

Crops Marketing and Management Update

Grains and Forage Center of Excellence

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Topic 1. 2019 Projected Profitability and Break-Even Analysis: Western Kentucky Corn vs. Soybeans

As managers think about 2019, a starting point in preparing marketing and risk management plans is to compare the profitability of corn and soybeans and the price needed to cover the budgeted costs. The projected costs of producing corn, soybeans, and second-year soybeans are shown in Table 1.

The budgets use current harvest-time cash forward contract bids as the sales price. The yields are the Olympic Average yields reported by the Kentucky Farm Business Management (KFBM) for the Ohio Valley region.

Corn has the largest return over total variable costs and cash rent. However, the return over total budgeted costs for corn and soybeans are almost equal. Second-year soybeans have been profitable for several years but are not projected to be profitable over total costs for 2019 because of higher production costs and slightly lower yields.

Given the assumptions for costs and yields, the price needed to cover total budgeted corn and soybean costs is \$3.71 and \$8.86 per bushel, respectively. Managers should perform sensitivity analysis on this break-even price by changing the yield and other costs to understand better the prices needed from the market to be profitable in 2019.

Table 1. Comparison of Returns over Budgeted Costs for Western Kentucky Corn vs. Soybeans for 2019.			
	<u>Rotation Corn</u>	<u>Rotation Beans</u>	<u>2nd Year Beans</u>
Price	\$3.74	\$8.96	\$8.96
Yield	<u>180.0</u>	<u>55.0</u>	<u>53.6</u>
Revenue	\$673	\$493	\$480
Total Variable Costs (TVC)	\$426	\$265	\$285
Rent	<u>\$175</u>	<u>\$175</u>	<u>\$175</u>
Return over TVC+Rent	\$72	\$53	\$20
Overhead	<u>\$68</u>	<u>\$47</u>	<u>\$47</u>
Return over Budgeted Costs	\$4	\$6	-\$27
Break-Even Price over Budgeted Costs	\$3.71	\$8.86	\$9.46

A question I receive in Extension meetings at this time of the year is “What price do I need from soybeans to be as profitable with corn (or vice versa)?” This question is easy to answer and can be calculated easily using the budgets in Table 1.

Table 2. Break-Even Price which makes Rotation Soybeans and Second-Year Soybeans as Profitable as Rotation Corn in Western Kentucky in 2019.			Table 3. Break-Even Yields which makes Rotation Soybeans and Second-Year Soybeans as Profitable as Rotation Corn for Western Kentucky in 2019.		
If the Corn Price is:	Break-Even Soybean Price for Same Return		If the Corn Yield is:	Break-Even Soybean Yield for Same Return	
<u>Price Corn</u>	<u>Rotation Soybeans</u>	<u>2nd Year Soybeans</u>	<u>Yield Corn</u>	<u>Rotation Soybeans</u>	<u>2nd Year Soybeans</u>
\$2.50	\$4.88	\$5.38	120	29.8	32.0
\$2.70	\$5.54	\$6.05	130	34.0	36.2
\$2.90	\$6.19	\$6.72	140	38.1	40.4
\$3.10	\$6.84	\$7.39	150	42.3	44.6
\$3.30	\$7.50	\$8.06	160	46.5	48.7
\$3.50	\$8.15	\$8.74	170	50.7	52.9
\$3.70	\$8.81	\$9.41	180	54.8	57.1
\$3.90	\$9.46	\$10.08	190	59.0	61.2
\$4.10	\$10.12	\$10.75	200	63.2	65.4
\$4.30	\$10.77	\$11.42	210	67.4	69.6
\$4.50	\$11.43	\$12.09	220	71.5	73.8

Assuming the costs and yields from Table 1, the prices that make rotation soybeans and second-year soybeans, as profitable as rotation corn are shown in Table 2. If corn is sold at \$3.90 per bushel, then rotation soybeans are as profitable at a price of \$9.46 per bushel while second-year soybeans need a price of \$10.08 per bushel for the same profitability. If corn is sold at \$3.50 per bushel, then soybeans sold at \$8.15 and \$8.74 per bushel would have the same profitability for rotation and second-year soybeans (Table 2). The corn market may have more upside price potential, which may make corn preferred over soybeans.

Table 3 uses the prices and costs from Table 1 to calculate the break-even yields that makes soybeans as profitable as corn. If corn yields are typically 160 bushels per acre, then rotation soybeans and second-year soybeans must yield 46.5 and 48.7 bushels, respectively, to be as profitable as corn. Similarly, soybeans must yield 63.2 and 65.4 bushels to be as profitable as 200-bushel corn (Table 3).

This analysis is to motivate managers to use their own cost information for the 2019 crops along with their knowledge of typical yields to understand which crop enterprise may be more profitable. Soybeans may have greater downside price risk given uncertainty about trade and South American production. Managers producing soybeans for 2019 should remain vigilant for pricing opportunities.

Topic 2. When is a Good Time to Consider Hedging and Cash Forward Contracts for Corn and Soybeans?

Another question that I am asked during Extension meetings is “When is a good time to use hedging or cash forward-contract (CFC) corn and soybeans?” The best time to use either price risk management tool should be based on your marketing plan and the price needed to pay production costs, cash rent, principal and interest payments, family living expenses, and any other expenses that are paid from the farm business. Managers should also understand the seasonality of commodity futures and forward contract bids to know the months that tend to provide pricing opportunities. As managers begin to form their 2019 risk management plan, it is helpful to understand the seasonality of the December corn and November soybean futures contracts for the last four crops.

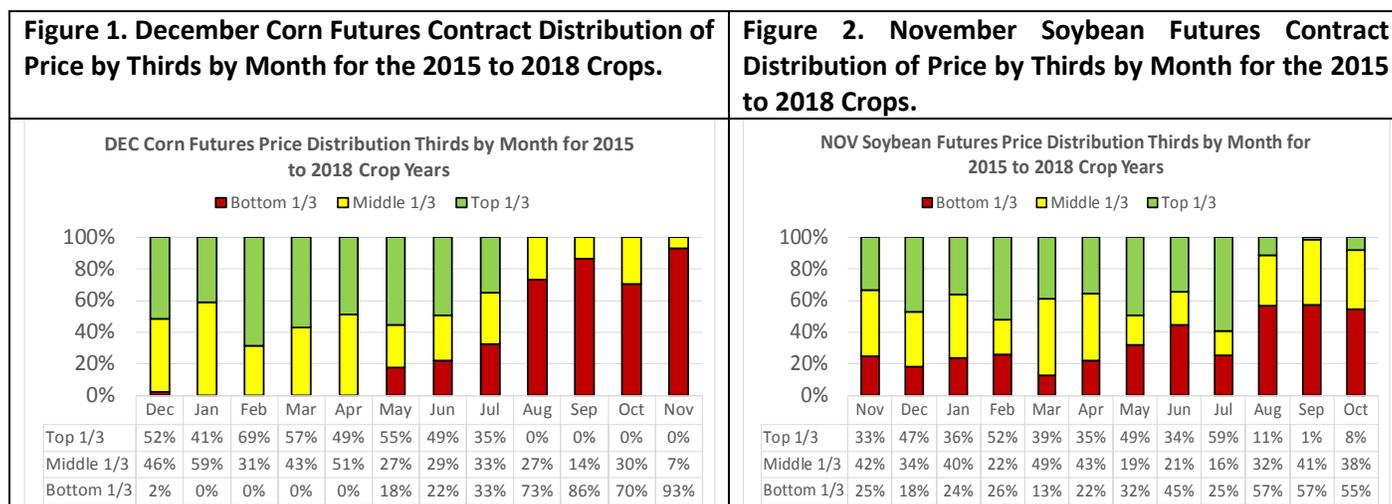


Figure 1 and Figure 2 show the distribution of closing prices each month in the year’s top-third (green), middle-third (yellow), and bottom-third (red) ranking for corn and soybeans, respectively. The analysis uses daily futures prices from December previous year to November of the harvest year for corn and from November to October for soybeans. For each year, the number of days the futures price closed in the year’s top-third, middle-third, or bottom-third is calculated for each month.

The green colored bars in Figures 1 and 2 represent the percentage of the days where the futures price closed in the year’s top-third price range. For corn, it should not be surprising to see that the top-third prices for the 2015 to 2018 crops were most likely to occur from December to May (Figure 1). A combination of South American weather risk, bidding for the planted area in the United States, and planting-time weather risk kept the futures price trading in the top-third.

There is value in knowing when not to implement a hedge. The red columns in Figure 1 show that once the size of the corn crop is known by the market, opportunities to price in the top-third price range declines. Figure 1 shows why managers should avoid selling at harvest unprotected, as they are more likely to receive the low-third price for the year. The futures contract did not close in the top-third range from August to November for the 2015 to 2018 crops.

February tends to be the month when the November soybean contract trades in the top-third of the market (Figure 2). The soybean market tends to offer more opportunities to hedge in the top-third in from December to May than later in the growing season. However, July has offered hedging opportunities because of growing season weather. However, the opportunities to market in the top-third declines after July as production risk is removed.

Also, there are seasonal patterns to the cash-forward contract bids (CFC) throughout the calendar year from January to harvest. Using cash market data compiled by Ed McQueen at the Kentucky Farm Bureau Federation, I have summarized the average price change for Western Kentucky corn and soybean bids from January to October for the 2007 to 2014 crops (red line) and the average for the 2015-18 crops (black line) for corn (Figure 3) and soybeans (Figure 4).

The indices shown in Figures 3 and 4 are the average cash-forward bid for harvest-time delivery relative to the average price in October for the same production year. Then each month’s indices are averaged for the 2015-18 crop

years and the 2007 to 2014 crop years. This averaging smooths some of the influence of an individual year in determining the “best” time to forward-contract. It is important to remember that the indices will not necessarily predict which month will be best for 2019. Figures 3 and 4 reinforces the benefit of pricing some percentage of expected production before harvest to receive a price that is greater than what you can receive from selling off of the combine without any price protection.

Figure 3 shows that cash-forward contract bids for corn remained steady from February to June at 10% or 11% above the harvest price in October. While 10 percent may not seem significant, assuming a harvest price of \$3.50 per bushel, and additional 10% is \$0.35/bushel or \$3.85 per bushel corn. While bids may not appreciate as much as during the 2007-14 crop years, the window to price tends to close after June, as the size of the crop becomes better understood by the market.

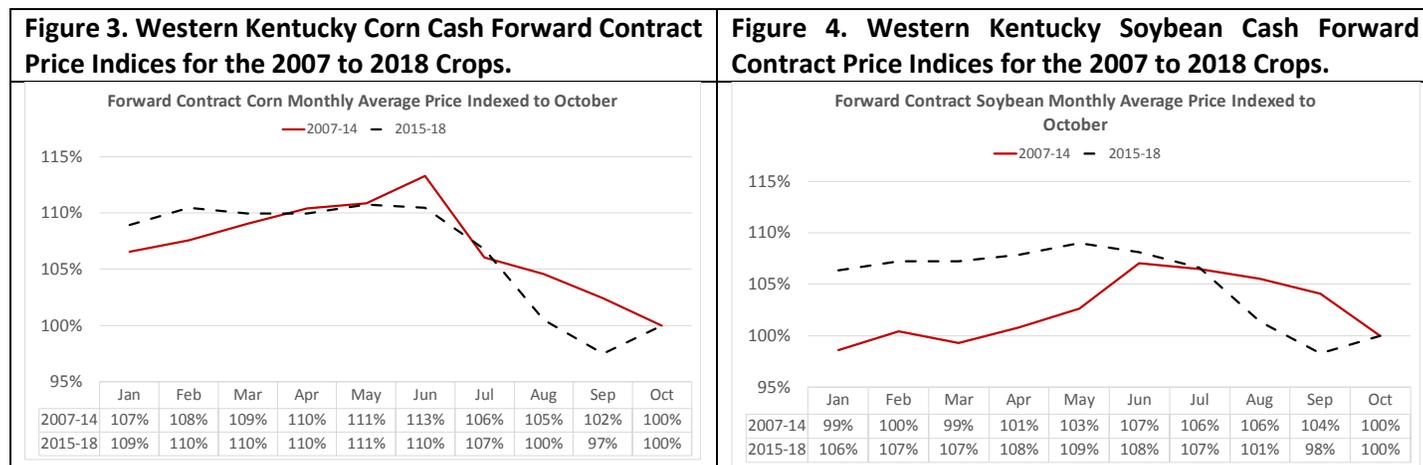


Figure 4 shows that the average soybean CFC price in May was 9% greater than the harvest price, on average, from 2015-18 (blue line). In contrast, the best bids tended to be in June and July for the 2007 to 2014 crop years due to the years of strong demand and tight grain stocks providing better pricing opportunities closer to harvest. Notice that soybean bids decline into harvest after July in a pattern similar to that for corn.

Managers need to know what price is needed from the market to be profitable and be prepared to price when opportunities arise. Figures 1 and 2 serve as a reminder that pricing opportunities are usually better before planting (corn) or before soybeans bloom. Those uncomfortable with hedging should consider the seasonality in forward contract bids shown in Figures 3 and 4 and use forward contracts to lock in a price before harvest.

Topic 3. 2018 Corn, Soybean, Wheat Basis vs. Previous Years – Implications for Storage

Figure 5, Figure 6, and Figure 7 show the monthly average corn, soybean and wheat spot basis, respectively, for twelve Western Kentucky markets. For each figure, the blue line represents the average basis for the 2013-15 crop years, and the red line is the basis for the 2016 crop. The green line is the 2017 basis while the black dots represent the 2018 basis.

The corn basis is -\$0.15/bushel under the March corn contract, which is a \$0.09/bushel increase from harvest in October. Last year, the corn basis appreciated from October to February by \$0.29/bushel, which is \$0.11/bushel more than the appreciation in basis for the 2016 corn crop (Figure 5).

The average soybean basis, as of January 18, was -\$0.47/bushel under the March 2019 soybean contract. The basis is \$0.23 per bushel wider than 2017 basis and \$0.30 per bushel wider than the 2016 basis (Figure 6). Last year, the basis appreciated \$0.28/bushel from October to January, but the 2016 crop’s basis had a maximum appreciation in basis of \$0.12/bushel in December. Basis appreciation will be important for positive returns to soybean storage with current appreciation at \$0.11/bushel from October to January (Figure 6).

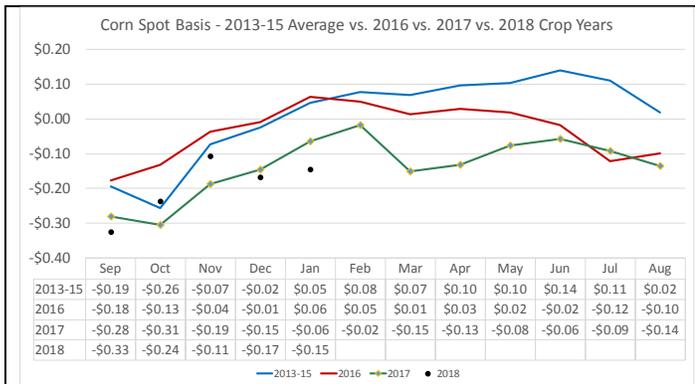


Figure 5. Western Kentucky Corn Spot Market Basis Appreciation from September to August for 2013 to 2018 Crop Years.

Basis Calculated on January 18, 2019

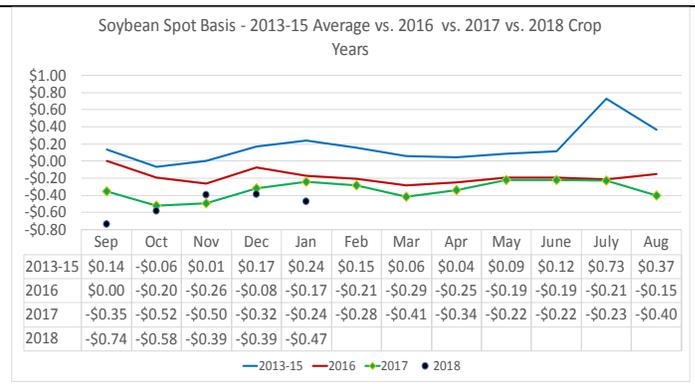


Figure 6. Western Kentucky Soybean Spot Market Basis Appreciation from September to August for 2013 to 2018 Crop Years.

Basis Calculated on January 18, 2019

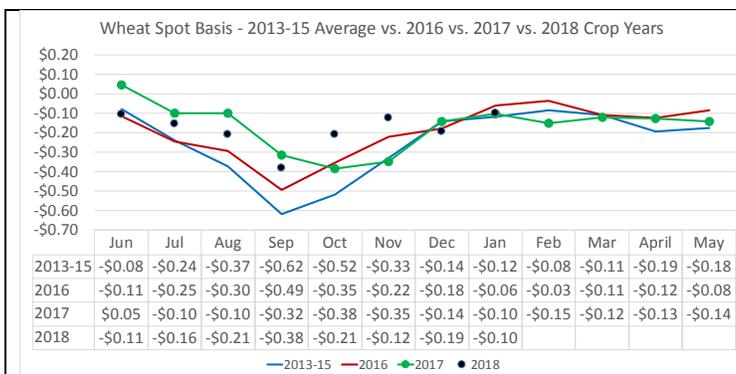


Figure 7. Western Kentucky Wheat Spot Market Basis Appreciation from June to May for 2013 to 2018 Crop Years.

Basis Calculated on January 18, 2019

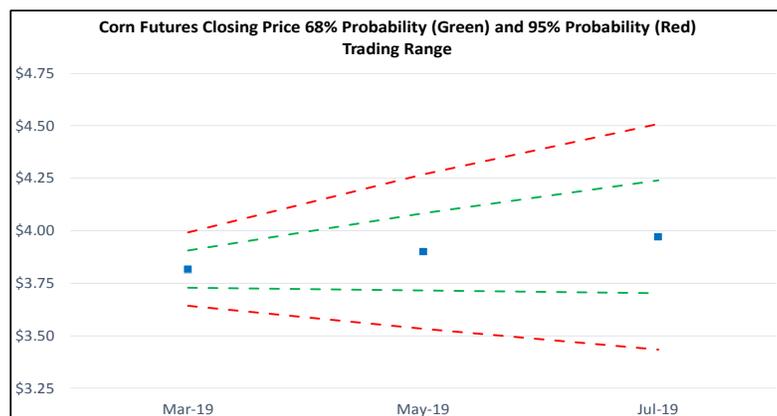
The average appreciation in wheat basis was \$0.15/bushel from harvest to February for the 2013-15 crop years. The average appreciation in basis for the 2016 crop year was \$0.21/bushel from harvest to February. Maximum appreciation was \$0.00/bushel in January for the 2017 crop (Figure 7).

The 2018 wheat basis is currently at -\$0.10/bushel under the MAR contract. Seasonal narrowing in basis will improve the returns to wheat storage with the best basis typically in January or February.

Topic 4. Projected Corn, Soybean, and Wheat Futures Trading Ranges to July 2019

Figures 8–10 provide the projected futures price trading range, by futures contract month, based on the contracts' volatility for the previous 21-day period. The green lines represent the range that describes the 68% probability of the projected trading range with the red line representing 95% likelihood of the expected trading range. Notice how these projections fan out for the contracts that will expire later in 2019. That is because there is more time until expiration; thus, there is a wider potential trading range for these deferred futures contracts.

Figure 8. Corn Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



Futures Trading Range Calculated on: January 18, 2019

Trading range calculated on January 18, 2019, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on January 18, 2019, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 8 provides the probabilistic trading range for the corn futures contracts from March 2019 to July 2019. There is a 68% probability that the March 2019 corn contract will trade between \$3.73 and \$3.91 and a 95% probability that the March 2019 corn contract will trade between \$3.64 and \$3.99 (Figure 8). Managers who are thinking about managing price risk for the stored 2018 corn crop into late spring should notice that the July 2019 contract has a 68% probability of trading between \$3.70 and \$4.24 per bushel (Figure 8).

Figure 9 provides the probabilistic trading range for soybean futures contracts from March 2019 to July 2019. The March 2019 soybean futures have a 68% probability of trading between \$8.95 to \$9.39 with a 95% likelihood of trading between \$8.73 and \$9.60 (Figure 9). The July 2019 futures contract has a 68% probability of trading between \$8.75 and \$10.10 per bushel (Figure 9). The increased volatility in the soybean market contributes to this wide range in possible soybean prices for the deferred soybean futures contracts.

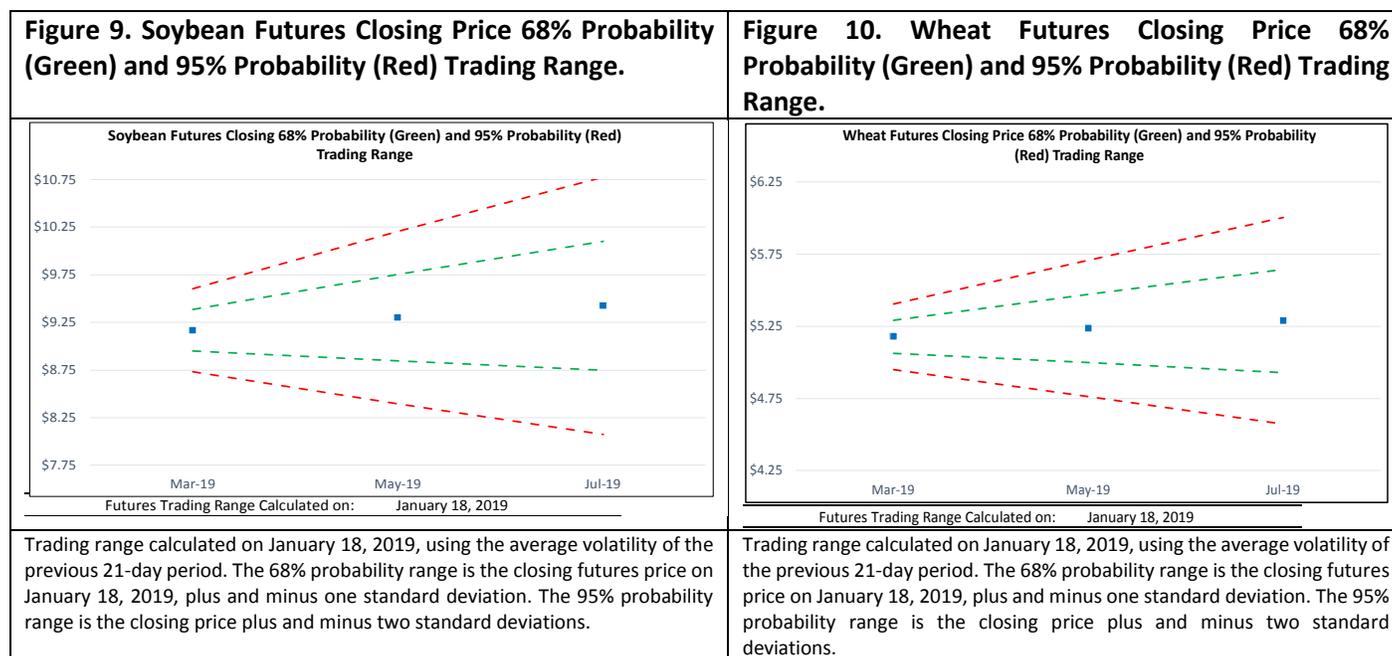


Figure 10 provides the probabilistic trading range for wheat futures contract from March 2019 to July 2019 contracts. The March 2018 wheat futures contract has a 68% probability of trading between \$5.06 and \$5.29 per bushel while the May 2019 contract has a 68% chance of trading between \$5.00 and \$5.47/bushel (Figure 10). The wheat market is not as impacted by tariffs and trade uncertainty, so any production problem domestic or worldwide would be supportive of higher prices. The July 2019 wheat contract has a 68% chance of trading between \$4.93 and \$5.65/bushel (Figure 10), which should be monitored for 2019 pre-harvest risk management.

Topic 5. 2018 Corn and Soybean Risk Management Opportunities for May Delivery

Managers storing corn and soybeans to May 2019 may want to consider if the futures or options markets are providing opportunities to protect prices at profitable levels.

Table 4. Western Kentucky Corn Storage Risk Management to May 2019 for Various Yield Objectives.					Those farms that produced more than 180-bushel corn may be able to lock-in a profit above total budgeted costs. Farms with lower expected yields do not have profitable risk management opportunities at current prices (Table 4).
Storage Hedge: May 2019		Corn			
Yield	170	180	190	200	
TVC+Rent+Overhead+Family Living (\$/acre)	\$670	\$670	\$670	\$670	
TVC+Rent+Overhead+Family Living (\$/bu)	\$3.94	\$3.72	\$3.53	\$3.35	
TVC+Rent+OH+Family+\$0.31 storage (\$/bu)	\$4.25	\$4.03	\$3.84	\$3.66	
Hedge @ \$3.97+\$0.06 basis = \$4.03	-\$0.22	+\$0.00	+\$0.20	+\$0.37	
Forward Contract at \$3.83	-\$0.42	-\$0.20	-\$0.00	+\$0.17	
Put: \$3.90 strike @\$0.133 = \$3.83 floor	-\$0.42	-\$0.21	-\$0.01	+\$0.17	
Strategies Evaluated on:	January 18, 2019				

Table 4 compares the risk protection provided by hedging (or Hedge-to-Arrive contracts), forward contracts, or with put options for corn for varying harvested yields. Each table illustrates the break-even price that covers total inputs, rent, overhead, family living, and storage. The July 2019 corn futures contract and put options on the July 2019 corn contract are compared for May 2019 delivery. The similar price risk tools are evaluated for soybeans (Table 5) to measure the potential profitable returns over total variable costs, inputs, overhead, family living, and on-farm storage.

Table 5 presents risk management alternatives for storing soybeans from harvest to May 2019. The example varies the harvested yield to illustrate how the break-even price over inputs, rent, overhead, family living, and storage changes with yield.

Table 5. Western Kentucky Soybean Storage Risk Management to February 2019 for Various Yield Objectives.				
Storage Hedge: May2019	Soybeans			
Yield	<u>45</u>	<u>55</u>	<u>65</u>	<u>75</u>
TVC+Rent+Overhead+Family Living (\$/acre)	\$528	\$528	\$528	\$528
TVC+Rent+Overhead+Family Living (\$/bu)	\$11.73	\$9.60	\$8.12	\$7.04
TVC+Rent+OH+Family+\$0.32 storage (\$/bu)	\$12.05	\$9.92	\$8.44	\$7.36
Hedge @ \$9.43 + \$0.00 basis = \$9.43	-\$2.63	-\$0.49	+\$0.98	+\$2.07
Forward Contract at \$8.90	-\$3.15	-\$1.02	+\$0.46	+\$1.54
Put: \$9.40 strike @\$0.355 = \$9.045 floor	-\$3.01	-\$0.88	+\$0.60	+\$1.69
Strategies Evaluated on:	January 18, 2019			

The example illustrates that a yield of 65-bushels is needed to lock in a profit using the futures market or forward contracts. Table 5 also illustrates that lower yields will be challenged to find profitability at current prices and the assumed costs.

Topic 6. Projected Return to Storage for Corn and Soybeans

Figure 11 provides projected returns to on-farm (blue) and commercial corn storage (red) from harvest to the following August. The return to on-farm storage is calculated as the deferred price less the harvest price less the monthly opportunity cost. The harvest price for corn is assumed at \$3.34 per bushel. The annual interest rate is 5.5%, which gives a monthly interest cost of \$0.015/bushel for corn. The corn futures complex closing prices on January 18, 2019, and the average monthly spot basis are used to forecast the deferred cash prices. The return to on-farm storage is the return to the farm's drying and storage system.

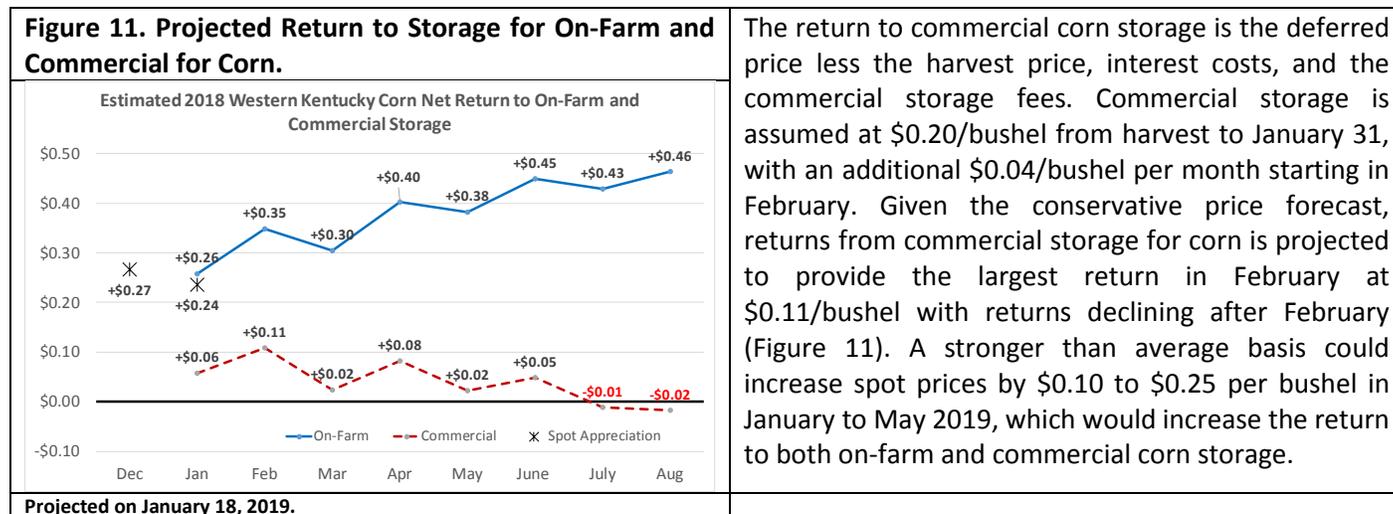
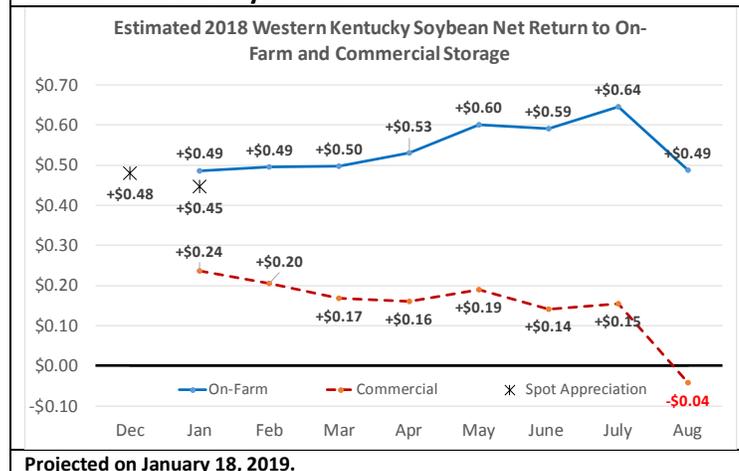


Figure 11 identifies two potential marketing periods – February 2019 and May 2019 – for corn stored on-farm. Given the current futures carry and average basis, the return in February is \$0.35/bushel with a \$0.40/bushel return in May. The implied basis from forward contract bids provides a conservative forecast for deferred prices.

The projected on-farm (red) and commercial (blue) storage returns for soybeans are presented in Figure 12. The harvest price for soybeans is projected at \$8.07 per bushel with a monthly interest cost of \$0.037/bushel. The implied basis from cash forward contract bids posted on DTN is used in forecasting the deferred spot prices. This implied basis is used as a conservative approach given the uncertainty in trade and the impact on basis. Figure 12

identifies potential return to storage of \$0.49/bushel in February 2019 with greater returns if held to May 2019 for stored soybeans on-farm. Given the current futures carry and expected basis, the return in May is \$0.60/bushel.

Figure 12. Projected Return to Storage for On-Farm and Commercial for Soybeans.



The return to commercial soybean storage is the deferred price less the harvest price, interest costs, and the commercial storage fees. Commercial storage is assumed at \$0.25/bushel from harvest to January 31, with an additional \$0.04/bushel per month starting in February. Commercial storage to January 2019 could provide a return of \$0.24 per bushel. As commercial storage fees increase \$0.04 per bushel per month starting in February, the projected returns to storage decrease throughout the rest of the storage season.

Topic 7. Pre-Harvest 2019 Corn, Soybean, and Wheat Risk Management Opportunities

Tables 6-9 analyze the effectiveness of using hedging with futures or put options in protecting revenue that covers total input costs, cash rent, overhead and family living for corn, soybeans, wheat, and double-crop soybeans in 2019.

Table 6 presents risk management alternatives for Western Kentucky corn production for 2019. Several yield projections are provided to show what yield is needed to find profitable pricing opportunities. Three risk management alternatives are compared. The first marketing alternative is to hedge with commodity futures, or HTA contracts, that would lock in an expected cash price at \$3.74/bushel assuming a -\$0.30/bushel harvest-time basis. The second is to lock in a cash price with a forward contract at \$3.75/bushel. The third alternative is to establish a price floor at \$3.47/bushel by buying a put option with a \$4.00 strike price that costs \$0.23.

Table 6 reminds managers that the corn market currently offers risk management opportunities for the 2019 crop if the farm routinely harvests corn yields above 180 bushels, as hedging with futures may lock in a positive return over input costs, rent, overhead, and family living.

Table 6. Risk Management Alternatives for 2019 Western Kentucky Corn for Various Yield Objectives.

Yield	160	170	180	190	200	210		
TVC+Rent+Overhead+Family Living (\$/acre)	\$670	\$670	\$670	\$670	\$670	\$670	Those farms that routinely produce 200-bushel corn may be able to lock-in a price floor that covers all of the budgeted costs by purchasing a put option (Table 6). A price floor at \$3.47 locks in a \$0.12/bushel return and allows farmers to benefit if the futures price increases.	
TVC+Rent+Overhead+Family Living (\$/bu)	\$4.19	\$3.94	\$3.72	\$3.53	\$3.35	\$3.19		
Hedge @ \$4.04+ -\$0.30 basis = \$3.74	-\$0.45	-\$0.20	+\$0.02	+\$0.21	+\$0.39	+\$0.55		
Forward Contract at \$3.75	-\$0.44	-\$0.19	+\$0.03	+\$0.22	+\$0.40	+\$0.56		
Put: \$4.00 strike @ \$0.232 = \$3.47 floor	-\$0.72	-\$0.47	-\$0.25	-\$0.06	+\$0.12	+\$0.28		
Strategies Evaluated on:	January 18, 2019							

Table 7 illustrates the potential of using risk management products to lock in a profitable return on input costs, cash rent, overhead and family living for 2019 full-season soybeans if managers routinely obtain yields of 65 bushels/acre or more. Managers that are comfortable with hedging with futures or using HTA contracts may be able to lock in a profit of \$0.93/bushel assuming a harvest-time basis of -\$0.50/bushel under the November 2019 contract. A forward contract could lock in a return of \$0.94/bushel for a yield of 65 bushels/acre. Put options could be used to establish a price floor at \$8.57/bushel. The flexibility of options to establish a floor and to benefit from higher prices may be a good alternative for managers to consider for bushels planned to be sold at harvest (Table 7).

Table 7. Risk Management Alternatives for 2018 Western Kentucky Full-Season Soybeans for Various Yield Objectives.

Yield	35	45	55	65	75
TVC+Rent+Overhead+Family Living (\$/acre)	\$528	\$528	\$528	\$528	\$528
TVC+Rent+Overhead+Family Living (\$/bu)	\$15.09	\$11.73	\$9.60	\$8.12	\$7.04
Hedge @ \$9.55 + -\$0.50 basis = \$9.05	-\$6.03	-\$2.68	-\$0.54	+\$0.93	+\$2.02
Forward Contract at \$9.06	-\$6.03	-\$2.67	-\$0.54	+\$0.94	+\$2.02
Put: \$9.60 strike @\$0.531 = \$8.57 floor	-\$6.52	-\$3.16	-\$1.03	+\$0.45	+\$1.53
Strategies Evaluated on:	January 18, 2019				

The soybean market is not offering risk management opportunities for yields less than 65 bushels/acre. Given the uncertainty in the soybean market, managers should monitor opportunities to manage risk when they are available.

Table 8. Risk Management Alternatives for 2019 Western Kentucky Wheat for Various Yield Objectives.

Yield	60	70	80	90	100
TVC+50% Rent+Overhead+Family Living (\$/acre)	\$476	\$476	\$476	\$476	\$476
TVC+50% Rent+Overhead+Family Living (\$/bu)	\$7.93	\$6.80	\$5.95	\$5.29	\$4.76
Hedge @ \$5.29 - \$0.10 basis = \$5.19	-\$2.75	-\$1.61	-\$0.76	-\$0.10	+\$0.43
Forward Contract at \$5.24	-\$2.69	-\$1.56	-\$0.71	-\$0.05	+\$0.48
Put: \$5.30 strike @\$0.296 = \$4.90 floor	-\$3.03	-\$1.90	-\$1.05	-\$0.38	+\$0.14
Strategies Evaluated on:	January 18, 2019				

Table 8 reports the potential of using risk management to lock in a profitable return on inputs, one-half of cash rent, overhead, and family living expense for 2019 winter wheat. Those who typically harvest more than 90-bushel wheat may be able to lock in a profitable return by using forward contracts. Opportunities are not available at lower wheat yields.

I typically do not differentiate marketing plans for full-season and double-crop soybeans. However, the November 2019 soybean futures contract is offering more opportunities for double-crop soybeans than full-season soybeans.

Table 9. Risk Management Alternatives for 2019 Western Kentucky Double-Crop Soybeans for Various Yield Objectives.

Yield	35	40	45	50	55
TVC+Rent+Overhead+Family Living (\$/acre)	\$393	\$393	\$393	\$393	\$393
TVC+Rent+Overhead+Family Living (\$/bu)	\$11.21	\$9.81	\$8.72	\$7.85	\$7.14
Hedge @ \$9.56 + -\$0.50 basis = \$9.06	-\$2.16	-\$0.76	+\$0.34	+\$1.21	+\$1.92
Forward Contract at \$9.06	-\$2.15	-\$0.75	+\$0.34	+\$1.21	+\$1.92
Put: \$9.60 strike @\$0.531 = \$8.57 floor	-\$2.65	-\$1.24	-\$0.15	+\$0.72	+\$1.43
Strategies Evaluated on:	January 18, 2019				

Table 9 reports the potential of using risk management to lock in a profitable return on inputs, one-half of cash rent, overhead, and family living expense for 2019 double-crop soybeans. Those who typically harvest more than 50-bushel double-crop soybeans wheat may be able to lock in a profitable return by using forward contracts.

Topic 8. Potential 2019-2020 Corn, Soybean, and Wheat Balance Sheets and Price Potential

After the January USDA reports, the market typically shifts its focus to South America's production and potential 2019 planted area. The delayed reports have the market in an information limbo; however, it is worthwhile to consider how potential changes in the planted area might affect ending stocks and the 2019-20 U.S. MYA price.

The preliminary USDA *Agricultural Baseline* projections suggested that corn area would increase by 2.9 million acres from 2018. Table 10 provides a sensitivity analysis of corn area increasing by 1 and 2.9 million acres, respectively. The agricultural media is publishing surveys of farmers that indicate they do not plan to change their rotation from 2018 even with lower soybean futures than last year.

The sensitivity analysis performed in Table 10 uses the trend-yield of 178 bushels/acre with yields that are 2 bushels below trend and 2 bushels above trend. The beginning stocks for 2019-20 are the ending stocks from the December 2018 *WASDE* for the 2018-19 marketing-year. Total use is estimated to remain constant from the 2018-19 marketing-year, which is a conservative assumption.

If corn area increases by 1 million acres and obtains trend-yields, corn stocks could continue to decline to about 1.4 billion bushels or a 9.3% stocks-to-use ratio (Table 10). Even with above trend yields, ending stocks could still decline from the 2018-19 marketing-year. A conservative projection of the U.S. marketing-year average price is that corn prices could increase by \$0.10 to \$0.30 per bushel from the current projected U.S. MYA price for the 2018-19 marketing-year. The DEC 2019 corn contract could be at \$3.80 to \$4.00 per bushel in October 2019 harvest if stocks decline as projected in Table 10.

Because corn has strong demand, a 2.9 million increase in planted area could still result in lower stocks if yields are at trend or below trend. The takeaway message from Table 10 is that the market could handle an increase in area with trend yields. The other message is that there is little relative cushion in stocks to absorb a weather event that reduces production (Table 10). A yield of 172 bushels/acre could reduce corn stocks to about a 6% stocks-to-use ratio, which would approach minimum pipeline levels.

Table 10. Potential 2019-20 U.S. Corn Balance Sheet.							Table 11. Potential 2019-20 U.S. Soybean Balance Sheet.						
	Acreage Increased by 1.0 Million			Acreage Increased by 2.9 Million				Acreage Reduced by 2 Million			Acreage Reduced by 4 Million		
Planted Area	90.1			92.0			Planted Area	87.1			85.1		
Harvested Area	82.0			83.7			Harvested Area	86.3			84.3		
Yield	176.0	178.0	180.0	176.0	178.0	180.0	Yield	47.0	49.0	51.0	47.0	49.0	51.0
Beginning Stocks + Imports	1,831			1,831			Beginning Stocks + Imports	980			980		
Production	14,434	14,598	14,762	14,739	14,906	15,074	Production	4,057	4,234	4,407	3,964	4,132	4,301
Total Supply	16,265	16,429	16,593	16,570	16,737	16,905	Total Supply	5,037	5,214	5,387	4,944	5,112	5,281
Total Use	15,030			15,030			Total Use	4,100			4,100		
Ending Stocks	1,235	1,399	1,563	1,540	1,707	1,875	Ending Stocks	937	1,114	1,287	844	1,012	1,181
Stocks-to-Use	8.2%	9.3%	10.4%	10.2%	11.4%	12.5%	Stocks-to-Use	22.9%	27.2%	31.4%	20.6%	24.7%	28.8%
Days of Stocks	30	34	38	37	41	46	Days of Stocks	83	99	115	75	90	105
MYA Price	\$3.92	\$3.81	\$3.71	\$3.73	\$3.64	\$3.56	MYA Price	\$8.63	\$8.34	\$8.09	\$8.81	\$8.50	\$8.24

The preliminary projections released in early November 2018 projected 2019 soybean planted area to fall by over 6 million acres from 2018. Since the release of those projections, the November 2019 soybean contract has traded in an upward trend market and is about \$0.80/bushel higher from the lows made in September 2018. The sensitivity analysis conducted in Table 11 considers the soybean area reduced by 2 and 4 million acres from 2018, respectively.

If soybean area is reduced by 4 million acres and a trend-yield is harvested, soybean stocks could increase to over 1 billion bushels. The U.S. MYA price would potentially be \$0.10/bushel below the current projected price for the 2018-19 marketing-year (Table 11). The risk for the soybean market is planted area declining by 2 million acres from 2018. Given the potential for above-trend yields coupled with sluggish use, soybean stocks could continue to grow to over 1.1 billion bushels. Under that scenario, the U.S. MYA price could decline to \$8.30/bushel. Given the potential for a bearish story for 2019 soybeans, the current November 2019 soybean futures price is likely reflecting hope for a resolution to trade disruptions and large purchases from China.

The preliminary *Agricultural Baseline* projections released in early November 2018 pegged wheat area to increase by over 3 million acres from 2018. Given the delayed harvest and bad weather last fall, the winter wheat seeded area may have a larger percentage not planted as intended. The analysis in Table 12 considers a 1 million and 2.9 million increase in wheat planted area from 2018.

Table 12. Potential 2019-20 U.S. Wheat Balance Sheet.						
	Acreage Increased by 1.0 Million			Acreage Increased by 2.9 Million		
Planted Area	48.8			50.8		
Harvested Area	41.0					
Yield	44.0	48.0	52.0	44.0	48.0	52.0
Beginning Stocks + Imports	1,104			1,104		
Production	1,804	1,968	2,132	1,878	2,048	2,219
Total Supply	2,908	3,072	3,236	2,982	3,152	3,323
Total Demand	2,149			2,149		
Ending Stocks	759	923	1,087	833	1,003	1,174
Stocks-to-Use	35.3%	42.9%	50.6%	38.7%	46.7%	54.6%
Days of Stocks	129	157	185	141	170	199
MYA Price	\$5.42	\$5.21	\$5.03	\$5.32	\$5.12	\$4.94

The wheat market could absorb a 2.9 million acre increase if yields were below-trend. Demand is assumed to be the same as the 2018-19 marketing-year. The wheat market's long-term concern is use, so any increase in acreage risks increasing stocks and reducing the marketing-year average price.

Given the lack of updated USDA information, the potential balance sheets for the 2019-20 marketing-year remains somewhat of an academic exercise. However, the insight from this exercise is that the corn market is better able to absorb additional area than wheat in 2019. The other takeaway is that soybeans need reduced area; however, strong market prices in the futures market may not motivate farmers to shed significant area. The local basis may provide the signal to farmers what to plant in 2019, as the soybean basis has been much wider than normal the last two harvests. Managers planning to sell corn or soybeans at harvest should monitor basis to gauge if basis contracts may be helpful in reducing basis risk at harvest.

Topic 9. Combining Crop Insurance and Forward Contracts to Reduce Revenue Risk: Preliminary Game Plans for 2019 Corn, Soybeans, and Wheat

The final topic evaluates the potential risk protection provided by combining crop insurance with forward contracts to manage revenue risk for corn (Figure 13), full-season soybeans (Figure 14), wheat (Figure 15), and double-crop soybeans (Figure 16). The analysis uses the corn and soybean budgets from Table 1 in Topic 1 (above). The RP crop insurance projected price is assumed to be \$4.05 per bushel and coverage at the 75% level. The marketing plan is to forward contract 40% of expected production (assuming the expected yield of 185-bushels) at a price of \$3.90 per bushel. At a harvested yield of 185-bushel (Figure 13 – green line), the return over budgeted costs is \$-34/acre at a DEC 19 futures price of \$3.24/bushel (\$2.94/bushel cash). If there is a 10% yield loss (Figure 13 – blue line), the maximum loss is -\$71/acre at the DEC 19 futures price of \$3.24/bushel (\$2.94/bushel cash). The lines form a “v-shape” which reflects crop insurance indemnities paid from lower prices or yields. The gold-line reflects a 20% yield loss with the lowest return at -\$100/acre at a DEC 19 futures price of \$3.65/bushel (\$3.35/bushel cash) (Figure 13). A 20% yield loss would strain working capital and may provide liquidity problems.

The return over total budgeted soybean costs for full-season soybeans is shown in Figure 14. The inputs, land, and overhead costs from Table 1 are used in this analysis. The risk management plan is to purchase RP insurance at the 75% coverage level at a projected price of \$9.55/bushel. The marketing plan is to forward contract 65% of expected production (assuming an expected yield of 55 bushels) at a cash price of \$9.35 per bushel. Assuming a -\$0.50/bushel basis, the November 2019 futures price would be \$9.85/bushel to fulfill this marketing objective.

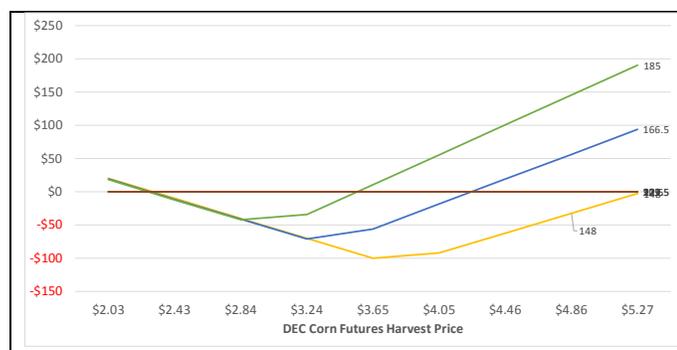


Figure 13. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Corn.

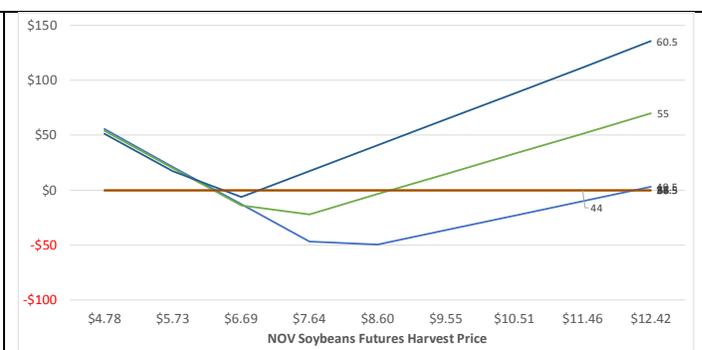


Figure 14. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Full Season Soybeans.

For the planned yield of 55 bushels/acre (Figure 14 -- green line), the returns are positive until the futures price of \$8.60/bushel (\$8.10/bushel cash). If the yield is 60.5 bushels (10% higher), the returns are positive until the futures price is \$6.64/bushel (\$6.14/bushel cash). If yields are 10% lower at 49.5 bushels/acre (Figure 14 – light blue), then returns are negative for most future prices. Figure 14 demonstrates that soybean margins are thin and risk management tools are not as effective as in corn in protecting the profit margins from a 10% yield loss.

Previous newsletters have discussed the seasonality of the July wheat futures contract and that the greatest probability of hedging in the top-third of the market is in July the year before harvest. The risk management plan presented in Figure 15 assumes RP crop insurance was purchased at the 75% coverage level at the projected price of \$5.63/bushel. The marketing plan is to forward contract 40% of planned production (85-bushel planned yield) at the contract price of \$5.40/bushel.

The graph of the wheat enterprise returns over budgeted costs also includes the revenue from the double-crop soybeans at a yield of 49.5 bushels/acre. Double-crop soybean revenues are included in the graph to demonstrate how soybean contributes to enterprise profitability. The wheat/double-crop soybeans have total variable costs of \$549/acre, cash rent of \$175/acre, and overhead costs of \$100/acre. For the planned yield of 85-bushels or larger, the wheat/double-crop soybeans enterprise is profitable. Even with a 10% yield loss for wheat (76.5 bushels/acre), the enterprise is profitable with the minimum return over total costs of \$9/acre (Figure 15)

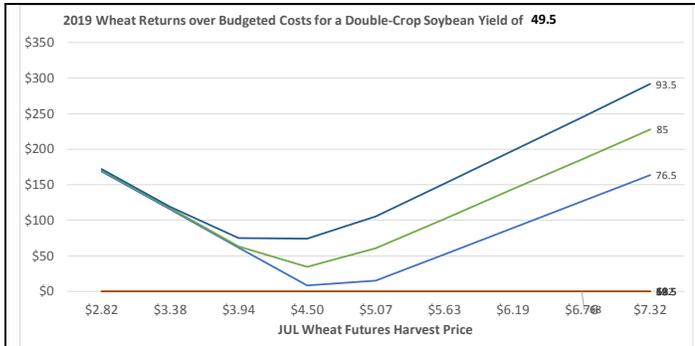


Figure 15. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Wheat for a Double-Crop Soybean Yield of 49.5 bushels/acre.

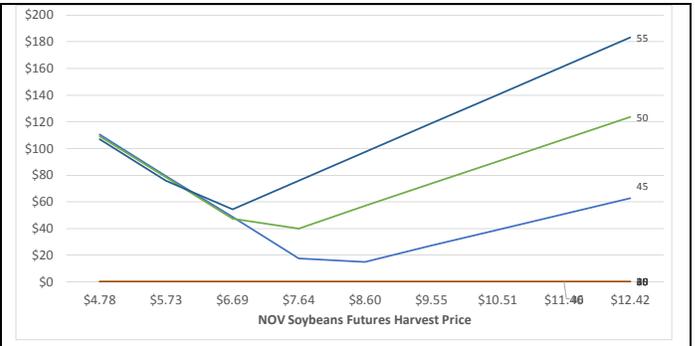


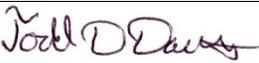
Figure 16. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Double-Crop Soybeans.

Figure 16 shows the full-season soybean risk management plan applied to the double-crop soybean enterprise. Because of the lower cost structure, locking in a large percentage of expected production at \$9.35/bushel in the spot market buoys the wheat enterprise. Figure 16 is shown to remind managers of the importance to lock in favorable margins when they exist.

The purpose of this article is to demonstrate how risk management tools can be combined to protect revenue. Unfortunately, there is not a silver bullet cure to provide 100 percent risk protection. Managers should calculate how much working capital is available and gauge how much risk can be absorbed by the farm business. The risk that cannot be absorbed by the farm business should be passed to the insurance market and price risk tools.

Topic 10. How Do I Get on the Email Distribution List to Receive this Newsletter?

The *Crops Marketing and Management Update* is published monthly usually after the release of the USDA: WASDE report. You can find this issue and past issue on the UK Agricultural Economics Department’s website at <http://www.uky.edu/Ag/AgEcon/extcmmu.php>. Email todd.davis@uky.edu to receive the newsletter by email.

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