

Crops Marketing and Management Update

Grains and Forage Center of Excellence

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Topics in this Month's Update:

1. **May WASDE Report Provides First Projections for the 2019-2020 Marketing Year**
2. **Soil Moisture and Short-Term Precipitation and Temperature Outlook**
3. **2019 Corn and Soybean Planting Progress and 2019 Wheat Condition**
4. **Statistical Unplanted Corn and Soybean Acres**
5. **2018 Corn, Soybean, and Wheat Basis vs. Previous Years**
6. **Projected Corn, Soybean, and Wheat Futures Trading Ranges to December 2019**
7. **Pre-Harvest 2019 Corn and Soybean Risk Management Opportunities**
8. **Comparison of Pre-Harvest and Post-Harvest Wheat Hedging Strategies**
9. **2019 Corn and Soybean Projected Profitability Compared to Corn Prevented Planting**
10. **Projected 2019-20 Corn and Soybean Balance Sheets**
11. **How Do I Get on the Email Distribution List to Receive this Newsletter?**

Topic 1. May WASDE Report Provides First Projections for the 2019-2020 Marketing Year

The May WASDE provides the first projections for the 2019-20 supply and demand for corn, soybean, and wheat. Analysts surveyed before the report was released expected stocks to increase for corn, soybeans, and wheat from the February USDA Outlook Conference projections. The USDA report was bearish for all three crops as USDA increased projected stocks more than expected. The May report's projected stocks were 343, 27, and 68 million bushels above the average analyst's guess for corn, soybeans, and wheat, respectively.

USDA provided minor adjustments to the old-crop corn balance sheet by reducing imports by 5 million bushels and reducing industrial use by 65 million bushels from the April report. The net effect is a 60 million bushel increase in 2018-19 corn ending stocks to 2.09 billion bushels (Table 1). USDA projects the U.S. marketing year average (MYA) farm price for 2018-19 at \$3.50 per bushel.

USDA projects the 2019 corn crop at 15.03 billion bushels based on the planted area of 92.8 million acres and harvested area of 85.4 million acres (Table 1). The acreage estimates are from the *Prospective Plantings* report, and USDA did not adjust the planted area to reflect the slow start for corn planting. Similarly, USDA did not adjust the projected yield to reflect the planting progress and chose to use the trend yield of 176 bushels/acre (Table 1). Total corn supply is projected at 17.1 billion bushels, which would be an increase of 565 million bushels over the 2018-19 corn supply if realized.

Table 1. U.S. Corn Supply and Use.					
	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Area (million)	94.0	90.2	89.1	92.8	+3.7
Harvested Area (million)	86.7	82.7	81.7	85.4	+3.7
Yield (bushels/acre)	174.6	176.6	176.4	176.0	-0.4
----- Million Bushels -----					
Beginning Stocks	1,737	2,293	2,140	2,095	-45
Production	15,148	14,609	14,420	15,030	+610
Imports	<u>57</u>	<u>36</u>	<u>35</u>	<u>35</u>	<u>+0</u>
Total Supply	16,942	16,939	16,595	17,160	+565
Feed and Residual	5,472	5,304	5,300	5,450	+150
Food, Seed & Industrial	6,883	7,056	6,900	6,950	+50
Ethanol and by-products	5,432	5,605	5,450	5,500	+50
Exports	<u>2,293</u>	<u>2,438</u>	<u>2,300</u>	<u>2,275</u>	<u>-25</u>
Total Use	14,649	14,799	14,500	14,675	+175
Ending Stocks	2,293	2,140	2,095	2,485	+390
Stocks/Use	15.7%	14.5%	14.4%	16.9%	+2.5%
Days of Stocks	57	53	53	62	+9
U.S. Marketing-Year Average Price (\$/bu)	\$3.36	\$3.36	\$3.50	\$3.30	-\$0.20
Source: May 2019 WASDE - USDA: WAOB.					

USDA projects corn stocks to increase by 390 million bushels to 2.485. If realized, this will be the largest level of stocks since the 1987-88 marketing year. Fortunately, the stocks-to-use ratio is projected at 16.9% for the 2019 crop as compared to 54.9% for the 1987 corn crop.

The stronger demand for corn is providing the potential for higher prices in response to any production risk. USDA projects the 2019-20 MYA farm price at \$3.30 per bushel, which is \$0.20/bushel below last year's MYA price (Table 1).

Many analysts expect the planted area and yield projections to decline in future reports due to the slow planting progress. Any factor that reduces production will be supportive of higher prices.

The May report updated the corn production estimates for Argentina and Brazil. The 2018-planted corn crop is projected at 1.93 and 3.93 billion bushels in Argentina and Brazil, respectively, and is 78 and 157 million bushels larger than the April report. This would be a 669 and 709 million bushel increase over the 2017-corn crop, respectively.

Table 2. U.S. Soybeans Supply and Use.					
	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Area (million)	83.4	90.2	89.2	84.6	-4.6
Harvested Area (million)	82.7	89.5	88.1	83.8	-4.3
Yield (bushels/acre)	52	49.3	51.6	49.5	-2.1
----- Million Bushels -----					
Beginning Stocks	197	302	438	995	+557
Production	4,296	4,412	4,544	4,150	-394
Imports	<u>22</u>	<u>22</u>	<u>17</u>	<u>20</u>	<u>+3</u>
Total Supply	4,515	4,735	4,999	5,165	+166
Crushings	1,901	2,055	2,100	2,115	+15
Exports	2,174	2,129	1,775	1,950	+175
Seed	105	104	98	96	-2
Residual	<u>34</u>	<u>9</u>	<u>31</u>	<u>34</u>	<u>+3</u>
Total Use	4,213	4,297	4,004	4,195	+191
Ending Stocks	302	438	995	970	-25
Stocks/Use	7.2%	10.2%	24.9%	23.1%	-1.7%
Days of Stocks	26	37	91	84	-6.3
U.S. Marketing-Year Average Price (\$/bu)	\$9.47	\$9.33	\$8.55	\$8.10	-\$0.45
Source: May 2019 WASDE - USDA: WAOB.					

The May report provided minor adjustments to the old-crop soybean balance sheet by reducing projected exports by 100 million bushels to 1.775 billion bushels. This amount is the smallest quantity projected to be exported since the June 2016 report for the 2015-16 marketing year. This reduction in projected use increased soybean ending stocks for the 2018-19 marketing year to 995 million bushels (Table 2). The increase in stocks pushed the projected 2018-19 U.S. MYA farm price lower to \$8.55.

USDA's projects the 2019 soybean crop at 4.15 billion bushels, which would be a reduction of 394 million bushels from the 2018 crop. Planted and harvested soybean area is projected at 84.6 and 83.8 million acres, respectively, based on the March *Prospective Plantings* report.

The 2019 soybean yield is projected at the trend of 49.5 bushels per acre (Table 2). Total soybean supply is projected at 5.16 billion bushels, an increase of 166 million bushels from the 2018-19 marketing year (Table 2).

USDA projects total soybean use at 4.195 billion bushels, which would be a 191 million bushel increase over last year if realized. The increased use is mostly due to a larger quantity exported at 175 million bushels above the 2018-19 marketing year. Crushing use is also projected to increase from last year to 2.1 billion bushels (Table 2).

USDA projects 2019-20 soybean stocks at 970 million bushels, which is a 25 million bushel decrease from the 2018-19 marketing year. The stocks-to-use ratio is projected at 23.1%, which is almost unchanged from the current

marketing year. Because stocks are not projected to decline significantly, USDA projects the 2019-20 U.S. MYA farm price at \$8.10 per bushel. This would be a \$0.45/bushel decline from 2018-19 and the lowest farm price since 2006.

The May report updated the soybean production estimates for Argentina and Brazil. The 2018-planted soybean crop is projected at 2.05 and 4.29 billion bushels in Argentina and Brazil, respectively, and is 36 and 0 million bushels larger than the April report. This would be a 669 million bushel increase and a 184 million bushel decrease from the 2017 planted soybean crop, respectively.

Table 3. U.S. Wheat Supply and Use.

	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Acres (million)	50.1	46.1	47.8	45.8	-2.0
Harvested Acres (million)	43.9	37.6	39.6	39.0	-0.6
Yield (bushels/acre)	52.7	46.4	47.6	48.6	+1.0
----- Million Bushels -----					
Beginning Stocks	976	1,181	1,099	1,127	+28
Production	2,309	1,741	1,884	1,897	+13
Imports	<u>118</u>	<u>157</u>	<u>140</u>	<u>140</u>	<u>+0</u>
Total Supply	3,402	3,079	3,123	3,164	+41
Food	949	964	960	965	+5
Seed	61	63	62	68	+6
Feed and Residual	156	51	50	90	+40
Exports	<u>1,055</u>	<u>901</u>	<u>925</u>	<u>900</u>	<u>-25</u>
Total Use	2,222	1,980	1,997	2,023	+26
Ending Stocks	1,181	1,099	1,127	1,141	+14
Stocks/Use	53.2%	55.5%	56.4%	56.4%	-0.0%
Days of Stocks	194	203	206	206	-0
U.S. Marketing-Year Average Price (\$/bu)	\$3.89	\$4.72	\$5.20	\$4.70	-\$0.500

Source: May 2019 WASDE - USDA: WAOB.

USDA reduced 2018-19 wheat imports by 5 million bushels, exports by 20 million bushels, feed by 20 million bushels and food use by 5 million bushels. The net effect is a 40 million bushel increase in 2018-19 wheat stocks to 1.127 billion bushels. USDA did not adjust the 2018-19 U.S. MYA wheat price and kept it at \$5.20 per bushel (Table 3).

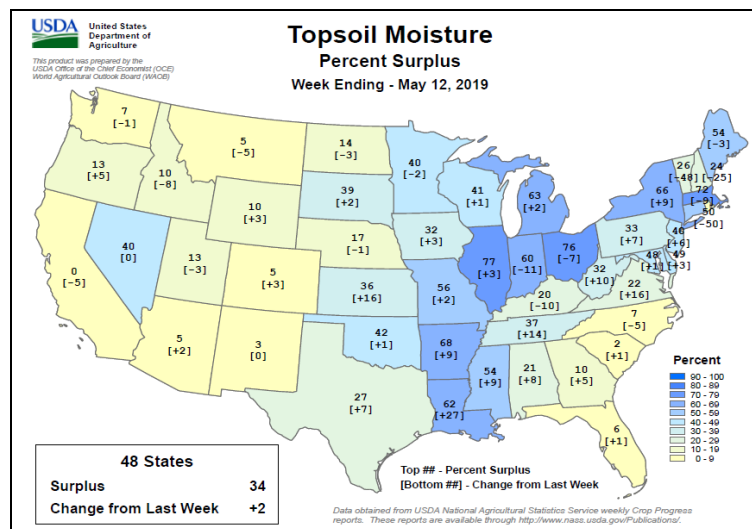
USDA projects the 2019 wheat crop at 1.897 billion bushels, which is a slight increase over the 2018 crop. Total wheat supply is projected at 3.16 billion bushels and is a 41 million bushel increase over the 2018-19 supply.

Wheat use is projected at 2.02 billion bushels. Feed use is projected to increase by 40 million bushels, while exports are projected 25 million bushels below the 2018-19 marketing year.

Since supply is projected to increase more than use, ending stocks are projected to increase to 1.14 billion bushels. The stocks-to-use ratio is unchanged from 2018-19, but the U.S. MYA price is projected to decline \$0.50/bushel to \$4.70/bushel (Table 3).

Topic 2. Soil Moisture and Short-Term Precipitation and Temperature Outlook

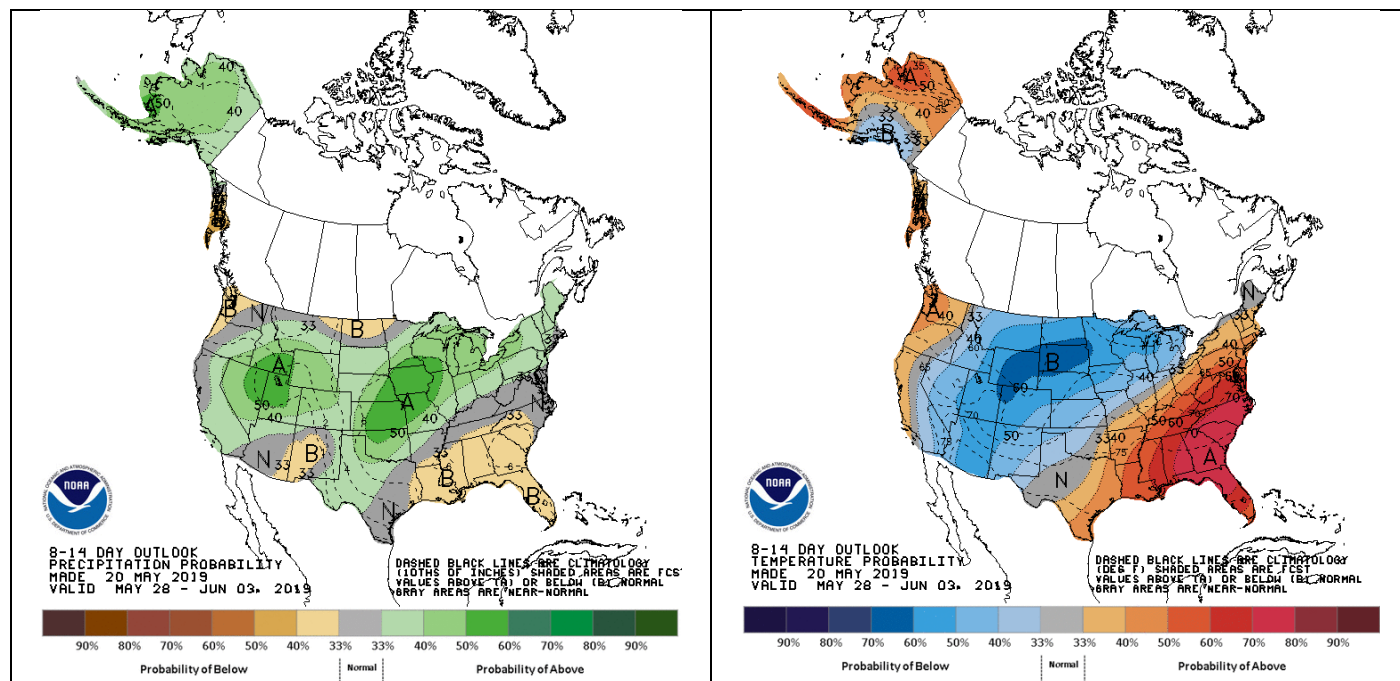
The market is monitoring planting progress, which is being delayed by excess soil moisture. The percent surplus moisture in the topsoil (left map below) shows that two of the top-five corn states (Illinois and Indiana) have more than 50% of the fields surveyed with excess moisture as of May 12, 2019.



Iowa is projected to have 32% of cropland with excess moisture while Nebraska is projected to have 17% with excess moisture as of May 12.

Excess soil moisture is also a problem in Arkansas (68%), Louisiana (62%), and Mississippi (54%). This region, along with Illinois, reported an increase in the percentage rated in excess moisture from the previous estimate.

The 8 to 14-day precipitation (below left) and temperature (below right) outlooks suggest rainy and cool weather throughout late May and into June for the upper Midwest states. The Eastern Corn Belt is projected to have an above-average probability of precipitation but warmer temperatures that may help improve soil moisture conditions.



Topic 3. 2019 Corn and Soybean Planting Progress and 2019 Wheat Condition

The 18-states surveyed for corn planting progress (Table 4) are all running behind the 5-year average process as of the week ending May 19, 2019. Illinois, Indiana, and Minnesota are 65%, 59%, and 27% behind their respective 5-year average planting progress. Of the three states, only Minnesota was able to make any progress (+35%) from the previous week's survey. Overall, the U.S. corn planting progress is 31% behind the five-year average progress.

Table 4. Corn Planting Progress for 2019 Compared to Last Week and the Five-Year Average.

	% 13-May	% 20-May	% Change from Last Week	% Behind 2014-18 Avg.	May 20 Average 2014-18
Colorado (#15)	39	63	24	-6	69
Illinois (#2)	11	24	13	-65	89
Indiana (#5)	6	14	8	-59	73
Iowa (#1)	48	70	22	-19	89
Kansas (#7)	46	61	15	-19	80
Kentucky (#14)	55	71	16	-9	80
Michigan (#12)	5	19	14	-35	54
Minnesota (#4)	21	56	35	-27	83
Missouri (#9)	52	62	10	-30	92
Nebraska (#3)	46	70	24	-16	86
North Carolina (#19)	88	93	5	-2	95
North Dakota (#11)	11	42	31	-21	63
Ohio (#8)	4	9	5	-53	62
Pennsylvania (#16)	26	42	16	-13	55
South Dakota (#6)	4	19	15	-57	76
Tennessee (#17)	79	85	6	-9	94
Texas (#13)	75	92	17	8	84
Wisconsin (#10)	14	35	21	-30	65
18 States	30	49	19	-31	80

Source: USDA Crop Progress Report, May 20, 2019.

Iowa and Nebraska are 19% and 16% behind the five-year average progress, respectively. The Western Corn Belt has been able to take advantage of a planting window in that area. Iowa's corn crop increased the percentage planted by 22% while the Nebraska corn crop percentage planted increased by 24% in a week.

South Dakota and North Dakota are 57% and 21% behind their average planting pace. FSA data on prevented plantings show the Dakotas as typically responsible for the largest percentage of failed acres for all crops for the 2007 to 2018 crop years.

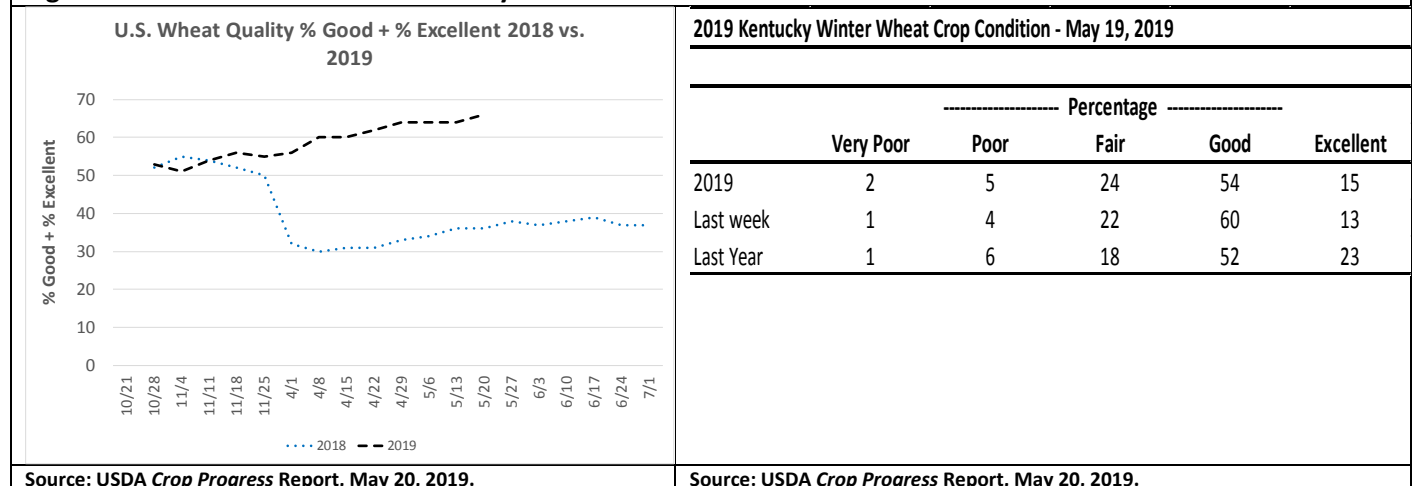
Table 5. Soybean Planting Progress for 2019 Compared to Last Week and the Five-Year Average.

	% 13-May	% 20-May	% Change from Last Week	% Behind 2014-18 Avg.	May 20 Average 2014-18
Arkansas (#11)	21	31	10	-34	65
Illinois (#1)	3	9	6	-42	51
Indiana (#4)	2	6	4	-37	43
Iowa (#2)	13	27	14	-28	55
Kansas (#10)	7	17	10	-12	29
Kentucky (#15)	13	22	9	-4	26
Louisiana (#17)	53	67	14	-18	85
Michigan (#13)	3	10	7	-21	31
Minnesota (#3)	3	22	19	-35	57
Mississippi (#12)	33	45	12	-35	80
Missouri (#7)	5	9	4	-29	38
Nebraska (#5)	20	40	20	-14	54
North Carolina (#18)	25	36	11	4	32
North Dakota (#9)	5	24	19	-15	39
Ohio (#6)	2	4	2	-31	35
South Dakota (#8)	0	4	4	-35	39
Tennessee (#16)	20	31	11	-6	37
Wisconsin (#14)	4	12	8	-23	35
18 States	9	19	10	-28	47

Source: USDA Crop Progress Report, May 20, 2019

NASS projects the U.S. soybean planting progress at 19%, which is 28% behind the five-year average. Arkansas, Illinois, Minnesota, and Mississippi are 34%, 42%, 35% and 35% behind their respective average planting progress. Also, Indiana (37%), Iowa (28%), and Nebraska (14%) are also behind their average planting pace. Only North Carolina, the 18th largest soybean producer, is ahead of its average planting pace

Figure 1 shows the percentage of the U.S. wheat crop rated in good or excellent condition in 2019 as compared to the percentage for the 2018 wheat crop. The 2018 winter wheat crop broke dormancy at about 30% good or excellent condition. The 2019 crop is in much better condition with 66% rated in good to excellent condition. Kentucky's winter wheat crop is currently rated at 69% good to excellent condition as compared to 75% in 2018.

Figure 1. 2019 U.S. Wheat and Kentucky' Condition vs. 2018 Condition.

Source: USDA Crop Progress Report, May 20, 2019.

Source: USDA Crop Progress Report, May 20, 2019.

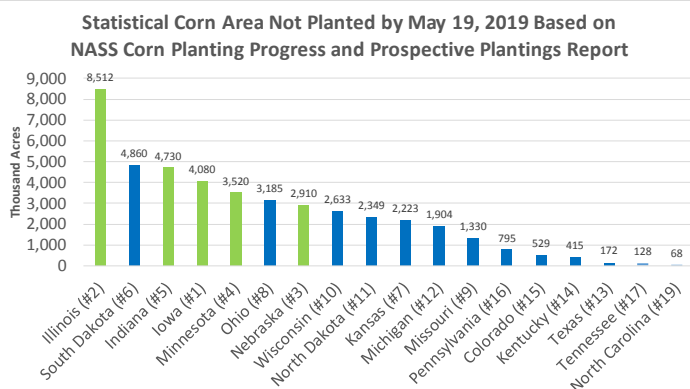
Topic 4. Statistical Unplanted Corn and Soybean Acres

Given the slow planting progress for the U.S. corn crop by May 19, combined with the forecast for the probability of more precipitation throughout the Midwest, the market is struggling with the question of how many corn acres will be planted late, filed as prevented planting, or switched to another crop. Topic 9 will compare the

projected profitability, and crop insurance prevented planting payment for an example Western Kentucky grain farm. This topic will discuss the statistical corn and soybean acres that are projected to be unplanted as of the May 20 *Crop Progress* report. The areas that remain to be planted are based on the *Prospective Plantings* report for each state surveyed and the planting progress for each state surveyed by NASS.

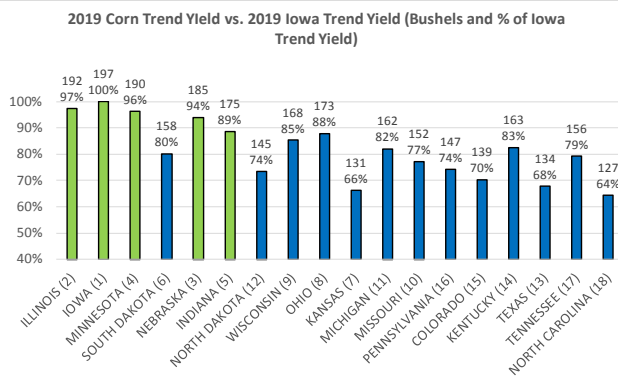
Figure 2 shows that there is a projected 47.3 million corn acres remaining to be planted as of May 19, 2019. The 18-states surveyed by NASS are organized by the acreage remaining to be planted. Each state's average production ranking is included with the state's name. Illinois, for example, is the second-largest corn producing state and is projected to have 8.5 million acres unplanted on May 19, 2019. The columns shaded green in Figure 2 represent the unplanted corn acres in the top-five corn-producing states. These top-five states are projected to have 23.7 million acres remaining to be planted or about 50% of the unplanted area. Also, North Dakota and South Dakota are projected to have 7.2 million corn acres remaining to be planted as of May 19, 2019 (Figure 2).

Figure 2. Statistical 2019 U.S. Corn Area Unplanted on May 19, 2019.



Source: USDA *Crop Progress* Report, May 20, 2019, and 2019 *Prospective Plantings* report

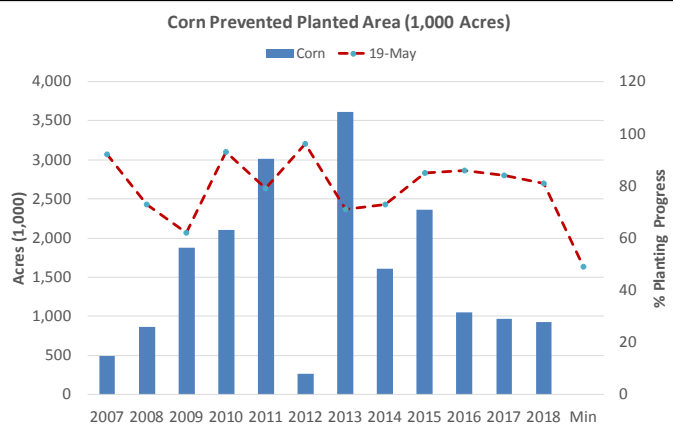
Figure 3. 2019 Trend Corn Yields and the Percentage of Iowa's Trend Corn Yield.



Source: USDA: NASS.

Figure 3 shows each state's trend yield and percentage of Iowa's trend yield. The area that has the fewest projected acres remaining to be planted is also the area with trend-yields 64% to 83% of Iowa's yield. Figure 3 serves as a reminder that the region experiencing planting delays is also the region with the greatest production capacity. Further delayed planting could result in below-trend yields and an above average amount of corn acres taking prevented planting crop insurance payments. Reduced production would be bullish for the corn market.

Figure 4. Corn Prevented Planted Area from 2007-2018 and the Percentage of the U.S. Corn Crop Planted by May 19.



Source: USDA *Crop Progress* Report, May 20, 2019, and USDA: FSA Prevented Planting Data.

Figure 4 shows the corn prevented planting area for the 2007 to 2018 crop years. The average area prevented from planting is 1.6 million acres ranging from 262 thousand acres in 2012 to 3.6 million acres in 2013.

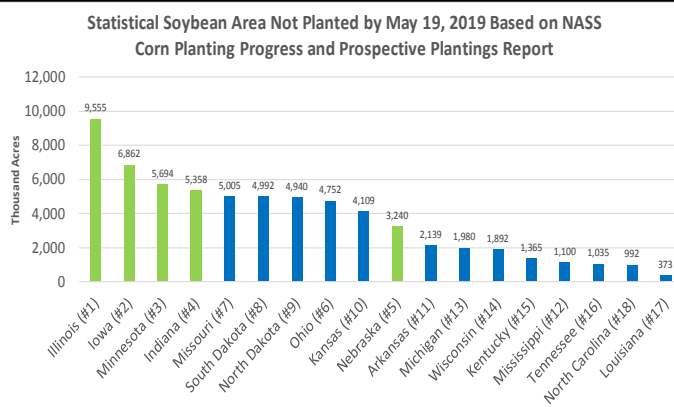
The red line is the percentage of the U.S. corn crop planted on May 19 for each crop year. For the 2019 crop, 49% of the corn crop is projected to be planted. For comparison, 71% of the 2013 corn crop was planted on May 19, 2013. Figure 4 suggests that 2019 corn prevented planted area could be 3.6 million acres or larger.

Soybean planting progress is also running 28% behind the five-year average as of May 19, 2019. Figure 5 shows the statistical unplanted soybean area as of May 19. The unplanted area is calculated using the *Prospective Plantings*

survey estimate for each state and the soybean planting progress from the weekly *Crop Progress* report. Illinois is projected to have 9.5 million acres remaining to be planted while Iowa and Minnesota are projected to have 6.8 and 5.6 million acres, respectively, unplanted (Figure 5). The top-five soybean producing states, shaded in green, are projected to have 30.7 million acres remaining to be planted and is about 45% of the unplanted area. North Dakota and South Dakota, two states that typically have prevented planting, are projected to have 9.9 million acres unplanted on May 19. The total statistical soybean area remaining to be planted is projected at 68.5 million acres (Figure 5).

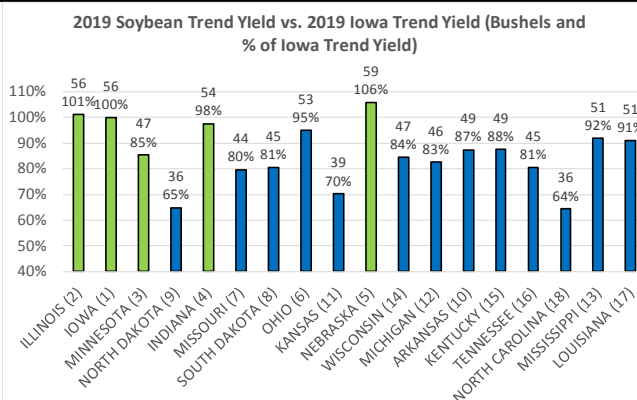
Figure 6 shows the 2019 soybean trend yields for the states surveyed by NASS in the weekly *Crop Progress* report and the state's trend yield relative to Iowa's trend yield. The states with the largest area remaining to be planted are also states with the best yields. While the soybean market has more than sufficient stocks, a reduction in planted area and yield would reduce stocks and would be helpful for the soybean market. Conversely, the states that have delayed planting for corn might switch intended acres to soybeans. The combination of larger than expected soybean area would maintain or increase projected soybean stocks and push prices lower.

Figure 5. Statistical 2019 U.S. Soybean Area Unplanted on May 19, 2019.



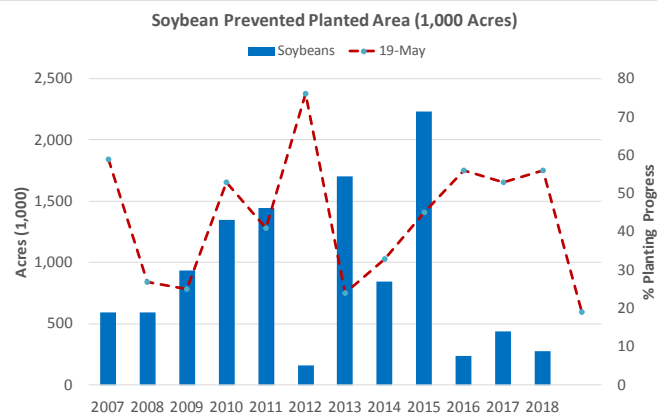
Source: USDA *Crop Progress* Report, May 20, 2019, and 2019 *Prospective Plantings* report.

Figure 6. 2019 Trend Soybean Yields and the Percentage of Iowa's Trend Soybean Yield.



Source: USDA: NASS.

Figure 7. Soybean Prevented Planted Area from 2007-2018 and the Percentage of the U.S. Soybean Crop Planted by May 19.



Source: USDA *Crop Progress* Report, May 20, 2019, and USDA: FSA Prevented Planting Data.

The reported soybean prevented planted area from 2007 to 2018 are shown in Figure 7. The average area prevented from 2007 to 2018 was 900 thousand acres with a range of 160 thousand to 2.2 million acres. The red line is the percentage of the U.S. soybean crop planted by May 19. The 19% planted for 2019 is slightly behind the 24% for 2013. The prevented area was 1.7 million acres for that year. The 2015 soybean crop had 45% planted by May 19 but also had 2.2 million acres in prevented planting. The market is not concerned about soybean prevented planting, as the window is still wide enough to plant a crop. Still, this is a factor the market will consider when projecting the size of the 2019 crop.

Topic 5. 2018 Corn, Soybean, Wheat Basis vs. Previous Years

Figure 8, Figure 9, and Figure 10 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 $-\$0.06$ /bushel under the July corn contract, which is a $\$0.18$ /bushel increase from harvest in October. Last year, the corn basis appreciated from October to May by $\$0.23$ /bushel, which was $\$0.08$ /bushel higher than the amount of appreciation in basis for the 2016 corn crop (Figure 8).

The average soybean basis, as of May 17, 2019, was $-\$0.35$ /bushel under the July 2019 soybean contract. The basis is $\$0.13$ per bushel wider than 2017 basis and $\$0.16$ per bushel wider than the 2016 basis (Figure 9). Last year, the basis appreciated $\$0.28$ /bushel from October to January, but the 2016 crop's basis had a maximum appreciation in the basis of $\$0.12$ /bushel in December. Current basis appreciation for the 2018 crop is $\$0.23$ /bushel from October to May (Figure 9).

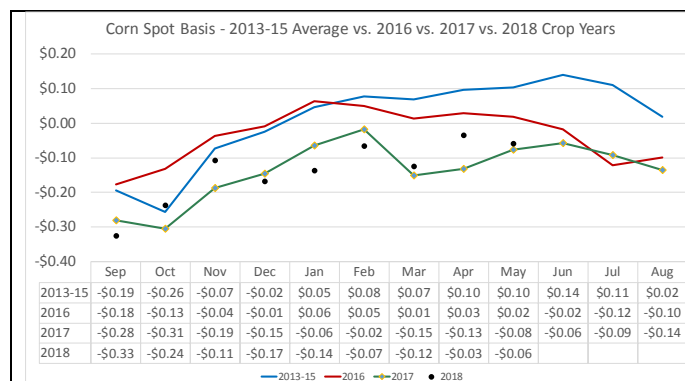


Figure 8. Western Kentucky Corn Spot Market Basis Appreciation from September to August for 2013 to 2018 Crop Years.

Basis Calculated on May 17, 2019

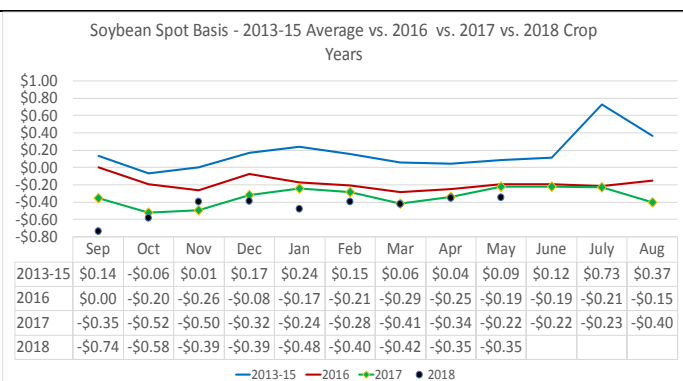


Figure 9. Western Kentucky Soybean Spot Market Basis Appreciation from September to August for 2013 to 2018 Crop Years.

Basis Calculated on May 17, 2019

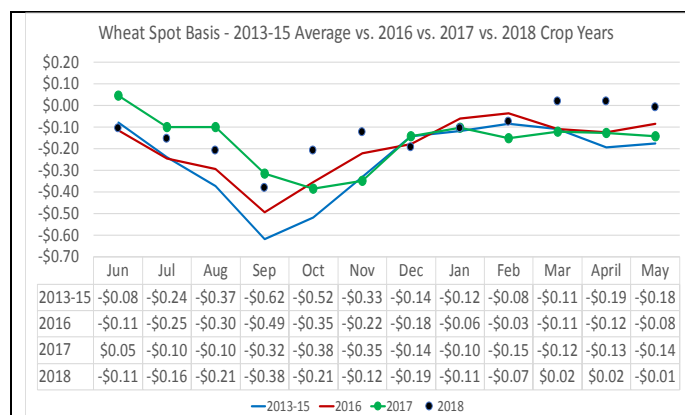


Figure 10. Western Kentucky Wheat Spot Market Basis Appreciation from June to May for 2013 to 2018 Crop Years.

Basis Calculated on May 17, 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 the 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 10).

The 2018 wheat basis is currently at $-\$0.01$ / bushel below the July contract. The spot basis is stronger than the most recent years. Basis should be monitored for opportunities to lock in a strong basis for wheat being stored.

Topic 6. Projected Corn, Soybean, and Wheat Futures Trading Ranges to December 2019

Figures 11–13 provide the projected futures price trading range, by futures contract month, based on the contracts' volatility for the previous 21-day period for corn, soybeans, and wheat. The green lines represent the range that describes the 68% probability of the projected trading range with the red line representing a 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 11 provides the probabilistic trading range for the corn futures contracts from July 2019 to December 2019. There is a 68% probability that the July 2019 corn contract will trade between $\$3.69$ and $\$3.97$ and a 95% probability that the July 2019 corn contract will trade between $\$3.56$ and $\$4.11$. Managers who are thinking about

managing price risk for the 2019 corn crop should consider that there is a 68% probability that the December corn futures contract will trade between \$3.54 and \$4.43 per bushel (Figure 11).

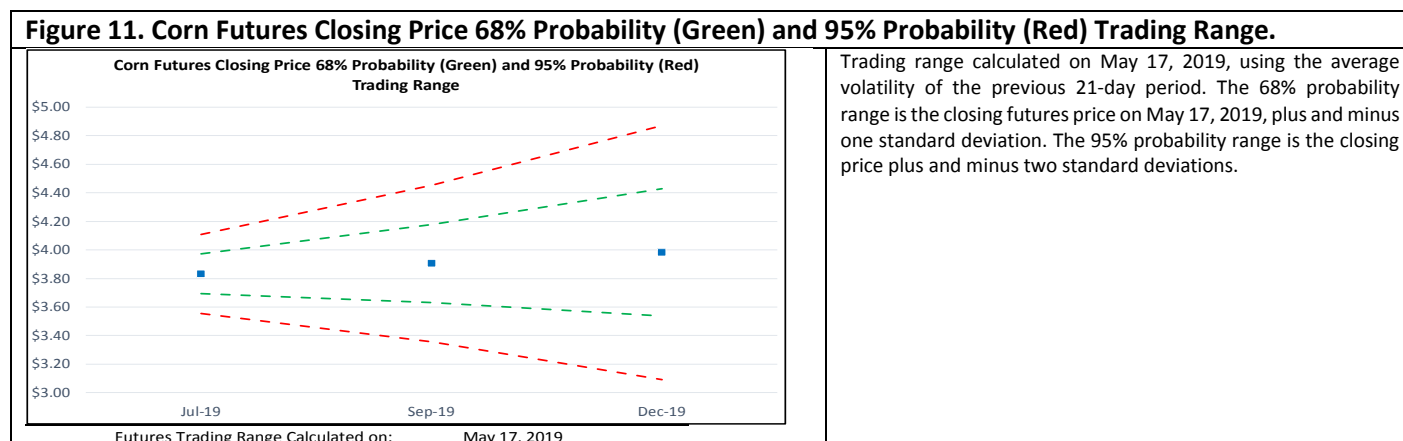


Figure 12 provides the probabilistic trading range for soybean futures contracts from July 2019 to November 2019. The July 2019 soybean futures have a 68% probability of trading between \$7.98 to \$8.46 with a 95% likelihood of trading between \$7.74 and \$8.70. The November 2019 futures contract has a 68% probability of trading between \$7.71 and \$9.23 per bushel (Figure 12). The increased volatility in the soybean market contributes to this wide range in possible soybean prices for the new-crop soybean futures contracts.

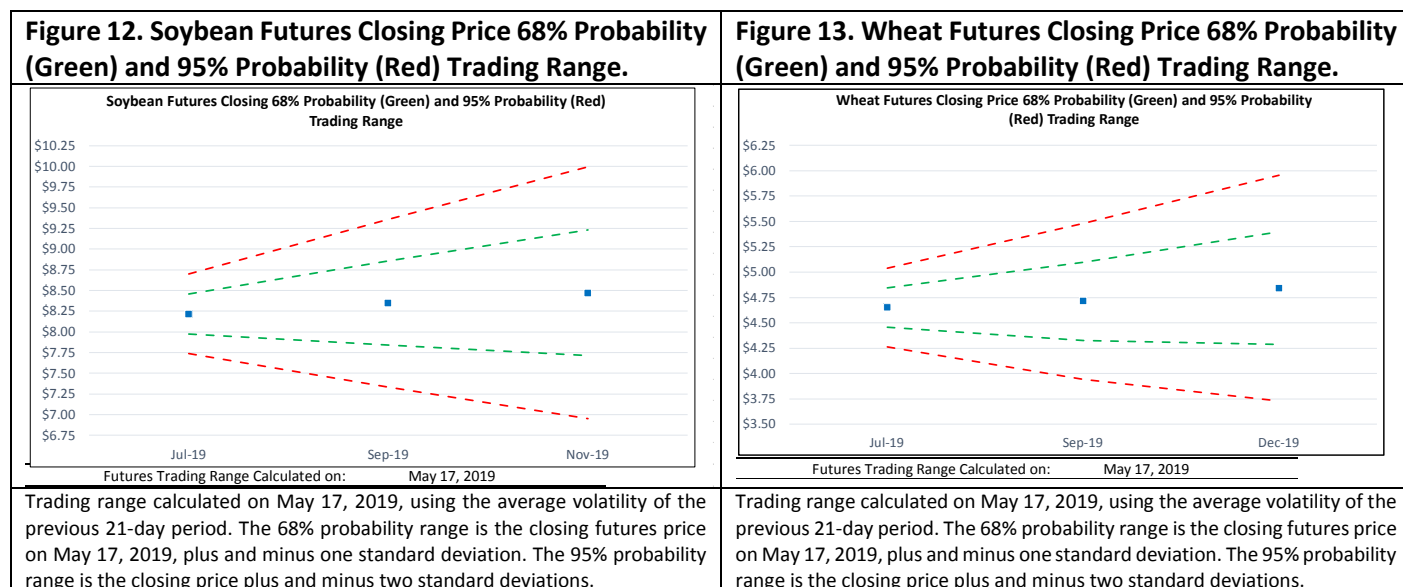


Figure 13 provides the probabilistic trading range for wheat futures contract from July 2019 to December 2019 contracts. The July 2019 wheat futures contract has a 68% probability of trading between \$4.46 and \$4.84 per bushel, with a 95% chance of trading between \$4.26 and \$5.04/bushel (Figure 13). The December 2019 wheat contract has a 68% chance of trading between \$4.29 and \$5.40/bushel, which should be monitored for managing 2019 wheat that is planned to be stored. Similarly, the July 2020 Futures contract closed at \$5.15 on May 20 and should be considered as a tool to manage price risk for producers planning on seeding wheat for 2020.

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

Tables 6-8 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, 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 \$3.81/bushel. The third alternative is to establish a price floor at \$3.42/bushel by buying a put option with a \$3.46 strike price that costs \$0.247.

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
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	-\$0.44	-\$0.20	+\$0.02	+\$0.22	+\$0.40	+\$0.55
Forward Contract at \$3.81	-\$0.38	-\$0.13	+\$0.09	+\$0.28	+\$0.46	+\$0.62
Put: \$4.00 strike @ \$0.244 = \$3.46 floor	-\$0.73	-\$0.49	-\$0.27	-\$0.07	+\$0.11	+\$0.27
Strategies Evaluated on:	May 20, 2019					

Table 6 demonstrates that the weather market may provide risk management opportunities for farmers that typically harvest 180-bushel corn. Forward contracting may provide better risk protection by removing both futures price risk and basis risk.

Table 7 illustrates that the decline in November 2019 futures in May has removed any opportunity to protect revenue for full-season soybeans. The average price of November 2019 futures was \$9.54 in February 2019, \$9.36 in March 2019, \$9.16 in April 2019, and closed at \$8.58 on May 20. A rally is needed to provide another opportunity to manage risk.

Table 7. Risk Management Alternatives for 2019 Western Kentucky Soybeans for Various Yield Objectives.						
Yield	45	50	55	60	65	The soybean market is not offering risk management opportunities for yields 65-bushel or less. Managers should know their break-even prices to monitor the market for opportunities.
TVC+Rent+Overhead+Family Living (\$/acre)	\$528	\$528	\$528	\$528	\$528	
TVC+Rent+Overhead+Family Living (\$/bu)	\$11.73	\$10.56	\$9.60	\$8.80	\$8.12	
Hedge @ \$8.58 + -\$0.50 basis = \$8.08	-\$3.66	-\$2.48	-\$1.52	-\$0.72	-\$0.05	
Forward Contract at \$8.11	-\$3.62	-\$2.45	-\$1.49	-\$0.69	-\$0.01	
Put: \$8.60 strike @ \$0.426 = \$7.67 floor	-\$4.06	-\$2.89	-\$1.93	-\$1.13	-\$0.45	
Strategies Evaluated on: May 20, 2019						

Table 8. Risk Management Alternatives for 2019 Western Kentucky Double-Crop Soybeans for Various Yield Objectives.						
Yield	35	40	45	50	55	The market is providing an opportunity to protect double-crop soybean risk for those that typically harvest 50-bushel double-crop soybeans or better. Given the fundamental weakness for soybeans, managers should consider pricing a percentage of production that will be sold at harvest.
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 @ \$8.58 + -\$0.50 basis = \$8.08	-\$3.14	-\$1.74	-\$0.64	+\$0.23	+\$0.94	
Forward Contract at \$8.11	-\$3.10	-\$1.70	-\$0.61	+\$0.26	+\$0.97	
Put: \$8.60 strike @\$0.426 = \$7.67 floor	-\$3.54	-\$2.14	-\$1.05	-\$0.18	+\$0.54	
Strategies Evaluated on:	May 20, 2019					

Topic 8. Comparison of Pre-Harvest and Post-Harvest Wheat Hedging Strategies

A focus of my Extension program involves helping producers understand how to use commodity futures to broaden the pricing window for grain sold at harvest or from storage. Farmers can hedge the 2019 crops as well as the 2020 crops using futures contracts instead of selling into the spot market after the crop is harvested. This topic will discuss the historical risk management benefit of hedging wheat before harvest using the July wheat futures contract hedged in July the year before harvest. Then the discussion will shift to the benefit provided by hedging stored wheat by using the March wheat futures contract hedged at the June harvest.

Figure 14 shows the likelihood of the July wheat contract trading in each year's top-third (green), middle-third (yellow), or the bottom-third price (red) from July to June for the 2015 to 2018 crop years. The July wheat contract tends to trade in the top-third in July or August almost a year before the contract's expiration. The bottom-third is

most likely in March to June as the harvest is about to begin and the contract nears expiration. Managers planning on seeding wheat this fall should consider hedging or hedge-to-arrive (HTA) contracts.

Figure 14. July Wheat Futures Price Distribution Thirds by Month for the 2015 to 2018 Crop Years.

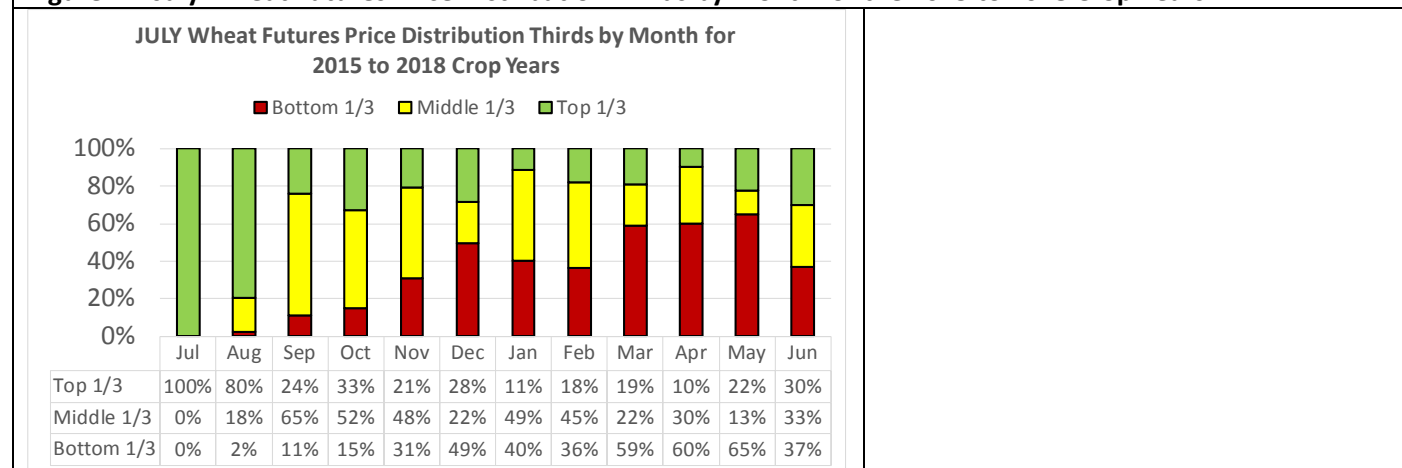


Table 9 reports the value of hedging the wheat crop by initiating the hedge in July by selling a futures contract and lifting the hedge in June by buying back the contract at harvest. To ease the potential liquidity issues from margin calls, it is assumed that this strategy will be implemented with HTA contracts where the grain elevator handles the margin account and margin calls.

Table 9. Value of Pre-Harvest Hedging with the July Wheat Futures Contract by Selling in July and Buying in June for the 2000 to 2018 Crop Years.

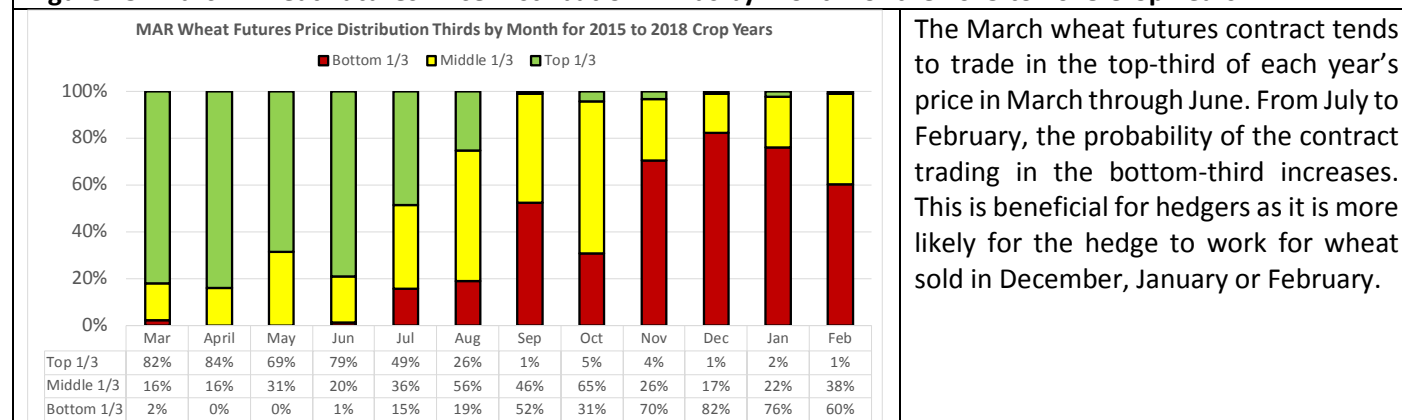
JULY Wheat Futures Hedge				Summary Statistics for July Wheat Hedge	
Crop Year	Previous July Price	June Harvest Price	Value of Hedge		
2000	\$2.97	\$2.69	+\$0.28	Average value of hedge 2000-2018	\$0.39
2001	\$3.00	\$2.57	+\$0.43	Average value of hedge 2012-2018	\$0.93
2002	\$3.11	\$2.89	+\$0.22	Value of 2019 Hedge (May 17)	\$0.89
2003	\$3.26	\$3.15	+\$0.10	Probability of Hedge Benefitting	74%
2004	\$3.23	\$3.54	-\$0.31	Average Benefit of Hedge	\$0.88
2005	\$3.57	\$3.25	+\$0.31	Probability of Hedge Hurting	26%
2006	\$3.69	\$3.74	-\$0.06	Average Hurt from Hedging	-\$0.99
2007	\$4.51	\$5.74	-\$1.23		
2008	\$5.67	\$8.48	-\$2.81		
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		
2018	\$5.69	\$5.01	+\$0.68		
2019	\$5.54	\$4.65	+\$0.89		

The summary statistics for the 18 years are reported on the right side of Table 9. This strategy did not work every year, but the average value of the hedge for this period is \$0.39/bushel. This strategy has been particularly effective for the 2012-18 crops as the average value of the hedged was \$0.93/bushel. This strategy provided positive risk management benefit 74% of the time. When the hedged provided value, the benefit was \$0.88/bushel. The 26% of the years when hedging locked in a lower price had a negative hedging account balance of -\$0.99/bushel (Table 9).

The July 2019 wheat futures contract closed at \$4.65 on May 17, 2019, and the hedge for the 2019 crop is projected to have a value of +\$0.89/bushel.

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 15. March Wheat Futures Price Distribution Thirds by Month for the 2015 to 2018 Crop Years.



The historical performance of hedging stored wheat with the March futures contract for the 2015 to 2018 crop years are reported in Table 10. 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 years is \$0.25/bushel. This strategy had an average value of \$0.96/bushel for the 2013-17 crop years. The value of the hedge for the 2018 crop is \$0.48/bushel (Table 10).

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 10).

Table 10. 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	Value of 2018 Hedge \$0.48
2003	\$3.38	\$3.81	-\$0.44	Probability of Hedge Benefitting 61%
2004	\$3.82	\$3.01	+\$0.82	Average Benefit of Hedge \$1.21
2005	\$3.57	\$3.59	-\$0.01	Probability of Hedge Hurting 39%
2006	\$4.25	\$4.65	-\$0.39	Average Hurt from Hedging -\$1.27
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	
2018	\$5.52	\$5.04	+\$0.48	

This article illustrates that futures can be used to expand the marketing window to protect the price for wheat to be sold at harvest or stored. A 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. Given the forecast for tight profitability margins, managers should be proactive to price at profitable levels even months before the crop is planted or harvested.

Topic 9. 2019 Corn and Soybean Projected Profitability Compared to Corn Prevented Planting

NASS projects Kentucky's corn crop to be 71% planted, which is among the best progress for the country but is 9% behind the state's five-year average (Table 4). As some farmers may have delayed planting and may be considering prevented planting or switching to soybeans, this article will compare the returns for corn vs. full-season soybeans grown in a rotation with corn and for second-year soybeans. The break-even soybean yields are provided to illustrate what soybean yields are needed to be as profitable as corn. Finally, this article will provide an example of crop insurance prevented planting payments for corn.

The projected returns in Table 11 uses the Olympic-Average yields from the Kentucky Farm Business Management cooperating farms for the Ohio Valley area. The harvest price is assumed at the forward contract price on May 20, 2019. The weather rally is helping corn with an average forward contract bid at \$3.81/bushel. Soybeans are pressured by large stocks with the harvest contract price at \$8.11/bushel.

Corn yielding 185-bushels is projected to cover total variable costs, cash rent, and overhead with a return of \$31/acre (Table 11). In contrast, soybeans are projected to lose **-\$46/acre** produced in a rotation with corn. Second-year soybeans are budgeted to have a **-\$77/acre** (Table 11).

Table 11. Budgeted 2019 Return over Total Costs for Western Kentucky Corn and Soybeans.			
	Rotation Corn	Rotation Beans	2nd Year Beans
Harvest Forward Contract F	\$3.81	\$8.11	\$8.11
Yield	<u>185.0</u>	<u>55.0</u>	<u>53.6</u>
Revenue	\$705	\$446	\$435
Total Variable Costs (TVC)	<u>\$426</u>	<u>\$265</u>	<u>\$285</u>
Return over TVC	\$279	\$181	\$150
Rent	<u>\$180</u>	<u>\$180</u>	<u>\$180</u>
Return over TVC+Rent	\$99	\$1	-\$30
Overhead	<u>\$68</u>	<u>\$47</u>	<u>\$47</u>
Return over Budgeted Costs	\$31	-\$46	-\$77
Break-Even Price over Budgeted Costs	\$3.64	\$8.95	\$9.55
Break-Even Yields over Budgeted Costs	176.8	60.7	63.1

Table 11 provides the break-even price needed to cover all budgeted costs at the budgeted yield. Also, the break-even yields needed to cover budgeted costs at current harvest cash forward contract prices. Soybeans produced in a rotation needs a price of \$8.95/bushel to cover all costs at a 55-bushel yield. Second-year soybeans need a price of \$9.55/bushel (Table 11). Alternatively, soybean yields need to exceed 61 bushels at current prices to cover all budgeted costs at current prices. Second-year soybeans need 64-bushel yields to cover all costs at \$8.11/bushel (Table 11).

Table 12. Break-Even Soybean Yields to be as Profitable as Corn for 2019.			
If the Corn Yield is:	Break-Even Soybean Yield for Same Return		
Yield Corn	Rotation Soybeans	2nd Year Soybeans	
145	45.7	48.2	
150	48.1	50.5	
155	50.4	52.9	
160	52.8	55.2	
165	55.1	57.6	
170	57.5	59.9	
175	59.8	62.3	
180	62.2	64.6	
185	64.5	67.0	
190	66.9	69.3	
195	69.2	71.7	

The soybean yield needed to provide the same profitability as corn is shown in Table 12. Late planted corn may have a lower potential yield than corn planted at the optimal date. For example, for corn yielding 170-bushels, rotation soybeans must yield 57.5 bushels/acre and 59.9 bushels/acre for second-year soybeans (Table 12). The point of Table 12 is that late-planted corn may be more profitable than planting soybeans depending on the yield potential for late-planted corn and the yield potential for soybeans.

Table 13 provides an example of prevented planting crop insurance payments for corn with an APH yield of 180-bushels and various coverage levels. Farmers that are not finished planting corn by the May 31 final planting date

have the option to receive 55% of the RP crop insurance revenue guarantee (assuming RP insurance was purchased for 2019). This calculation is called the Prevented Planting Payment.

Table 13. Example RP Corn Prevented Planting Payment for a Western Kentucky Farm.		
APH	180	<p>For farmers that purchased insurance at the 80% coverage level, the prevented planting payment is \$316.80/acre. This payment is before paying 35% of the insurance premium. Prevented planting may provide a larger return than planting lower-yielding corn or soybeans. Also, the insurance payment is received before harvest and may help farmers facing liquidity problems.</p> <p>Farmers not completing corn planting by May 31 should talk with their crop insurance agent about their prevented planting options and the comparison to returns from late-planted corn or soybeans.</p>
Projected Price	\$4.00	
Coverage Level	Prevented Planting Payment	
85%	\$336.60	
80%	\$316.80	
75%	\$297.00	
70%	\$277.20	
65%	\$257.40	
60%	\$237.60	
55%	\$217.80	
50%	\$198.00	

Topic 10. Potential 2019-20 Corn and Soybean Balance Sheets

The slow start to planting the 2019 corn and soybean crops is creating uncertainty about the potential quantity produced, acres switching from corn to soybeans, and acres filed as prevented planting. Also, the market will start to assume below-trend yields are more likely due to late planting in the key producing states. The market will continue to debate the use projections for corn and soybeans from the May *WASDE*. The continuing trade disruption with China could reduce soybean demand and add to projected stocks. This topic will discuss the impact of reduced planted corn area. Then we will discuss the impact of weaker soybean demand and increased soybean area combined with weaker use.

The projected 2019-20 U.S. corn balance sheet provided in Table 14 assumes that planted area is reduced by 3 million and by 5 million acres for prevented planting. The trend-yield is assumed to be 176 bushels/acre, with lower and higher yields included to show the impact of a 172-bushel and a 178-bushel yield. Total use is projected at 14.675 billion bushels and is based on the May *WASDE* projections.

If farmers plant 89.8 million acres and the trend-yield of 176 bushels per acre is achieved, then corn stocks are projected to decrease by 486 million bushels from the projected 2.485 billion in the May report for 2019-20 to 1.999 billion bushels (Table 14). The projected stocks-to-use ratio would be 13.6%, and the U.S. marketing year average (MYA) farm price would increase to \$3.49 per bushel (Table 14). A yield of 178 bushels/acre would cause stocks to decrease from the May report to 2.165 billion bushels and increase the U.S. MYA price to \$3.42/bushel. In contrast, a lower yield of 172-bushels would allow stocks to decline by 816 million bushels to 1.669 billion bushels with a stocks-to-use ratio to 11.4%. In this scenario, the U.S. MYA price would increase to \$3.65/bushel (Table 14).

Table 14. Projected 2019-20 U.S. Corn Balance Sheet for Projected and Reduced Planted Area.						
	3 Million Acres Prevented			5 Million Acres Prevented		
	2019-20	2019-20	2019-20	2019-20	2019-20	2019-20
Planted Area	89.8	89.8	89.8	87.8	87.8	87.8
Harvested Area	82.6	82.6	82.6	80.8	80.8	80.8
2019 Yield	172.0	176.0	178.0	172.0	176.0	178.0
	Million Bushels			Million Bushels		
Beginning Stocks	2,095			2,095		
Production	14,214	14,544	14,710	13,897	14,221	14,382
Imports	35			35		
Total Supply	16,344	16,674	16,840	16,027	16,351	16,512
Total Domestic	12,400					
Export	2,275					
Total Use	14,675	14,675	14,675	14,675	14,675	14,675
Ending	1,669	1,999	2,165	1,352	1,676	1,837
S/U	11.4%	13.6%	14.8%	9.2%	11.4%	12.5%
MYA Price	\$3.65	\$3.49	\$3.42	\$3.83	\$3.64	\$3.56

If weather prevents 5 million acres from being planted and yields are 176-bushels, then corn stocks could decline to 1.676 billion bushels. The U.S. MYA price would be \$3.64/bushel. If the U.S. yield is below-trend, then stocks could decline to 1.352 billion bushels and would support a price of \$3.83/bushel. For the combination of a reduced area but a larger yield, stocks would decline to 1.837 billion bushels with a U.S. MYA price of \$3.56/bushel.

Source: USDA-World Agricultural Outlook Board and Author's Projections.

Table 14 serves as a reminder that above-trend yields could partially offset the impact of the lower area. Lower yields and reduced acreage will provide fundamental support for a higher price. Also, the futures market might provide pricing opportunities prior if there is a perception of yield loss, and a risk premium is bid into the futures price.

The projected 2019-20 U.S. soybean balance sheet is provided in Table 15 analyzes the impact of weaker soybean demand and the impact of increased soybean area combined with weaker demand.

Table 15. Projected 2019-20 U.S. Soybean Balance Sheet for Projected and Increased Planted Area.

	2019-20	2019-20	2019-20	2019-20	2019-20	2019-20
	Prospective Plantings weaker Use			Weather Causes Increased Soybean Area		
Planted Area	84.6	84.6	84.6	86.6	86.6	86.6
Harvested Area	83.8	83.8	83.8	85.8	85.8	85.8
2019 Yield	46.9	49.5	52.1	46.9	49.5	52.1
	Million Bushels			Million Bushels		
Beginning Stocks	995			995		
Production	3,933	4,150	4,367	4,027	4,249	4,471
Imports	20			20		
Total Supply	4,948	5,165	5,382	5,042	5,264	5,486
Total Domestic	2,235			2,235		
Export	1,875			1,875		
Total Use	4,110	4,110	4,110	4,110	4,110	4,110
Ending	838	1,055	1,272	932	1,154	1,376
S/U	20.4%	25.7%	30.9%	22.7%	28.1%	33.5%
MYA Price	\$8.31	\$7.92	\$7.61	\$8.13	\$7.77	\$7.48

If the U.S. plants 84.6 million acres and harvests the trend-yield of 49.5-bushels, the total supply will exceed 5 billion bushels. Assuming a weaker use of 4.11 billion bushels, soybean stocks would increase from the May projections to 1.05 billion bushels. The stocks-to-use ratio of 25.7% suggests a U.S. MYA price of \$7.92/bushel. A larger yield of 52.1-bushels would increase stocks to over 1.27 billion bushels and causes prices to decline to \$7.61/bushel.

Source: USDA-World Agricultural Outlook Board and Author's Projections.


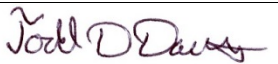

Table 15 suggests that with weaker than projected use for 2019-20, ending stocks could increase to over 1 billion bushels even with the reduced planted area from 2018. If weather causes 2 million acres to switch from corn to soybeans, then trend or above-trend yields would cause stocks to increase to 1.1 billion or 1.3 billion bushels, respectively (Table 15). If stocks were to exceed 1 billion bushels, then farmers should expect the U.S. MYA to decline to the below \$7.75 per bushel or even below \$7.50 per bushel depending on the stocks-to-use ratio (Table 15).

Is there any fodder to feed the corn market bull? The current weather event will likely reduce corn planted area and may keep yields at the trend or below-trend. Smaller production would provide fundamental support for higher prices. Unfortunately, any production impact will not be fully measured until combines roll in the fall. The fear of reduced production could provide hedging opportunities as the market bids in a risk premium, so managers should pay attention for marketing opportunities.

The fodder to feed the soybean market bull requires a trade agreement with China coupled with reduced production. The outbreak of African Swine Fever in China has cut their demand for soybeans and soybean meal, so the large volume of stocks created in the 2018-19 marketing year may take years to unwind. Especially if weather shifts intended corn acres to soybeans and yields are trend or above-trend.

Topic 11. 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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