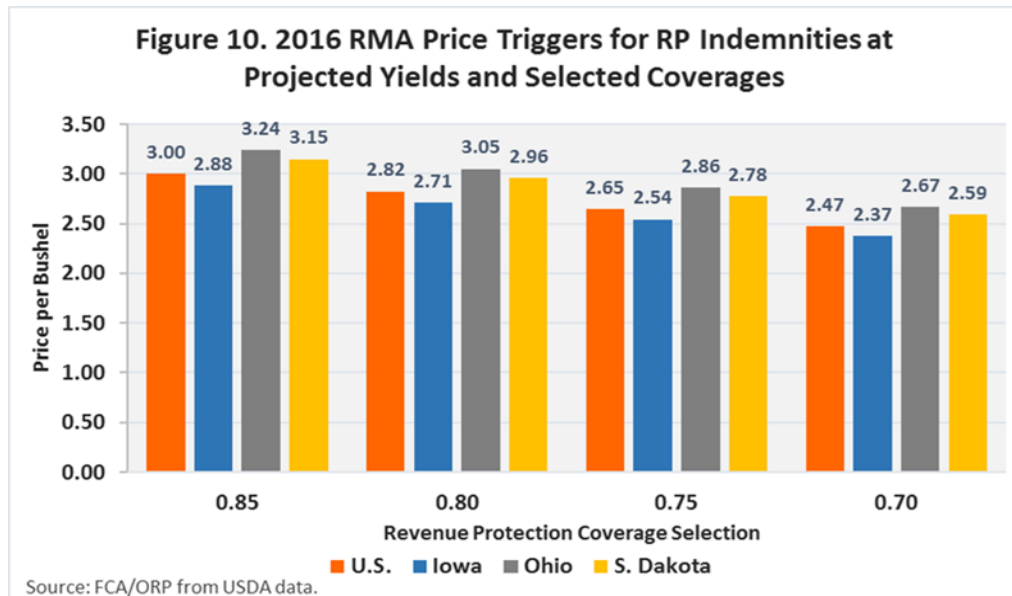
Typical coverage levels purchased by farmers vary by region of the country, and hence its value to cover revenue shortfalls varies. Figure 8 shows the share of insured corn acres in 2016 under the four most popular coverage options. More than 80 percent of insured Iowa corn acreage has 80 or 85 percent revenue coverage, compared with just 10 percent in South Dakota, and about half of U.S. corn acreage nationwide.



Regardless of the coverage selection, RP income guarantees using national or state level data for 2016 are well below total production costs as denoted by the green line (figure 9). The revenue guarantees are sufficient to cover production costs when land costs and depreciation are excluded (denoted by the blue line), even at the 70 percent coverage level.



Finally, figure 10 shows the approximate level of the Risk Management Agency (RMA) fall harvest price needed to trigger an insurance indemnity at the four coverage levels. (The RMA price is the average daily price of December futures during the month of October.) South Dakota and Ohio have relatively higher trigger prices for each RP coverage level because their expected yield in 2016 is not as high relative to their trend yield used to calculate their revenue guarantee. As of the end of August, the December corn futures price is close to triggering indemnities at the 85 percent coverage level for Ohio and South Dakota. However, only about 25 percent of insured Ohio corn acres and less than 1 percent of insured South Dakota corn acres are at that coverage level.



Conclusion

For the 2016 corn crop, the combined effect of ARC and crop insurance will ease some of the financial pain of low corn prices. The ARC payment is expected to help producers cover some but not all costs of production. Meanwhile, crop insurance will indemnify producers experiencing any localized weather-related losses, depending on the farmer's coverage level. Both of these expected outcomes closely track the congressional policy intention of income support via farm programs, with crop insurance covering a portion of farm production losses.

For 2017, the ARC guarantee will decline according to the statutory formula, thereby providing less income protection than for 2016 corn. For crop insurance, if corn futures prices remain low through next spring, when the 2017 crop insurance guarantee is set, farmers should expect yet another year of relatively low revenue protection afforded by crop insurance. In the absence of unexpected price strength, 2017 could be even more challenging than 2016.

Data and Methodology Used for Selected Figures

Figure 3. Iowa State University cost budgets for statewide production of corn are used to estimate per bushel costs for state average yields and prices. Yields for years prior to 2016 are actual, whereas 2016 yields are USDA estimates. Prices are those received by farmers in Iowa, except for 2016 which is USDA's August mid-point national farm price estimate adjusted to Iowa using historical relationship. Agriculture Risk Coverage payment is estimated from the data.

Figure 4. USDA's August mid-point farm price for 2016 is used to estimate average farm prices at the state level using the historical price relationship. Trend yield calculations reflect the methodology outlined by the Risk Management Agency.

Figure 5. Crop revenue and Agriculture Risk Coverage payments are estimated using USDA price and yield estimates. Costs reflect USDA national and regional cost estimates for 2015, adjusted by USDA's February 2016 forecast of national costs. Total costs exclude unpaid operator labor and management charges.

Figure 6. Analysis from USDA Economic Research Service is adapted to reflect 2016 cost structure from 2010 cost estimates by using average annual changes in expenses as reported by ERS.

Figure 7. Estimates of when Agriculture Risk Coverage payments begin and end using USDA national yields and prices as of August 2016 are shown. USDA's nationwide total cost of corn production (excluding unpaid operator labor and management) estimates for 2014-16 are shown.

Figure 8. Risk Management Agency data for the 2016 crop year as of August 15, 2016.

Figure 9. Estimates of 2016 coverage at national and state level using USDA yields and pricing, and estimated trend adjusted yields. Revenue guarantees for the four highest coverage selections are shown. Estimates of total cost and production costs less land and depreciation costs derived from USDA budgets are shown.

Figure 10. USDA August 2016 yield estimates, calculated trend adjusted yields, and RMA corn prices are used to estimate the price at which the RMA harvest price (Average December 2016 futures price in October 2016) would need to fall to before a payment is triggered. Value for the four highest coverage selections is shown.