

Crops Marketing and Management Update

Grains and Forage Center of Excellence

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Topic 1. May WASDE Update: USDA Provides First Projections for the 2018-19 Marketing-Year

I always say that some WASDE reports attract greater attention than other reports. The May report is a report that garners a lot of attention. This report provides the first supply and demand balance sheet projections for the 2018-19 marketing-year. The May report generated expectations that new-crop soybean stocks would increase to over 549 million bushels. As always, USDA provided a surprise in the report, which was a projected decline in soybean ending stocks for 2018-19.

USDA did not adjust the 2017-18 corn balance sheet in the May report (Table 1). The 2018 planted and harvested areas are projected to be 2.2 and 2 million acres, respectively, less than last year's area based on the *Prospective Plantings* report. USDA is using a trend-yield of 174 bushels per acre (BPA) which is 2.6 BPA less than last year's yield. Assuming the trend yield and reduced harvested area contributes to a potential 2018-corn crop that is 564 million bushels smaller than last year. USDA is projecting a slightly smaller carry-in of 2.18 billion bushels. In total, the U.S. corn supply is projected to be 675 million bushels less than last year (Table 1).

The reduced supply will offset the projected reduction in use for 2018-19. Exports are projected at 2.1 billion bushels, which is 125 million bushels less than last year. If exports are more than projected, ending stocks will decrease further and improve price potential.

USDA projects 2018-19 ending stocks at 1.68 billion bushels, which is 500 million bushels lower than the previous year. Shrinking corn stocks would reduce the stocks-to-use ratio to 11.5%, which is similar to a 42-day supply

of corn at the end of the marketing-year. Tighter stocks are projected to increase the U.S. marketing-year average (MYA) farm price to \$3.80 per bushel (Table 1).

Table 1. U.S. Corn Supply and Use					
	2015-16	2016-17	2017-18 Estimated	2018-19 Projected	Change from 17-18
Planted Area (million)	88.0	94.0	90.2	88.0	-2.2
Harvested Area (million)	80.8	86.7	82.7	80.7	-2.0
Yield (bushels/acre)	168.4	174.6	176.6	174.0	-2.6
----- Million Bushels -----					
Beginning Stocks	1,731	1,737	2,293	2,182	-111
Production	13,602	15,148	14,604	14,040	-564
Imports	67	57	50	50	+0
Total Supply	15,401	16,942	16,947	16,272	-675
Feed and Residual	5,131	5,472	5,500	5,375	-125
Food, Seed & Industrial	6,635	6,883	7,040	7,115	+75
Ethanol and by-products	5,206	5,432	5,575	5,625	+50
Exports	1,898	2,293	2,225	2,100	-125
Total Use	13,664	14,649	14,765	14,590	-175
Ending Stocks	1,737	2,293	2,182	1,682	-500
Stocks/Use	12.7%	15.7%	14.8%	11.5%	-3.2%
Days of Stocks	46	57	54	42	-12
U.S. Marketing-Year Average Price (\$/bu)	\$3.61	\$3.36	\$3.40	\$3.80	+\$0.40
Source: May 2018 WASDE - USDA; WAOB.					

Table 2. U.S. Soybean Supply and Use					
	2015-16	2016-17	2017-18 Estimated	2018-19 Projected	Change from 17-18
Planted Area (million)	82.7	83.4	90.1	89.0	-1.1
Harvested Area (million)	81.7	82.7	89.5	88.2	-1.3
Yield (bushels/acre)	48	52	49.1	48.5	-0.6
----- Million Bushels -----					
Beginning Stocks	191	197	302	530	+228
Production	3,926	4,296	4,392	4,280	-112
Imports	24	22	25	25	+0
Total Supply	4,140	4,515	4,718	4,835	+117
Crushings	1,886	1,901	1,990	1,995	+5
Exports	1,936	2,174	2,065	2,290	+225
Seed	97	105	103	103	+0
Residual	24	34	30	32	+2
Total Use	3,944	4,213	4,188	4,420	+232
Ending Stocks	197	302	530	415	-115
Stocks/Use	5.0%	7.2%	12.7%	9.4%	-3.3%
Days of Stocks	18	26	46	34	-11.9
U.S. Marketing-Year Average Price (\$/bu)	\$8.95	\$9.47	\$9.35	\$10.00	+\$0.65
Source: May 2018 WASDE - USDA; WAOB.					

USDA increased old-crop crushing use by 20 million bushels from the previous report for a corresponding reduction in ending stocks (Table 2). The 2018-19 soybean balance sheet projects an increase in total supply by 117 million bushels from the previous year. This increase is from the large carry-in of 530 million bushels, which more than offsets the projected smaller soybean crop. USDA has adopted the planted and harvested area from the *Prospective Plantings* report along with the statistical trend yield of 48.5 BPA (Table 2).

USDA projects soybean use to increase by 232 million bushels over the current marketing-year. Most of this increase is from exports. USDA projects 2018-19 soybean exports at 2.29 billion bushels, which would be a record if realized (Table 2). Since China is the primary destination for the world's soybean crop, positive trade relationships are essential for export growth to cause soybean stocks to decline as projected (Table 2).

Soybean stocks are projected to be a 34-day supply at the end of the marketing-year. This would support higher prices, and USDA projects the U.S. MYA farm price at \$10 per bushel, which is \$0.65/bushel more than 2017-18 (Table 2).

Table 3. U.S. Wheat Supply and Use					
	2015-16	2016-17	2017-18 Estimated	2018-19 Projected	Change from 17-18
Planted Acres (million)	55.0	50.1	46.0	47.3	+1.3
Harvested Acres (million)	47.3	43.9	37.6	38.9	+1.3
Yield (bushels/acre)	43.6	52.7	46.3	46.8	+0.5
----- Million Bushels -----					
Beginning Stocks	752	976	1,181	1,070	-111
Production	2,062	2,309	1,741	1,821	+80
Imports	113	118	155	135	-20
Total Supply	2,927	3,402	3,076	3,027	-49
Food	957	949	963	965	+2
Seed	67	61	63	62	-1
Feed and Residual	152	156	70	120	+50
Exports	775	1,055	910	925	+15
Total Use	1,952	2,222	2,006	2,072	+66
Ending Stocks	976	1,181	1,070	955	-115
Stocks/Use	50.0%	53.2%	53.3%	46.1%	-7.2%
Days of Stocks	183	194	195	168	-26
U.S. Marketing-Year Average Price (\$/bu)	\$4.89	\$3.89	\$4.70	\$5.00	+\$0.30
Source: May 2018 WASDE - USDA; WAOB.					

USDA adjusted old-crop wheat use lower by 6 million bushels. Exports were trimmed by 15 million bushels but USDA increased food and seed use by 9 million bushels. Old-crop stocks-to-use remains above 53%.

The new-crop wheat supply is projected lower by 49 million bushels mostly due to smaller carry-in and fewer imports. USDA projects the 2018 wheat crop at 1.8 billion bushels by using trend yields and the area from the *Prospective Plantings* report.

Wheat use is projected to increase slightly from the 2017-18 marketing-year. Feed and residual are leading this increase by 50 million bushels. Part of this increase is increased residual with a larger wheat crop. Another component is wheat feed demand tends to be projected larger at the start of the marketing-year.

If realized, wheat stocks will decline to a 46% stocks-to-use ratio and support a U.S. MYA farm price of \$5/bushel

Analysts focused on the report's update of estimated South America's corn and soybean production. USDA projects the Argentina corn crop to be 315 million bushels lower than last year with an estimated corn crop of 1.3 billion bushels. Similarly, the Argentina soybean crop was trimmed by 37 million bushels from the April report. If realized, Argentina will produce 691 million bushels less than last year with a 2017 soybean crop projected at 1.43 billion bushels. While the weather has limited Argentina's production, Brazil is projected to produce a record soybean crop of 4.3 billion bushels. The Brazilian corn crop is projected to be smaller than last year but still significant at 3.4 billion bushels.

Topic 2. 2018 Corn and Soybean Progress vs. Previous Years

After a slow start to the corn-planting season, the U.S. corn crop's planting progress has caught-up to the five-year average (Table 4). The top-five corn states (in bold) are above or at their five-year average percent planted. The exception is Minnesota, which made significant planting progress, +37%, from May 13 to May 20 but is still behind the average pace. Similarly, Michigan and Wisconsin are more than 10% behind their average corn-planting pace. South Dakota and Pennsylvania are even further behind in getting the corn crop planted.

Table 4. Corn Planting Progress for 2018 Compared to Last Week, Last Year, and the Five-Year Average.

	Week Ending			2013-17 Average	Change from Last week
	5/20/2017	5/13/2018	5/20/2018		
Colorado	67	41	67	71	+26
Illinois	87	90	96	87	+6
Indiana	73	73	88	71	+15
Iowa	91	65	86	88	+21
Kansas	69	68	82	79	+14
Kentucky	81	63	81	77	+18
Michigan	62	34	50	63	+16
Minnesota	93	40	77	84	+37
Missouri	92	91	96	87	+5
Nebraska	86	72	88	88	+16
North Carolina	96	92	96	96	+4
North Dakota	9	35	62	67	+27
Ohio	70	55	71	66	+16
Pennsylvania	56	30	35	64	+5
South Dakota	86	21	66	81	+45
Tennessee	94	86	94	92	+8
Texas	86	82	88	84	+6
Wisconsin	63	30	56	66	+26
18 States	82	62	81	81	+19

Source: USDA Crop Progress Report, May 21, 2018.

Table 5. Corn Emergence for 2018 Compared to Last Week, Last Year, and the Five-Year Average.

	Week Ending			2013-17 Average	Change from Last week
	5/20/2017	5/13/2018	5/20/2018		
Colorado	32	7	31	31	+24
Illinois	64	63	84	61	+21
Indiana	43	32	61	41	+29
Iowa	55	26	53	50	+27
Kansas	46	37	56	49	+19
Kentucky	58	30	52	56	+22
Michigan	14	6	22	23	+16
Minnesota	53	1	24	46	+23
Missouri	76	64	84	69	+20
Nebraska	49	26	53	48	+27
North Carolina	91	78	89	88	+11
North Dakota	34	1	8	22	+7
Ohio	39	16	45	34	+29
Pennsylvania	29	4	13	32	+9
South Dakota	42	1	15	35	+14
Tennessee	82	61	79	76	+18
Texas	75	70	81	73	+11
Wisconsin	18	8	21	25	+13
18 States	51	28	50	47	+22

Source: USDA Crop Progress Report, May 21, 2018.

Table 6. Soybean Planting Progress for 2018 Compared to Last Week, Last Year, and the Five-Year Average.

	Week Ending			2013-17 Average	Change from Last week
	5/20/2017	5/13/2018	5/20/2018		
Arkansas	72	62	81	57	+19
Illinois	44	66	81	42	+15
Indiana	44	53	73	36	+20
Iowa	59	33	58	51	+25
Kansas	25	31	50	24	+19
Kentucky	32	15	35	22	+20
Louisiana	90	88	93	80	+5
Michigan	33	18	29	39	+11
Minnesota	68	11	48	56	+37
Mississippi	85	72	84	71	+12
Missouri	39	42	61	31	+19
Nebraska	50	41	68	51	+27
North Carolina	34	24	38	31	+14
North Dakota	53	12	33	40	+21
Ohio	40	31	50	37	+19
South Dakota	52	4	24	44	+20
Tennessee	34	26	50	31	+24
Wisconsin	27	13	33	35	+20
18 States	50	35	56	44	+21

Source: USDA Crop Progress Report, May 21, 2018.

Table 7. Soybean Emergence for 2018 Compared to Last Week, Last Year, and the Five-Year Average.

	Week Ending			2013-17 Average	Change from Last week
	5/20/2017	5/13/2018	5/20/2018		
Arkansas	60	35	61	44	+26
Illinois	16	24	57	15	+33
Indiana	14	9	38	12	+29
Iowa	13	5	18	12	+13
Kansas	12	6	21	8	+15
Kentucky	12	2	13	8	+11
Louisiana	83	62	84	66	+22
Michigan		2	11	9	+9
Minnesota	14		3	15	+3
Mississippi	76	46	66	55	+20
Missouri	18	12	33	13	+21
Nebraska	12	5	25	12	+20
North Carolina	17	10	22	14	+12
North Dakota	9		1	7	+1
Ohio	15	3	22	11	+19
South Dakota	10		2	8	+2
Tennessee	13	4	25	13	+21
Wisconsin	3	2	7	7	+5
18 States	17	10	26	15	+16

Source: USDA Crop Progress Report, May 21, 2018.

The U.S. corn crop's emergence is also slightly ahead of the average rate. For the top-five corn states, Minnesota's rate of emergence is significantly slower than average emergence. Minnesota, Pennsylvania, and South Dakota are all lagging behind in planting and emergence. As we near the end of the month, those farmers still trying to plant corn may decide to file crop insurance prevented planting or switch intended corn acres to soybeans (Table 5).

The U.S. soybean planting progress, at 56% completed on May 20, is ahead of the five-year average (Table 6). Four of the top-five soybean-producing states (in bold) are ahead of average planting progress. However, Minnesota is running about 8% behind the average planting pace. As you would expect, Minnesota, Michigan, and South Dakota are also behind the average soybean-planting pace. Minnesota and South Dakota increased soybean plantings by 37% and 20%, respectively, from the previous week (Table 6).

Table 7 shows that the U.S. soybean crop is emerging at a faster pace than average with about 26% of the U.S. crop emerged as of May 20. Minnesota is the only top-five soybean state where soybeans have slower than average emergence (Table 7).

The U.S. corn and soybean crops have recovered from the slow start in getting into the fields. Regionally, there are some concerns about progress in northern Iowa/southern Minnesota and South Dakota where plantings are lagging. Warmer and drier weather will help the planting progress for both crops, and the surveys are not identifying a production problem so far for both crops.

Topic 3. Winter Wheat Crop Condition: 2018 vs. Previous Years

Table 8. 2018 Winter Wheat Condition for the 18-State Region as of May 20, 2018.

	Percentage				
	Very Poor	Poor	Fair	Good	Excellent
Arkansas	2	5	31	52	10
California			5	72	23
Colorado	5	14	31	44	6
Idaho			20	64	16
Illinois	3	6	25	54	12
Indiana	1	4	27	54	14
Kansas	15	32	38	14	1
Michigan	1	3	30	47	19
Missouri	3	8	41	43	5
Montana	2	6	28	30	34
Nebraska	1	6	31	51	11
North Carolina		4	19	65	12
Ohio	1	3	20	62	14
Oklahoma	34	27	27	11	1
Oregon	4	8	16	51	21
South Dakota	1	10	43	46	
Texas	33	29	22	14	2
Washington		1	10	78	11
18 States	15	20	29	29	7
Previous Week	14	22	28	29	7
Previous Year	4	11	33	44	8

USDA's weekly *Crop Progress* report provides a measure of the winter wheat's condition. While subjective, the percentage rated as very poor, poor, fair, good and excellent measures the potential of the 2018 crop compared to last year.

Table 8 lists the condition ratings as of May 20, 2018, for the eighteen states surveyed. The top five winter wheat states are highlighted in yellow. The long-term drought in the Southern Plains has had an impact on the winter wheat crop with 47, 61, and 62 percent rated as very poor or poor (VPP) in Kansas, Oklahoma, and Texas, respectively (Table 8). The survey rates 35% of the U.S. winter wheat crop in VPP condition in 2018 as compared to 15% in VPP condition at this time last year. While not a good forecast of yield, the ratings suggest the winter wheat crop will be below trend, which will help the wheat market work through the large volume of ending stocks.

Source: USDA *Crop Progress* Report, May 21, 2018.

2018 Kentucky Winter Wheat Crop Condition - May 20, 2018

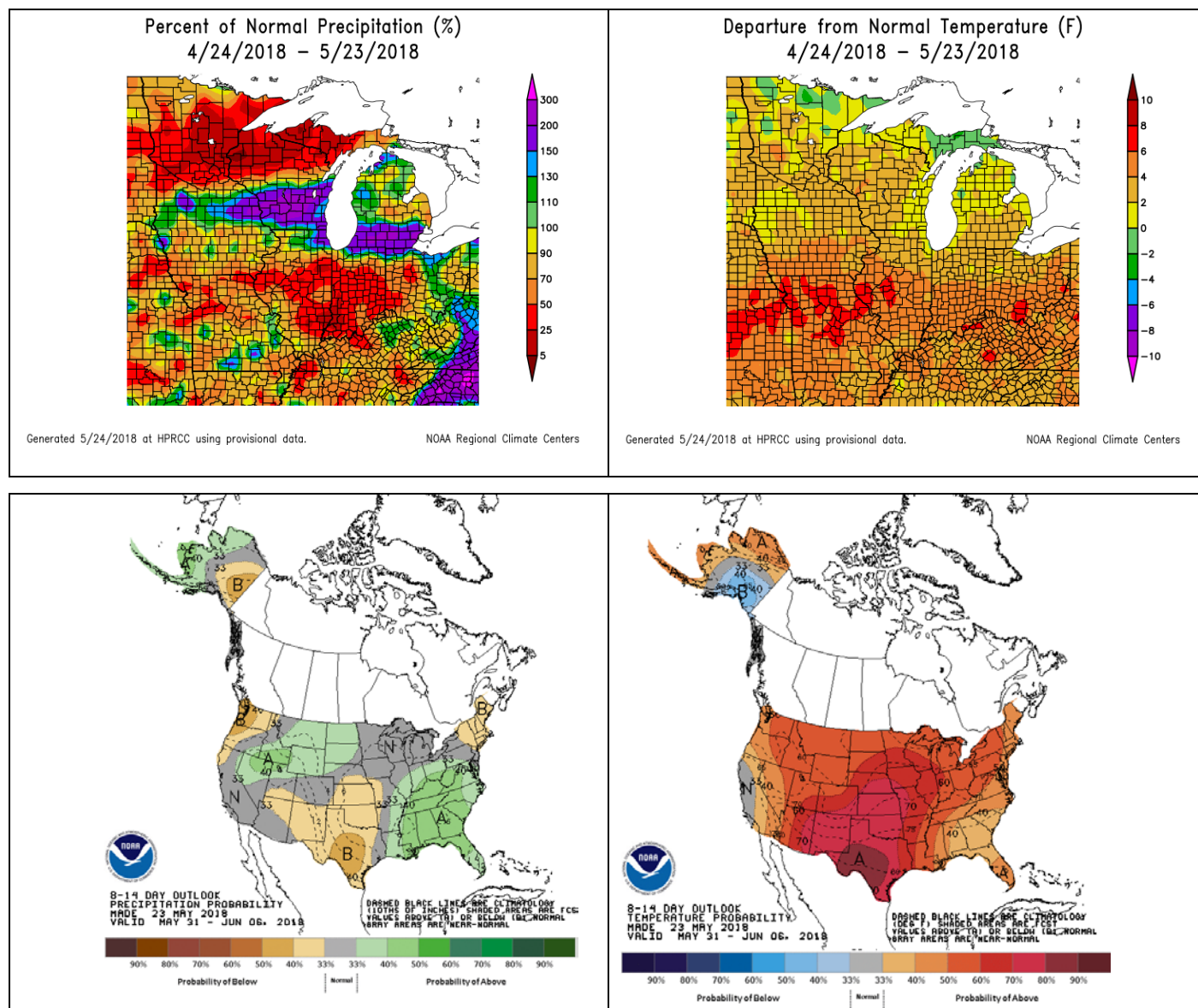
	Percentage				
	Very Poor	Poor	Fair	Good	Excellent
2018	1	6	18	52	23
Last week	1	4	20	54	21
Last Year	3	17	29	43	8

Kentucky's survey results are published in a separate report. Kentucky's 2018 winter wheat crop is rated at 7% in VPP condition as compared to 20% last year. The percentage rated in the good/excellent condition in 2018 is 75% compared to 51% for last year's crop. This is excellent news for Kentucky's wheat growers.

Source: USDA *Crop Progress* Report, May 21, 2018.

Topic 4. Precipitation and Temperature Outlook: Implications for the Growing Season

The green, purple, and blue counties in the Midwest states show where corn and soybean plantings are most likely delayed (left map below). This area has received over 150% of normal precipitation for the last thirty days and may see prevented plantings or potential switching from corn to soybeans. This area has been slightly warmer than normal (right map below) but has not had consistently warm weather.



The 8 to 14-day precipitation (above left) and temperature (above right) outlooks suggest those counties in Iowa, Minnesota, Wisconsin, and Michigan delayed from planting may have an opportunity to get the corn and soybean crops planted. There is less hope for South Dakota or Pennsylvania as both states have an above average probability of rain. South Dakota is a state where acreage may change from corn and spring wheat to soybeans. Just another interesting story that might be told in the June *Acreage* report.

Topic 5. 2017 Corn and Soybean Basis vs. Previous Years – Implications for Storage

A key component of marketing stored grain is monitoring local basis and understanding the seasonal components of basis. Figure 1 and Figure 2 show the monthly average corn and soybean spot basis, respectively, for twelve Western Kentucky markets.

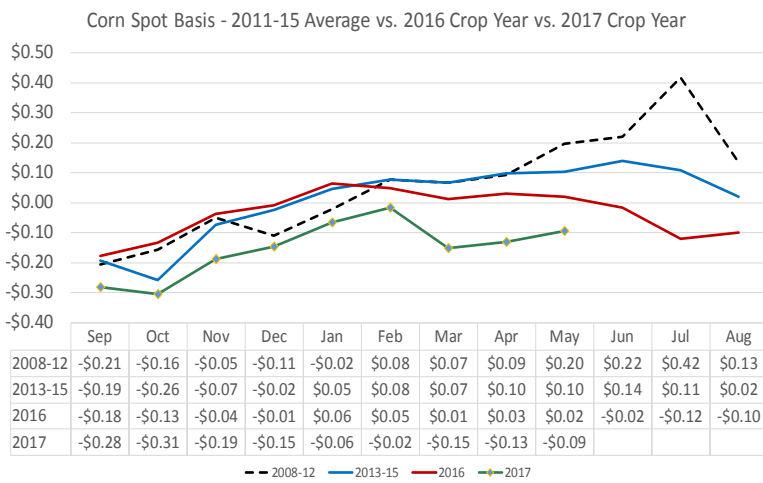


Figure 1. Western Kentucky Corn Spot Market Basis Appreciation from September to August for 2008 to 2017 Crop Years
Basis Calculated on May 18, 2018

The corn basis has appreciated from October to May by \$0.21/bushel, which is about \$0.06/bushel more than the 2016 corn crop's appreciation (Figure 1). The 2016 corn crop's basis reached maximum appreciation in January with basis then widening into spring and summer. For the 2017 corn crop, the greatest basis appreciation so far has been from October to February. Without significant rallies in the futures market, spot price appreciation will be limited, and storage returns may turn negative the longer corn is stored on-farm or commercially

The 2008-12 period (black line) provided significant basis appreciation in corn that averaged \$0.58/bushel from harvest to July. The 2016 corn crop's maximum appreciation was \$0.20/bushel in January with basis widening throughout spring and summer 2017. The 2017 corn basis appreciated \$0.29 from October to February but has widened \$0.07/bushel in May (Figure 1).

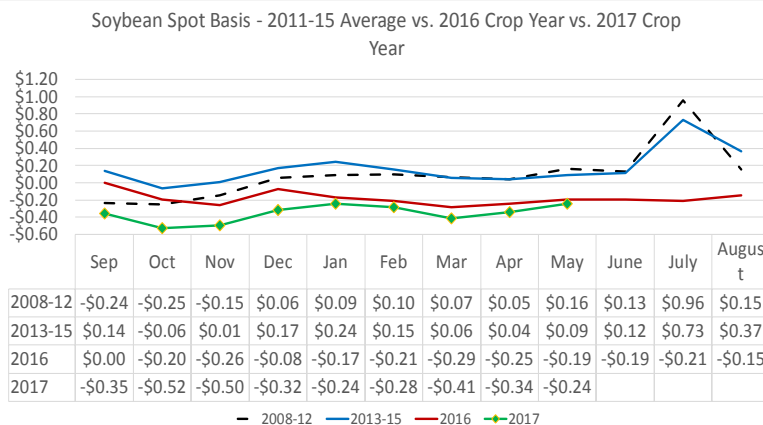


Figure 2. Western Kentucky Soybean Spot Market Basis Appreciation from September to August for 2008 to 2017 Crop Years
Basis Calculated on May 18, 2018

Figure 2 compares the average spot market soybean basis for the 2008-12 crop years (black line), the 2013-15 average (blue line), and last year's basis change (red line). The average 2017 basis is the green line. The average soybean basis, as of May 18, was **-\$0.24/bushel** under the July 2018 soybean contract. The basis is **\$0.05/bushel wider** than the 2016 basis and **-\$0.33** per bushel wider than the 2013-15 average (Figure 2). The 2017 soybean basis has appreciated \$0.28/bushel from October to January 2018 and has strengthened again to a \$0.28/bushel appreciation. Last year's maximum soybean appreciation was \$0.12 from October to December.

Last year's basis does not suggest further strengthening unless stronger demand spurs users to bid corn and soybeans out of the farmer's hands.

Topic 6. Corn and Soybean Price Appreciation from Harvest to Deferred Months

Continuing the theme of price appreciation after harvest, let us focus on the spot price appreciation from harvest (October) through August. The historical price appreciation is shown for corn (Figure 3) and soybeans (Figure 4). Both figures only report the price change excluding any use of price risk management to capture any carry in the futures market that existed before or at harvest.

The blue line in the graphs represents the average price for the 2000-06 crops. The red line represents the 2007-13 crop years while the green line represents the 2014-16 crop years. The black line represents the spot price for the 2017 crop, where the dashed line represents the projected price based on the past seasonality in the spot market

Figure 3. Western Kentucky Corn Spot Price Seasonal Appreciation from October to August.

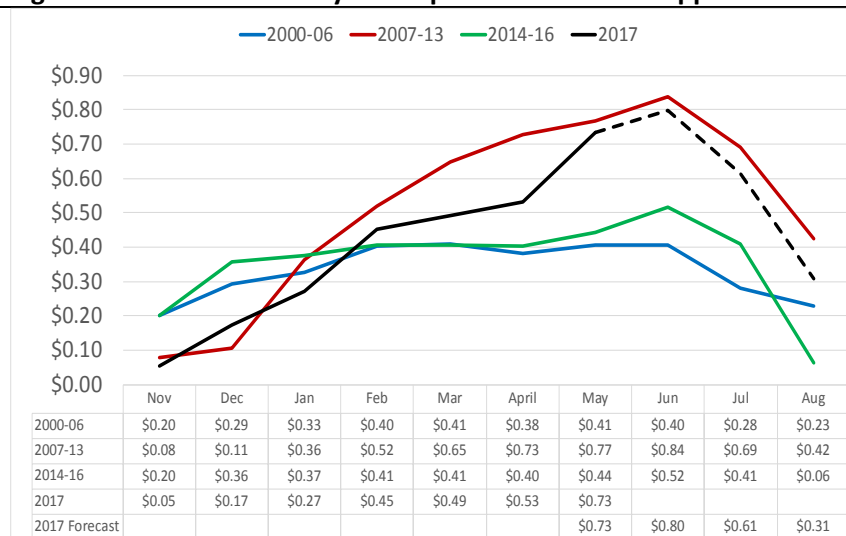


Figure 3 tells a story of the spot corn price, before 2007, reaching maximum appreciation in February/March and another rally appreciating in May/June. The unique fundamentals in the 2007-13 period pushed maximum appreciation into June with a swift decline in July and August. For the 2014-16 period, there was not as much price appreciation with the maximum occurring in June. The 2017 corn spot price has experienced steady appreciation. If the seasonal pattern holds, then May/June may be a good opportunity to sell any unpriced grain in storage.

Figure 4. Western Kentucky Soybean Spot Price Seasonal Appreciation from October to August.

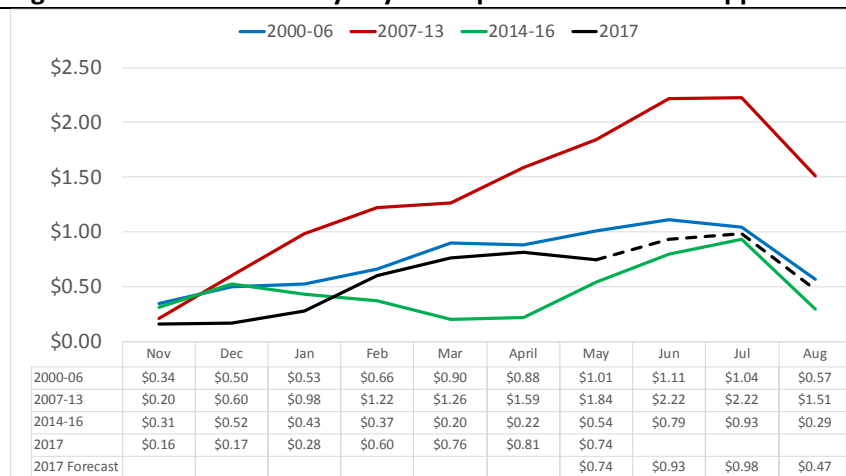


Figure 4 tells a similar story for soybean spot price appreciation. The maximum appreciation in soybeans is a later in the summer than for corn with the June/July period providing the maximum price. The average appreciation for the 2014-16 period to June/July has been \$0.79 and \$0.93 per bushel, respectively (Figure 4). Based on past spot price appreciation, we are in the zone where maximum price appreciation tends to occur for both corn and soybeans.

Topic 7. Projected Returns to On-Farm and Commercial Storage for Corn and Soybeans

The basis figures show the challenge managers may have in earning a return over on-farm and commercial storage costs for the 2017 crop. The cost assumptions for the on-farm and commercial storage costs are described in the October 2017 newsletter and is posted at <http://www.uky.edu/Ag/AgEcon/extmkt.php>.

A conservative spot price forecast using typical basis appreciation and current futures market prices are included in Table 9 for cash price projections for May to June 2018. An optimistic spot forecast uses historical seasonality in the futures market and the basis implied by forward contract bids listed on DTN to forecast spot corn prices.

On-farm storage returns potentially turned positive in February and had gradually improved throughout late winter and early spring. Current spot bids may be providing a \$0.34 return for on-farm storage. Farmers still using commercial storage have waited for this moment – the potential of positive storage returns. Current projections are for a \$0.08 return for commercial storage (Table 9).

Table 9. Projected Return to On-Farm and Commercial Storage for the 2017 Corn Crop.

Harvest Cash Price	\$3.20							
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE
On-Farm Storage Cost (\$/bu)	\$0.36	\$0.38	\$0.40	\$0.41	\$0.43	\$0.45	\$0.46	\$0.48
Commercial Storage (\$/bu)	\$0.61	\$0.62	\$0.64	\$0.68	\$0.69	\$0.71	\$0.72	\$0.73
Realized Spot Price (\$/bu)	\$3.24	\$3.36	\$3.46	\$3.65	\$3.68	\$3.72	\$4.01	
Conservative Spot Forecast (\$/bu)							\$4.01	\$4.03
Optimistic Spot Forecast (\$/bu)							\$4.09	\$4.12
Returns to On-Farm Storage	-\$0.33	-\$0.22	-\$0.14	+\$0.04	+\$0.05	+\$0.08	+\$0.34	+\$0.35
							+\$0.43	+\$0.44
Returns to Commercial Storage	-\$0.57	-\$0.46	-\$0.38	-\$0.23	-\$0.21	-\$0.18	+\$0.08	+\$0.09
							+\$0.17	+\$0.19

Returns Estimated on May 21, 2018

The October 2017 newsletter provides the assumptions behind the on-farm and commercial soybean storage cost estimates. Like in corn, there is a conservative and an optimistic price forecast.

Table 10. Projected Return to On-Farm and Commercial Storage for the 2017 Soybean Crop.

Harvest Cash Price	\$9.30							
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE
On-Farm Storage Cost (\$/bu)	\$0.27	\$0.31	\$0.35	\$0.39	\$0.43	\$0.47	\$0.51	\$0.55
Commercial Storage (\$/bu)	\$0.47	\$0.51	\$0.55	\$0.59	\$0.63	\$0.67	\$0.71	\$0.75
Realized Spot Price (\$/bu)	\$9.36	\$9.39	\$9.51	\$10.09	\$9.99	\$10.04	\$10.07	
Conservative Spot Forecast (\$/bu)							\$10.07	\$10.22
Optimistic Spot Forecast (\$/bu)							\$10.12	\$10.26
Returns to On-Farm Storage	-\$0.21	-\$0.22	-\$0.15	+\$0.40	+\$0.26	+\$0.27	+\$0.26	+\$0.37
							+\$0.31	+\$0.42
Returns to Commercial Storage		-\$0.42	-\$0.35	+\$0.20	+\$0.06	+\$0.07	+\$0.06	+\$0.17
							+\$0.11	+\$0.22

Returns Estimated on May 21, 2018

The soybean rally starting in February was the best opportunity to capture the largest return to storage. While spot price may rally again, there are three additional months storage and opportunity costs added to the cost of storage.

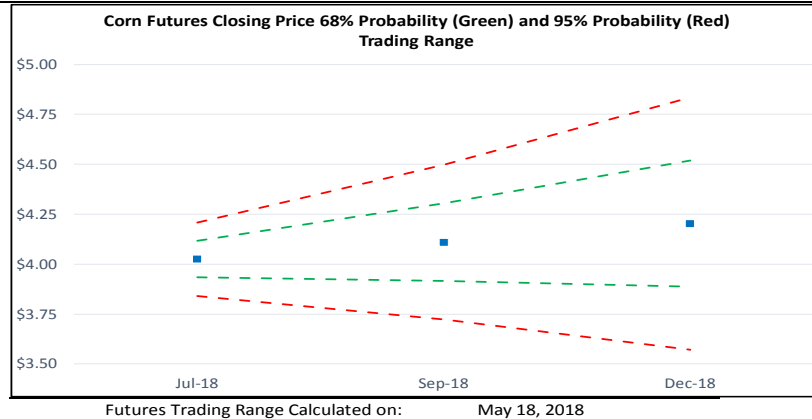
Currently, both on-farm and commercial storage are showing a positive return. The spot price would have to rally \$0.14 in May to earn the same on-farm return and commercial return as in February. Remember we are approaching maximum appreciation for the soybean spot price.

Topic 8. Projected Corn, Soybean, and Wheat Futures Trading Ranges to Harvest 2018

Understanding the probabilistic trading ranges based on current futures market volatility will help managers gauge the likelihood of reaching their pricing objectives. Figures 5–7 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 2018. That is because there is more time until expiration; thus, there is a wider potential trading range for these deferred futures contracts.

Figure 5 provides the probabilistic trading range for the corn futures contracts from May to December 2018. There is a 68% probability that the July 2018 corn contract will trade between \$3.93 and \$4.12 and a 95% probability that the July 2018 corn contract will trade between \$3.84 and \$4.21 (Figure 5). Managers who are thinking about pre-harvest price risk for the 2018 corn crop, the December 2018 contract has a 68% probability of trading between \$3.89 and \$4.52 per bushel (Figure 5).

Figure 5. Corn Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



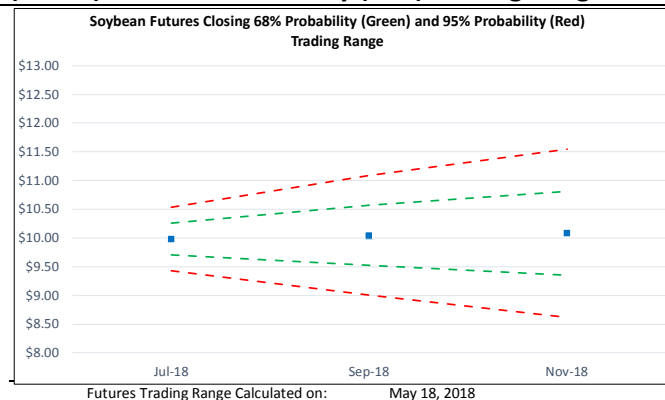
There are several fundamentals that support higher prices (reduced harvested area, trend yields, and strong use to reduce stocks). The downside price risk is from another large crop or weaker than expected use.

Trading range calculated on May 18, 2018, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on May 18, 2018, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 6 provides the probabilistic trading range for soybean futures contracts from May to November 2018. The July 2018 soybean futures have a 68% probability of trading between \$9.71 to \$10.26 with a 95% likelihood of trading between \$9.43 and \$11.54 (Figure 6). For the 2018 soybean crop, the November 2018 futures contract has a 68% probability of trading between \$9.35 and \$10.81 per bushel. The November 2018 soybean futures contract has a 95% likelihood of trading between \$8.62 and \$11.55 (Figure 6). The increased volatility in the soybean market this past month contributes to this \$2.93 range in possible soybean prices for the NOV 2018 soybean futures contract.

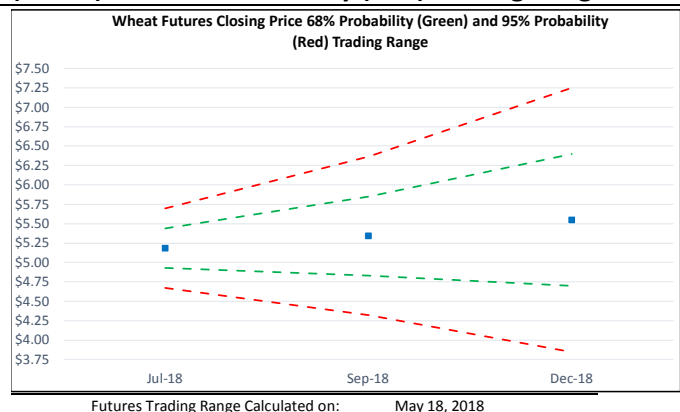
Figure 7 provides the probabilistic trading range for wheat futures contract from May to December 2018 contracts. The July 2018 wheat futures have a 68% probability of trading between \$4.93 and \$5.44 and a 95% probability of trading between \$4.67 and \$5.67.

Figure 6. Soybean Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



Trading range calculated on May 18, 2018, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on May 18, 2018, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 7. Wheat Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



Trading range calculated on May 18, 2018, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on May 18, 2018, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Those that plan to store wheat into the fall may want to monitor the December 2018 wheat contract. Currently, this contract has a 68% probability of trading between \$4.70 and \$6.40 per bushel. The volatility suggests upside potential for those willing to use storage and hedging to capture market carry from the July contract to the December futures contract.

Topic 9. 2018 Corn and Soybean Risk Management Opportunities

Tables 11-12 analyze the effectiveness of using cash forward contracts (CFC), hedging with futures, or put options in protecting revenue that covers total input costs plus cash rent for corn and soybeans.

Table 11 presents risk management alternatives for Western Kentucky corn production for 2018. Several yield projections are provided to show what yield is needed to find profitable pricing opportunities. Three risk management alternatives are compared. A cash-forward-contract at \$4.04/bushel is based on DTN bids for Western Kentucky locations. The second marketing alternative is to hedge with commodity futures, or HTA contracts, that would lock in an expected cash price at \$4.03/bushel assuming a -\$0.20/bushel harvest-time basis. The third alternative is to establish a price floor at \$3.72/bushel by buying a put option with a \$4.20 strike price that costs \$0.285.

Table 11 reminds managers that the corn market continues to lack risk management opportunities for the 2018 crop unless the farm routinely harvests corn yields of 190 bushels, as hedging with futures may lock in a positive return over input costs and rent of \$0.32/bushel.

Table 11. Risk Management Alternatives for 2018 Western Kentucky Corn for Various Yield Objectives.							
Yield	160	170	180	190	200	210	Those farms that routinely produce 200-bushel corn may be able to lock-in a profit above input costs and cash rent. Farms with lower expected yields do not have profitable risk management opportunities at current prices (Table 11).
TVC+Rent (\$/acre)	\$703	\$703	\$703	\$703	\$703	\$703	
TVC+Rent (\$/bu)	\$4.39	\$4.14	\$3.91	\$3.70	\$3.52	\$3.35	
CFC @ \$4.04	-\$0.35	-\$0.10	+\$0.13	+\$0.34	+\$0.53	+\$0.69	
Hedge @ \$4.23 + -\$0.20 basis = \$4.03	-\$0.37	-\$0.11	+\$0.12	+\$0.32	+\$0.51	+\$0.68	
Put: \$4.20 strike @\$0.285 = \$3.72 floor	-\$0.68	-\$0.42	-\$0.19	+\$0.01	+\$0.20	+\$0.37	
Strategies Evaluated on:	May 24, 2018						

Table 12 illustrates the potential of using risk management products to lock in a profitable return on input costs and cash rent for 2018 soybeans if managers routinely obtain yields of 60 bushels/acre or more. The soybean market may provide opportunities to lock in a cash price through forward contracts and lock in a profit of \$1.49/bushel. Managers that are comfortable with hedging with futures or using HTA contracts may be able to lock in a profit of \$1.50/bushel assuming a harvest-time basis of -\$0.26/bushel under the November 2018 contract. Put options could be used to establish a price floor at \$9.65/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 12).

Table 12. Risk Management Alternatives for 2018 Western Kentucky Soybeans for Various Yield Objectives.						The largest projected returns are from using hedging with CFC providing a lower return. Those managers seeking to place a price floor may be able to lock in a minimum return more than \$0.94/bushel protected with put options at 60-bushel yields (Table 12).
Yield	40	50	60	70	80	
TVC+Rent (\$/acre)	\$523	\$523	\$523	\$523	\$523	
TVC+Rent (\$/bu)	\$13.08	\$10.46	\$8.72	\$7.47	\$6.54	
CFC @ \$10.21	-\$2.87	-\$0.25	+\$1.49	+\$2.74	+\$3.67	
Hedge @ \$10.48 + -\$0.26 basis = \$10.22	-\$2.86	-\$0.25	+\$1.50	+\$2.74	+\$3.68	
Put: \$10.40 strike @\$0.486 = \$9.65 floor	-\$3.42	-\$0.81	+\$0.94	+\$2.18	+\$3.12	
Strategies Evaluated on:		May 24, 2018				

Topic 10. 2018 Corn and Soybean Risk Management Plan – May Update

The budgeted break-even prices for the 2018 corn and soybean crop were discussed in the November 2017 newsletter. Table 13 shows the frequency of the percentage of the days that the December and November 2018 contracts closed at or above the relevant breakeven levels since September 1, 2017. The breakeven prices are adjusted by the three-year average harvest basis to equate a cash market price to the futures market price. The December 2018 corn futures contract is offering protection over inputs and rent. Further price rallies are needed to protect overhead or family living expense (Table 13). The November 2018 soybean futures contract has been trading at levels that cover inputs and cash rent. Table 13 shows that futures price of \$10.66 is needed to cover budgeted overhead, and \$11.38

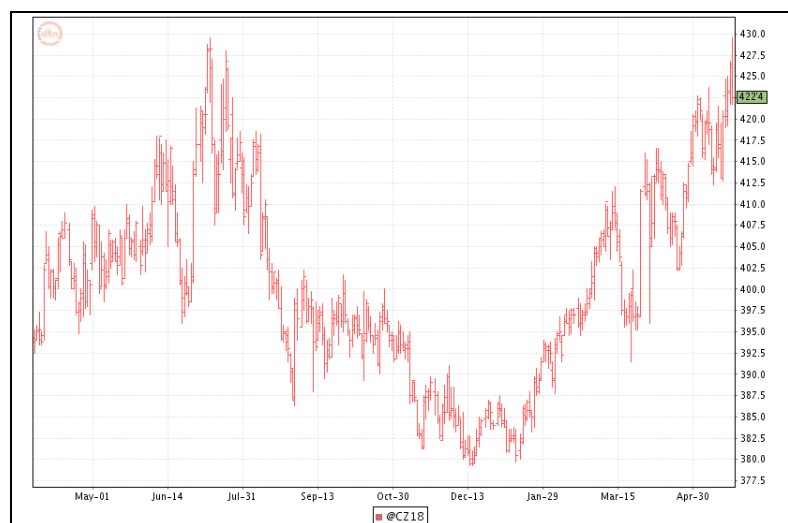
per bushel is needed to provide \$40/acre for family living assuming \$88,000 in family living expense divided by 2200 crop acres.

Table 13. Frequency of the December 2018 Corn and November 2018 Soybean Futures Contract Closing above Corn and Soybean Break-Even Cost Targets since September 1, 2017.

Frequency of DEC 2018 Corn and November 2018 Soybean Futures Closing Above Targets since September 1, 2017

	<u>Break Even + Basis</u>	<u>DEC 2018 Corn</u>	<u>Break Even + Basis</u>	<u>NOV 2018 Soybeans</u>
Total Variable Costs	\$3.22	100%	\$6.58	100%
+ Rent	\$4.22	2%	\$9.76	96%
+ Overhead	\$4.58	0%	\$10.66	0%
+ Family Living	\$4.81	0%	\$11.38	0%

Evaluated May 24, 2018



December 2018 Corn Futures Contract Chart (as of May 24, 2018)

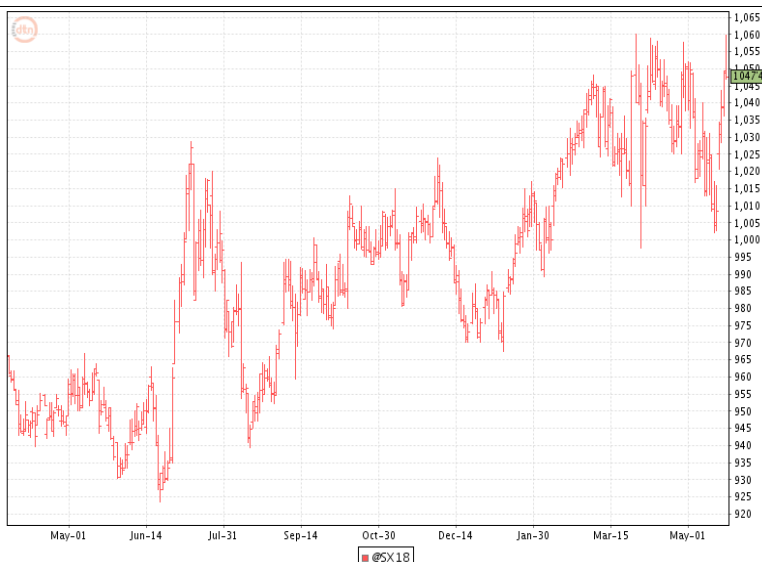
The December 2018 corn futures contract has reached prices not seen since last July. Resistance is at the \$4.27 - \$4.30 price range with support at \$4.15 and then in the \$4.02 - \$4.05 range. There is a lot of downside risk in the DEC 2018 chart and managers should consider rewarding this price rally. Managers that have not priced any 2018 corn should consider doing so as prices are at last summer's peak.

A production concern could push prices higher. However, this is a good starting point for marketing for those that have not done anything at this point.

Table 14. 2018 Corn Risk Management Game Plan as of May 24, 2018.

Expected Corn Production (Bushels/Acre)			175	
Date Priced	Price Target HTA	Price Target CFC	Bushels Priced	Expected Cash Price
2/27/2018	\$4.00		17.5	\$3.80
5/23/2018	\$4.27		17.5	\$4.07
MAY-JUN	\$4.40	\$4.20	17.5	\$4.20
MAY-JUN	\$4.55	\$4.35	17.5	\$4.35
MAY-JUN	\$4.70	\$4.50	17.5	\$4.50
	Bushels Priced		87.5	
	Average Expected Cash Price		\$4.18	

The corn risk plan is to scale-up HTA or CFC sales starting at \$4 (HTA) or \$3.80 (CFC). The first two objectives have been reached on 2/27 and 5/23. The plan will require DEC 2018 corn futures to move higher to reach pricing objectives. If the plan is realized, the average expected cash price is \$4.18 per bushel. That price would not cover budgeted overhead and family living expense.



November 2018 Soybean Futures Contract Chart (as of May 24, 2018)

The November 2018 futures contract is trading at levels that are significantly higher than May 2017. The current resistance is at the \$10.60 price range. There is support at \$10.20 and \$10.00 price levels.

If the November 2018 breaks below \$10, then resistance might be at the \$9.75 - \$9.80 price range. However, the fundamentals that cause that type of downward pressure may not be stopped at that price range. For example, a trade war with China may cause increased fear in the market and blow through the \$9.80 price.

The point is that the market is providing pricing opportunities to reduce downward price risk.

Table 15. 2018 Soybean Risk Management Game Plan as of May 24, 2018.

Expected Soybean Production (Bushels/Acre)			55	
Date Priced	Price Target HTA	Price Target CFC	Bushels Priced	Expected Cash Price
1/23/2018	\$10.02		5.5	9.77
2/27/2018	\$10.32	\$10.02	5.5	\$10.07
3/6/2018	\$10.45	\$10.15	5.5	\$10.15
MAY-JUL	\$10.60	\$10.30	8.25	\$10.30
MAY-AUG	\$10.80	\$10.50	8.25	\$10.50
	Bushels Priced		33	
	Average Expected Cash Price		\$10.20	

The 2018 soybean game plan has already hedged (HTA) 10% of expected production at \$10.02 on January 23, 2018. Additional HTA sales have been made at \$10.32 and \$10.45. If the complete plan is realized, the expected cash price of \$10.36 will cover all of the inputs and land costs and a majority of the overhead expense. The plan has targets that would require a weather event to reach. Managers should have objectives in place, as the pricing window for some objectives may not last very long in the market.

Notice that both the corn and the soybean game plans have targets that will only be reached by changing market fundamentals and increased volatility. The trading range forecasts in Figure 5 and Figure 6 suggest the very low probability of reaching prices above \$4.70 for DEC 18 corn. Soybeans, however, have a decent chance of reaching \$10.80 NOV 18 soybeans given current market volatility. At this point, the plans have these higher targets to remind managers of what OK prices might look like. Remember that the plans exist to help guide the pricing of bushels planned to be sold at harvest. Corn and soybean futures have only traded in the top 1/3 of the annual trading range in October in 22 and 36 percent of the time, respectively, from 2000 to 2017. Prudence suggests protecting price risk on bushels to be sold at harvest as probability favors low prices at harvest.

Notice that this plan is not trying to capture the highest possible price. The design of this plan is to reduce risk and to avoid a near fatal blow to the firm's revenue that creates liquidity and solvency problems.

Topic 11. Capturing the Carry in the Wheat Market: Protecting Price for Stored Wheat

Hopkinsville area farmer, Mr. Joseph Sisk, recently told me of the benefit of managing stored wheat for his farm business. Furthermore, Mr. Sisk advocated for farmers to treat marketing the same as how grain elevators merchandise grain. The use of commodity futures and managing basis is an important part of using grain bins to add profit to each crop enterprise.

This topic will discuss the historical risk management benefit of hedging wheat before harvest using the July wheat futures contract. Then the discussion will shift to the benefit provided by hedging stored wheat by using the

March wheat futures contract. The final discussion point will tie the two hedging activities together to describe a farmer that hedges before harvest and then decides to roll the hedge into the March futures to have management flexibility on the post-harvest sales.

Figure 8. July Wheat Futures Price Distribution Thirds by Month for 2000 to 2017 Crop Years.

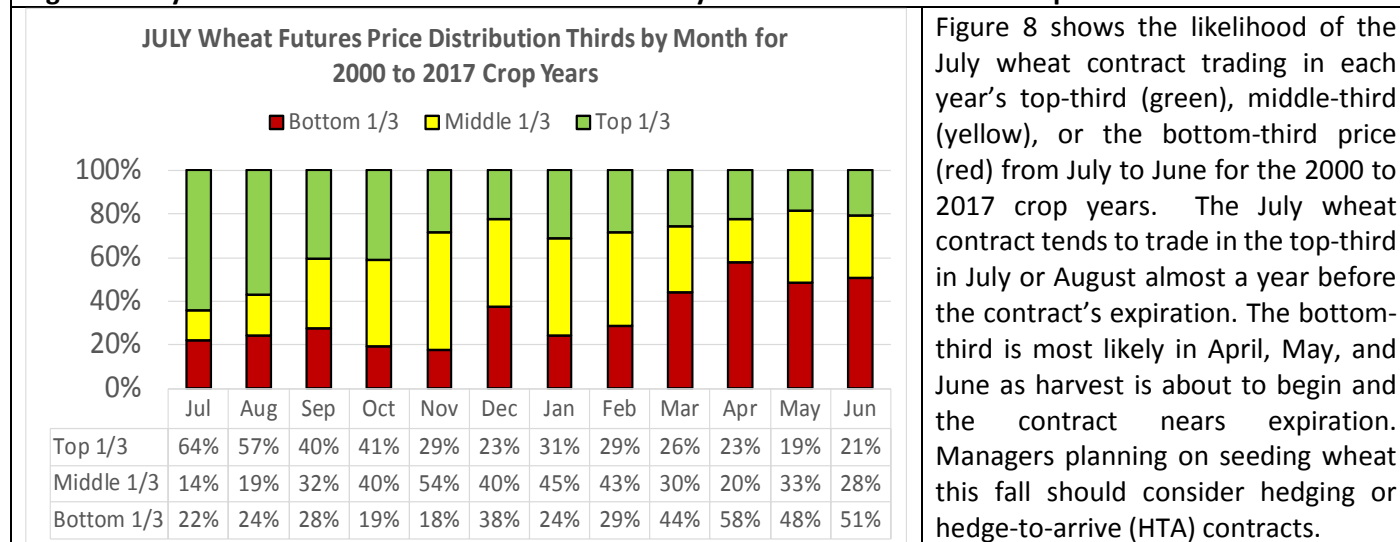


Table 16 reports the value of hedging the wheat crop by initiating the hedge in July by selling a futures contract and lifting the hedge in June by buying back the contract at harvest. To ease the potential liquidity issues from margin calls, it is assumed that this strategy will be implemented with HTA contracts where the grain elevator handles the margin account and margin calls.

Table 16. Value of Pre-Harvest Hedging with the July Wheat Futures Contract by Selling in July and Buying in June for the 2000 to 2017 Crop Years.

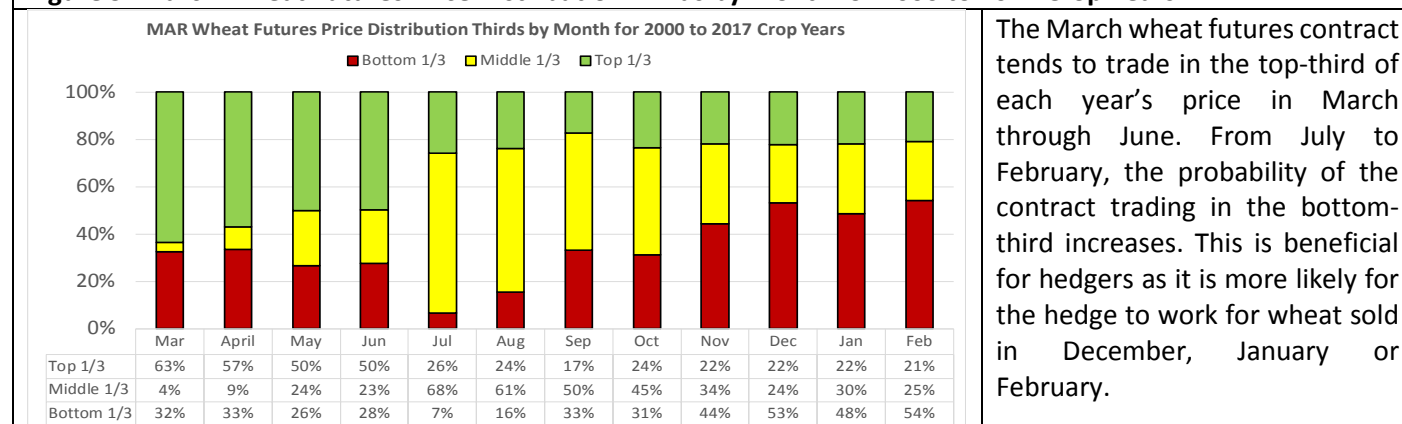
Crop Year	JULY Wheat Futures Hedge			Summary Statistics for July Wheat Hedge	
	Previous July Price	June Harvest Price	Value of Hedge		
2000	\$2.97	\$2.69	+\$0.28	Average value of hedge 2000-2017	\$0.37
2001	\$3.00	\$2.57	+\$0.43	Average value of hedge 2012-2017	\$0.97
2002	\$3.11	\$2.89	+\$0.22		
2003	\$3.26	\$3.15	+\$0.10	Probability of Hedge Benefitting	72%
2004	\$3.23	\$3.54	-\$0.31	Average Benefit of Hedge	\$0.90
2005	\$3.57	\$3.25	+\$0.31		
2006	\$3.69	\$3.74	-\$0.06		
2007	\$4.51	\$5.74	-\$1.23	Probability of Hedge Hurting	28%
2008	\$5.67	\$8.48	-\$2.81	Average Hurt from Hedging	-\$0.99
2009	\$8.88	\$5.80	+\$3.07		
2010	\$5.93	\$4.49	+\$1.43		
2011	\$6.41	\$6.96	-\$0.55		
2012	\$7.76	\$6.56	+\$1.20		
2013	\$8.24	\$6.88	+\$1.36		
2014	\$6.93	\$5.92	+\$1.01		
2015	\$6.14	\$5.19	+\$0.95		
2016	\$5.66	\$4.75	+\$0.91		
2017	\$4.92	\$4.54	+\$0.38		

The summary statistics for the 18-year period are reported on the right side of Table 16. This strategy did not work every year but the average value of the hedge for this period is \$0.37/bushel. This strategy has been particularly effective for the 2012-17 crops as the average value of the hedged was \$0.97/bushel. This strategy provided positive risk management benefit 72% of the time. When the hedged provided value, the benefit was \$0.90/bushel. The 28% of the years, when hedging "hurt" or locked in a lower price had a negative hedging account balance of -\$0.99/bushel (Table 16). The July 2019 wheat futures contract closed at \$5.93 ¼ on May 24, 2018. Wheat farmers should find a way

to hedge this price on a percentage of expected production. If prices increase, then you have the potential to sell wheat at harvest at a higher price. If prices are lower, then farmers benefit from the hedge's risk protection.

Now we will focus on protecting the price of stored wheat. To provide maximum management flexibility, the March futures contract is used to allow marketing in December, January or February.

Figure 9. March Wheat Futures Price Distribution Thirds by Month for 2000 to 2017 Crop Years.



The historical performance of hedging stored wheat with the March futures contract for the 2000 to 2017 crop years are reported in Table 17. No hedging strategy works every year, and that is the case with hedging with the March contract. The average value of the hedge over the 18-year period is \$0.25/bushel. This strategy had an average value of \$0.96/bushel for the 2013-17 crop years (Table 17).

The post-harvest hedging strategy provided positive value 61% of the years with the average benefit of \$1.21/bushel. The 39% of the years when this hedge did not work hurt the price received by \$1.27/bushel (Table 17). Wheat farmers should know that the March 2019 wheat contract closed at \$5.82 ½ on May 24, 2018.

Table 17. Value of Post-Harvest Hedging with the March Wheat Futures Contract by Selling in June and Buying in February for the 2000 to 2017 Crop Years.

Crop Year	MARCH Wheat Futures Hedge			Summary Statistics for March Wheat Hedge	
	Previous June Price	February Price	Value of Hedge		
2000	\$3.10	\$2.65	+\$0.45	Average value of hedge 2000-2017	\$0.25
2001	\$2.96	\$2.79	+\$0.17	Average value of hedge 2013-2017	\$0.96
2002	\$3.07	\$3.26	-\$0.19	Probability of Hedge Benefitting	61%
2003	\$3.38	\$3.81	-\$0.44	Average Benefit of Hedge	\$1.21
2004	\$3.82	\$3.01	+\$0.82	Probability of Hedge Hurting	39%
2005	\$3.57	\$3.59	-\$0.01	Average Hurt from Hedging	\$1.27
2006	\$4.25	\$4.65	-\$0.39		
2007	\$6.02	\$10.59	-\$4.57		
2008	\$9.10	\$5.35	+\$3.75		
2009	\$6.51	\$4.89	+\$1.62		
2010	\$5.24	\$8.32	-\$3.08		
2011	\$8.16	\$6.49	+\$1.67		
2012	\$7.16	\$7.35	-\$0.19		
2013	\$7.24	\$5.96	+\$1.28		
2014	\$6.43	\$5.17	+\$1.26		
2015	\$5.48	\$4.60	+\$0.88		
2016	\$5.25	\$4.37	+\$0.88		
2017	\$5.06	\$4.56	+\$0.51		

The final part of this article evaluates the risk protection provided by rolling the pre-harvest hedge into a post-harvest hedge (or rolling a July HTA contract into a March HTA contract). This type of marketing strategy has the potential for adding more value to the wheat crop by providing additional returns to storage. This strategy had an average value of \$0.62/bushel for the 2000-2017 crop years (Table 18). Rolling the July wheat hedge into the March hedge worked particularly well from 2012-17 with an average value of \$1.74/bushel (Table 18). This strategy added

value 78% of the years with an average benefit of \$1.38/bushel. The 22% of the years when this hedge had a negative value, the average was **-\$2.06/bushel** (Table 18). Most of this “loss” was the 2007 crop as commodity markets shifted higher due to biofuels and export demand.

Table 18. Value of Rolling a Pre-Harvest Hedge with the July Contract into a Post-Harvest Hedging with the March Wheat Futures Contract for the 2000 to 2017 Crop Years.

Crop Year	July Hedge Rolled into March Hedge			Summary Statistics for Rolled Hedge	
	Value of July Hedge	Value of March Hedge	Total Value		
2000	+\$0.28	+\$0.45	\$0.73	Average value of hedge 2000-2017	\$0.62
2001	+\$0.43	+\$0.17	\$0.60	Average value of hedge 2012-2017	\$1.74
2002	+\$0.22	-\$0.19	\$0.03		
2003	+\$0.10	-\$0.44	\$0.33	Probability of Hedge Benefitting	78%
2004	-\$0.31	+\$0.82	\$0.50	Average Benefit of Hedge	\$1.38
2005	+\$0.31	-\$0.01	\$0.30		
2006	-\$0.06	-\$0.39	\$0.45		
2007	-\$1.23	-\$4.57	\$5.80	Probability of Hedge Hurting	22%
2008	-\$2.81	+\$3.75	\$0.94	Average Hurt from Hedging	-\$2.06
2009	+\$3.07	+\$1.62	\$4.69		
2010	+\$1.43	-\$3.08	\$1.65		
2011	-\$0.55	+\$1.67	\$1.12		
2012	+\$1.20	-\$0.19	\$1.01		
2013	+\$1.36	+\$1.28	\$2.64		
2014	+\$1.01	+\$1.26	\$2.27		
2015	+\$0.95	+\$0.88	\$1.84		
2016	+\$0.91	+\$0.88	\$1.78		
2017	+\$0.38	+\$0.51	\$0.88		

This article illustrates that futures can be used to expand the marketing window to protect price for wheat to be sold at harvest or stored. A recent conversation with wheat farmers in the Hopkinsville area reinforced in my mind the importance of a marketing plan that links pre-harvest and post-harvest pricing. This also applies to corn and soybeans. The benefits for wheat are demonstrated in the above tables.

Topic 12. 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/extcmu.php>. Email todd.davis@uky.edu to receive the newsletter by email.



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