

Crops Marketing and Management Update

Grains and Forage Center of Excellence

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Vol. 2017 (11)

November 23, 2017

Topics in this Month's Update:

1. [USDA Releases Surprising Corn Estimates. Markets Wait for January's Final Estimate](#)
2. [WASDE Update: Market Reacts to Large Corn Stocks](#)
3. [2017 Corn and Soybean Basis vs. Previous Years – Implications for Storage](#)
4. [Projected Returns to On-Farm and Commercial Storage for Corn and Soybeans](#)
5. [Corn and Soybean Storage Risk Management Opportunities to May 2018](#)
6. [Comparing Harvest-Time and January Cash Forward Contract Bids and Managing Risk](#)
7. [Projected Corn, Soybean, and Wheat Futures Trading Ranges to Harvest 2018](#)
8. [How Has the ARC-CO Price Protection Changed from 2014 to 2016 for Corn and Soybeans?](#)
9. [Projected 2018 Corn and Soybeans Profit Potential](#)
10. [Post-Harvest Corn and Soybeans Risk Management Plan – November 2017 Update](#)
11. [How Do I Get on the Email Distribution List to Receive this Newsletter?](#)

Topic 1. USDA Releases Surprising Corn and Soybean Production Estimates – Once Again

The markets anticipated USDA to make minor adjustments to forecasted corn and soybean yields for corn and soybeans in the November *Crop Production* report. Typically, significant adjustments occur in the September or October reports if they were to occur. Analysts surveyed before the report expected USDA to increase the corn yield by 0.5 bushels/acre (BPA) and reduce the soybean yield by 0.3 BPA from the October report. As always, USDA surprised the market by increasing the U.S. corn yield by 3.6 BPA from the October estimates. USDA did not adjust the soybean yield from last month. If realized, the new record corn yield of 175.4 BPA would produce 14.578 billion bushels which is a 3.8% reduction from 2016 (Table 1).

The green shaded cells in Table 1 reflects states with a projected yield increase from the October report. USDA reduced yields in Michigan (-1 BPA) and Nebraska (-2 BPA) from the October. In contrast, USDA increased the projected yields in four of the top five states by 6 BPA (Illinois, Iowa, and Minnesota) and by 8 BPA in Indiana. USDA projects the Midwest to produce 4.3% less corn due to a reduction in area. USDA increased projected corn yield in the Southern region except in Alabama and Georgia. The reduced area will trim the Southern corn crop by 3.8% from last year (Table 1).

USDA projects the 2017 soybean crop at a record 4.425 billion bushels. The 8.2% increase in harvested area from 2016 offsets the 4.8% yield reduction from last year. USDA projects the 2017 soybean yield to be the 2nd largest on record, if realized, and only 2.5 BPA smaller than last year's yield,

USDA increased projected yield in two of the top five soybean-producing states (Illinois and Nebraska) and left the yields unchanged in Iowa, Indiana, and Minnesota. The Midwest region is projected to produce 3.65 billion bushels, which is a 0.5% increase from last year's crop (Table 2). In contrast, the South had better yields with the region increasing production by 17% over last year (Table 2).

	Yield (Bu/Acre)			% Change in Yield from 2016	Production (Million Bushels)		% Change in Production from 2016
	2017 Nov (F)	2017 Oct (F)	2016		2017 Sep (F)	2016	
Midwest States							
Illinois	198	192	197	+0.5%	2,188	2,256	-3.0%
Indiana	181	173	173	+4.6%	945	946	-0.2%
Iowa	197	191	203	-3.0%	2,541	2,741	-7.3%
Kansas	136	134	142	-4.2%	707	699	+1.2%
Michigan	167	168	157	+6.4%	326	320	+1.7%
Minnesota	190	184	193	-1.6%	1,454	1,544	-5.9%
Missouri	175	172	163	+7.4%	569	571	-0.3%
Nebraska	179	181	178	+0.6%	1,665	1,700	-2.1%
North Dakota	134	126	158	-15.2%	427	517	-17.3%
Ohio	173	173	159	+8.8%	541	525	+3.2%
South Dakota	150	147	161	-6.8%	788	826	-4.7%
Wisconsin	168	164	178	-5.6%	496	573	-13.5%
Midwest Total					12,646	13,216	-4.3%
Southern States							
Alabama	165	170	120	+37.5%	39	38	+2.6%
Arkansas	179	179	171	+4.7%	107	127	-16.4%
Georgia	179	184	165	+8.5%	45	56	-20.2%
Kentucky	177	174	159	+11.3%	219	223	-1.4%
Louisiana	183	183	165	+10.9%	90	91	-1.2%
Mississippi	188	188	166	+13.3%	94	120	-21.4%
North Carolina	140	138	129	+8.5%	116	121	-4.2%
Oklahoma	130	123	121	+7.4%	42	42	-1.8%
South Carolina	137	135	127	+7.9%	45	44	+0.2%
Tennessee	171	170	151	+13.2%	121	125	-3.8%
Texas	142	142	127	+11.8%	311	324	-4.0%
Virginia	154	152	148	+4.1%	52	50	+4.1%
South Total					1,311	1,390	-5.7%
United States	175.4	171.8	174.6	+0.5%	14,578	15,148	-3.8%

	Yield (Bu/Acre)			% Change in Yield	Production (Million Bushels)		% Change in Production
	2017 Nov (F)	2017 Oct (F)	2016		2017 (F)	2016	
Midwest States							
Illinois	58	57	59	-1.7%	611	593	+3.1%
Indiana	55	55	58	-4.3%	327	324	+0.9%
Iowa	56	56	60	-6.7%	557	566	-1.6%
Kansas	40	41	48	-16.7%	204	192	+6.0%
Michigan	45	49	51	-10.9%	103	104	-1.4%
Minnesota	46	46	52	-11.5%	373	389	-4.3%
Missouri	49	49	49	+0.0%	290	271	+6.9%
Nebraska	58	56	61	-4.9%	328	314	+4.3%
North Dakota	35	36	42	-15.7%	249	249	-0.0%
Ohio	51	52	55	-6.4%	257	264	-2.6%
South Dakota	45	45	50	-9.1%	252	256	-1.4%
Wisconsin	46	47	55	-16.4%	98	107	-8.2%
Midwest Total					3,649	3,630	+0.5%
Southern States							
Alabama	45	44	32	+40.6%	15	13	+16.6%
Arkansas	50	51	47	+6.4%	175	146	+20.1%
Georgia	40	45	30	+33.3%	6	7	-19.4%
Kentucky	52	53	50	+4.0%	101	89	+13.3%
Louisiana	54	54	49	+11.3%	67	58	+16.0%
Mississippi	52	52	48	+8.3%	113	97	+16.4%
North Carolina	41	39	35	+17.1%	68	58	+17.8%
Oklahoma	29	27	29	+0.0%	18	14	+34.0%
South Carolina	37	36	31	+19.4%	14	13	+14.9%
Tennessee	51	50	45	+13.3%	85	73	+15.4%
Texas	38	37	31	+22.6%	7	4	+56.4%
Virginia	45	42	36	+25.0%	27	22	+22.9%
South Total					704	600	+17.3%
United States	49.5	49.5	52	-4.8%	4,425	4,296	+3.0%

USDA threaded the needle by adjusting projected soybean yields higher and lower across the country in a way to obtain the same 2017 yield projection in November as in the October report (Table 2).

USDA will release the “final” production estimate for the 2017 corn and soybean crop in January. That will be the last production estimate related to the 2017 crops.

Topic 2. WASDE Update: Market Reacts to Larger Corn Stocks but Smaller Soybean Stocks

Analysts surveyed before the report expected a slight increase in 2017 corn ending stocks as the analysts expected USDA to increase the 2017 yield slightly from the October report. Similarly, analysts expected 2017 soybean ending stocks to decline from last month’s report as USDA was anticipated to trim the 2017 soybean yield. The USDA corn yield was above the range of projected yields, and the market was surprised by a more substantial than expected corn crop and a corresponding significant increase in stocks. USDA reduced projected soybean ending stocks, which provided some bullish news to the market.

	2014-15	2015-16	2016-17 Estimated	2017-18 Projected	Change from 16-17
Planted Area (million)	90.6	88	94.0	90.4	-3.6
Harvested Area (million)	83.1	80.8	86.7	83.1	-3.6
Yield (bushels/acre)	171	168.4	174.6	175.4	+0.8
----- Million Bushels -----					
Beginning Stocks	1,232	1,731	1,737	2,295	+558
Production	14,216	13,602	15,148	14,578	-570
Imports	<u>32</u>	<u>67</u>	<u>57</u>	<u>50</u>	<u>-7</u>
Total Supply	15,479	15,401	16,942	16,922	-20
Feed and Residual	5,323	5,131	5,463	5,575	+112
Food, Seed & Industrial	6,560	6,635	6,891	6,935	+44
Ethanol and by-products	5,200	5,206	5,439	5,475	+36
Exports	<u>1,864</u>	<u>1,898</u>	<u>2,293</u>	<u>1,925</u>	<u>-368</u>
Total Use	13,748	13,664	14,647	14,435	-212
Ending Stocks	1,731	1,737	2,295	2,487	+192
Stocks/Use	12.6%	12.7%	15.7%	17.2%	+1.6%
Days of Stocks	46	46	57	63	+6
U.S. Marketing-Year Average Price (\$/bu)	\$3.70	\$3.61	\$3.36	\$3.20	-\$0.16

Source: November 2017 WASDE - USDA: WAOB.

The November WASDE revised the estimated corn yield to 175.4, which is a 0.8 BPA increase over the 2016 yield (Table 3). Harvested area is 3.6 million acres less than last year, which reduced the corn crop by 570 million bushels from 2016. With the carry-in of 2.295 billion bushels, the 2017 corn supply is only 20 million bushels less than last year even with a smaller harvested area (Table 3).

USDA projects total use to decline by 212 million bushels from 2016. Reduced exports of 368 million bushels offset the 112 and 44 million bushel increase in feed and industrial use, respectively, from 2016.

USDA projects 2017-18 ending stocks at 2.48 billion bushels, which is a 192 million bushel increase from last year. The projected U.S. marketing-year average (MYA) farm price will decline by \$0.16/bushel from last year to \$3.20/bushel.

	2014-15	2015-16	2016-17 Estimated	2017-18 Projected	Change from 16-17
Planted Area (million)	83.3	82.7	83.4	90.2	+6.8
Harvested Area (million)	82.6	81.7	82.7	89.5	+6.8
Yield (bushels/acre)	47.5	48	52.0	49.5	-2.5
----- Million Bushels -----					
Beginning Stocks	92	191	197	301	+104
Production	3,927	3,926	4,296	4,425	+129
Imports	<u>33</u>	<u>24</u>	<u>22</u>	<u>25</u>	<u>+3</u>
Total Supply	4,052	4,140	4,515	4,752	+237
Crushings	1,873	1,886	1,899	1,940	+41
Exports	1,843	1,936	2,174	2,250	+76
Seed	96	97	105	101	-4
Residual	<u>49</u>	<u>24</u>	<u>36</u>	<u>35</u>	<u>-1</u>
Total Use	3,862	3,944	4,214	4,326	+112
Ending Stocks	191	197	301	425	+124
Stocks/Use	4.9%	5.0%	7.1%	9.8%	+2.7%
Days of Stocks	18	18	26	36	+9.8
U.S. Marketing-Year Average Price (\$/bu)	\$10.10	\$8.95	\$9.47	\$9.30	-\$0.17

Source: November 2017 WASDE - USDA: WAOB.

	2014-15	2015-16	2016-17 Estimated	2017-18 Projected	Change from 16-17
Planted Acres (million)	56.8	55	50.1	46.0	-4.1
Harvested Acres (million)	46.4	47.3	43.9	37.6	-6.3
Yield (bushels/acre)	43.7	43.6	52.7	46.3	-6.4
----- Million Bushels -----					
Beginning Stocks	590	752	976	1,181	+205
Production	2,026	2,062	2,309	1,741	-568
Imports	<u>149</u>	<u>113</u>	<u>118</u>	<u>150</u>	<u>+32</u>
Total Supply	2,766	2,927	3,402	3,071	-331
Food	958	957	949	950	+1
Seed	79	67	61	66	+5
Feed and Residual	122	152	156	120	-36
Exports	<u>854</u>	<u>775</u>	<u>1,055</u>	<u>1,000</u>	<u>-55</u>
Total Use	2,014	1,952	2,222	2,136	-86
Ending Stocks	752	976	1,181	935	-246
Stocks/Use	37.3%	50.0%	53.2%	43.8%	-9.4%
Days of Stocks	136	183	194	160	-34
U.S. Marketing-Year Average Price (\$/bu)	\$5.99	\$4.89	\$3.89	\$4.60	+\$0.71

Source: November 2017 WASDE - USDA: WAOB.

USDA reduced the 2017 soybean crop by 5 million bushels from the October report without adjusting yield or harvested area. This magic reduction occurred because the soybean production adjustments are masked by rounding as the reports are produced. The net result was a 5 million bushel reduction in 2017 ending stocks to 425 million bushels

(Table 4). The projected increase in carryout from 2016 will pressure price lower to a U.S. MYA farm price of \$9.30/bushel (Table 4).

USDA increased projected wheat exports by 25 million bushels from the previous projection to 1 billion bushels exported for the 2017-18 marketing year (Table 5). The increase in use reduced 2017-18 ending stocks by 25 million to 935 million bushels. If realized, the wheat stocks-to-use ratio will be less than 50 percent for the first time since 2014-15 (Table 5). The relative decline in stocks will allow for price improvement with the 2017-18 U.S. MYA price pegged at \$4.60 per bushel, which is an increase of \$0.71/bushel from last year (Table 5).

Topic 3. 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 12 Western Kentucky markets. Notice that basis tends to follow seasonal patterns with the widest level at harvest with appreciation into spring and early summer.

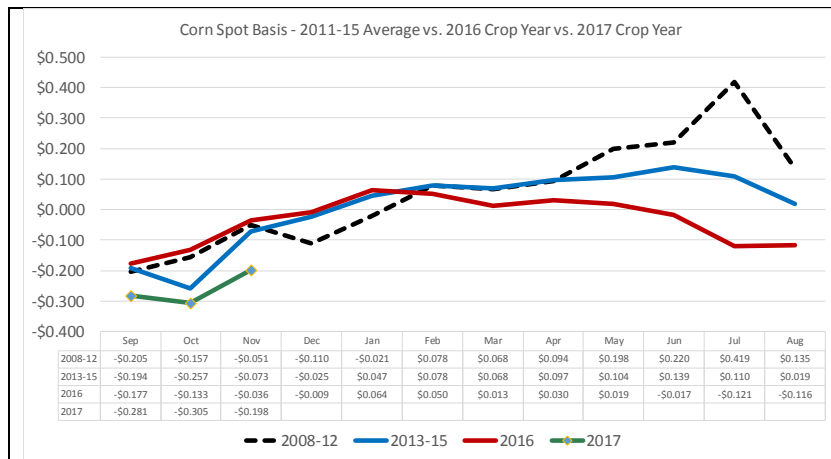


Figure 1. Western Kentucky Corn Spot Market Basis Appreciation from September to August for 2008 to 2017 Crop Years

Figure 1 compares the corn spot market average 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 2017 corn basis is significantly wider than the previous years' basis. The November average corn basis, as of November 22, was **-\$0.19**/bushel under the December corn futures contract. The 2017 basis is **-\$0.162** wider than last year's basis and **-\$0.126**/bushel wider than the 2013-15 average basis (Figure 1).

Basis Calculated on November 22, 2017

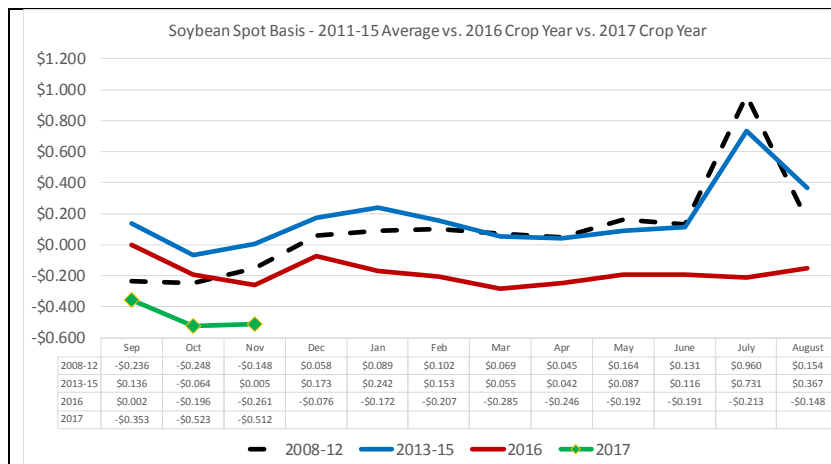


Figure 2. Western Kentucky Soybean Spot Market Basis Appreciation from September to August for 2008 to 2017 Crop Years

Figure 2 compares the soybean spot market average 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 soybean basis (Figure 2) has a similar story as corn. The average soybean basis, as of November 22, was **-\$0.512**/bushel under the January 2018 soybean contract. The basis is **-\$0.251**/bushel wider than the 2016 basis and **-\$0.517** per bushel wider than the 2013-15 average basis (Figure 2).

Basis Calculated on November 22, 2017

A concern is that this wider than average basis may hinder appreciation and limit storage returns. The 2016 corn crop's basis appreciated \$0.197/bushel from October to January, which is disappointing compared to the average \$0.397/bushel increase from October to June for the 2013-15 crop years (Figure 1). The 2016 soybean basis appreciated only \$0.12 from October to December (Figure 2), which is significantly less than the \$0.795/bushel average

basis appreciation from October to July for the 2013-15 crop years (Figure 2). If basis remains wide, any increase in the futures price will not be fully transmitted to the cash market price. Managers should remain aware of basis and the cost of storage for an additional month to profit from storage.

Topic 4. 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 in 2017. 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 6 for cash prices in December 2017 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.

Table 6. 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							
Conservative Spot Forecast (\$/bu)		\$3.41	\$3.46	\$3.50	\$3.51	\$3.62	\$3.58	\$3.66
Optimistic Spot Forecast (\$/bu)		\$3.50	\$3.53	\$3.60	\$3.66	\$3.76	\$3.69	\$3.79
Returns to On-Farm Storage	-\$0.33	-\$0.18	-\$0.14	-\$0.11	-\$0.12	-\$0.03	-\$0.09	-\$0.02
		-\$0.09	-\$0.07	-\$0.01	+\$0.03	+\$0.12	+\$0.03	+\$0.11
Returns to Commercial Storage	-\$0.57	-\$0.42	-\$0.38	-\$0.38	-\$0.38	-\$0.29	-\$0.34	-\$0.27
		-\$0.33	-\$0.31	-\$0.28	-\$0.24	-\$0.15	-\$0.23	-\$0.14

The combination of seasonality and a narrowing basis implied by forward contract bids suggest a possible positive storage return in March 2018. If basis does not narrow as implied by the forward contract bids, then managers may need to cut their losses after April 2018.

Commercial storage is not projected to provide a positive return assuming current basis and current futures market prices (Table 6)

Returns Estimated on November 22, 2017

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. Unlike corn, there is better potential for positive storage returns both on-farm and through commercial storage (Table 7).

Table 7. 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							
Conservative Spot Forecast (\$/bu)		\$9.63	\$9.49	\$9.66	\$9.89	\$10.03	\$9.99	\$10.12
Optimistic Spot Forecast (\$/bu)		\$9.71	\$9.74	\$9.87	\$9.90	\$10.38	\$10.42	\$10.66
Returns to On-Farm Storage		+\$0.02	-\$0.16	-\$0.03	+\$0.16	+\$0.26	+\$0.18	+\$0.27
		+\$0.10	+\$0.09	+\$0.18	+\$0.17	+\$0.61	+\$0.61	+\$0.81
Returns to Commercial Storage		-\$0.18	-\$0.36	-\$0.23	-\$0.04	+\$0.06	-\$0.02	+\$0.07
		-\$0.10	-\$0.11	-\$0.02	-\$0.03	+\$0.41	+\$0.41	+\$0.61

Some managers plan to store soybeans until January to manage tax liability and then sell for cash flow. The soybean market may provide better storage returns than corn past January 2018. The spot price projections include the potential for \$10/bushel soybeans in early Spring. Table 7 suggests profitable pricing opportunities in March and April for on-farm storage. Commercial storage may be profitable in April as well.

Returns Estimated on November 22, 2017

Managers could expect greater excitement in soybeans than in corn given the relatively tighter stocks. A South American weather event could spur the soybean market higher. Recognize that the risk window starts to close in

February as South American soybean harvest starts and risk premium is removed when the market can measure the size of the 2018 South American crops (Table 7).

Topic 5. Corn and Soybean Storage Risk Management Opportunities to May 2018

As we focus on storage costs and profitable returns from storage, managers may want to consider if the futures or options markets are providing opportunities to protect prices at levels that would cover budgeted inputs, rent, overhead, and provide a return for family living. Table 8 compares the risk protection provided by hedging (or Hedge-to-Arrive contracts) with put options for corn for varying harvested yields. The July 2018 corn futures contract and put options on the July 2018 corn contract are compared to a cash forward contract for May 2018 delivery. The similar soybean price risk tools are evaluated to measure the potential profitable returns over total variable costs, inputs, overhead, family living and on-farm storage to May 2018 (Table 9).

Table 8. Risk Management Comparison for Corn Stored On-Farm until May 2018 for Western Kentucky Markets.					The July 2018 corn futures contract is trading below budgeted break-even prices. With a 185-bushel corn yield, the break-even cash price is \$4.51/bushel to pay for inputs, rent, overhead, storage, and family living expenses. Put options provide flexibility by placing a floor on price. However, put options are not at a price that would reduce the risk for this example corn farm.	
Storage Hedge: May 2018		Corn				
Yield		<u>165</u>	<u>175</u>	<u>185</u>		<u>195</u>
TVC+Rent (\$/acre)		\$640	\$640	\$640		\$640
Overhead + Family (\$/acre)		\$110	\$110	\$110		\$110
TVC+Rent+OH+Family+\$0.46 storage (\$/bu)		\$5.01	\$4.75	\$4.51	\$4.31	
Hedge @ \$3.73 +\$0.07 basis = \$3.80		-\$1.21	-\$0.95	-\$0.72	-\$0.51	
Forward Contract at \$3.56 for May 2018		-\$1.44	-\$1.18	-\$0.95	-\$0.74	
Put: \$3.70 strike @\$0.167 = \$3.60 floor		-\$1.41	-\$1.15	-\$0.92	-\$0.71	
Strategies Evaluated on:		November 22, 2017				

Table 9. Risk Management Comparison for Soybeans Stored On-Farm until May 2018 for Western Kentucky Markets.					Farmers harvesting 65-bushel or greater soybeans might be able to use the July soybean futures to hedge a return over inputs, rent, overhead, storage and family living expense. A put option may be feasible for those with even better yields depending on cost structure and cost of the put option. Put options can place a floor on price while having the flexibility to benefit from higher prices between purchase and selling grain in May 2018.	
Storage Hedge: May 2018		Soybeans				
Yield		<u>55</u>	<u>65</u>	<u>75</u>		<u>85</u>
TVC+Rent (\$/acre)		\$486	\$486	\$486		\$486
Overhead + Family (\$/acre)		\$110	\$110	\$110		\$110
TVC+Rent+OH+Family+\$0.55 storage (\$/bu)		\$11.39	\$9.72	\$8.50	\$7.56	
Hedge @ \$10.36 + \$0.03 basis = \$10.39		-\$1.11	+\$0.56	+\$1.78	+\$2.72	
Forward Contract at \$9.99 for May 2018		-\$1.40	+\$0.27	+\$1.49	+\$2.43	
Put: \$10.40 strike @\$0.555 = \$9.88 floor		-\$1.58	+\$0.09	+\$1.31	+\$2.24	
Strategies Evaluated on:		November 22, 2017				

Topic 6. Comparing Harvest-Time and January Cash Forward Contract Bids and Managing Risk

Figures 3 and 4 compare current harvest-time and January CFC bids to budgeted variable costs, land rent, fixed costs, and a minimum storage cost from October harvest to January. The production costs, fixed costs, and land rent are from the University of Kentucky *Farm Business Management Program* budgets for Western Kentucky assuming harvested yields of 170-bushels and 55-bushels, respectively, for corn and soybeans. On-farm storage costs are explained in the October 2017 newsletter and are assumed at \$0.397/bushel for corn and \$0.352/bushel for soybeans assuming both crops are stored from October 2017 to January 2018.

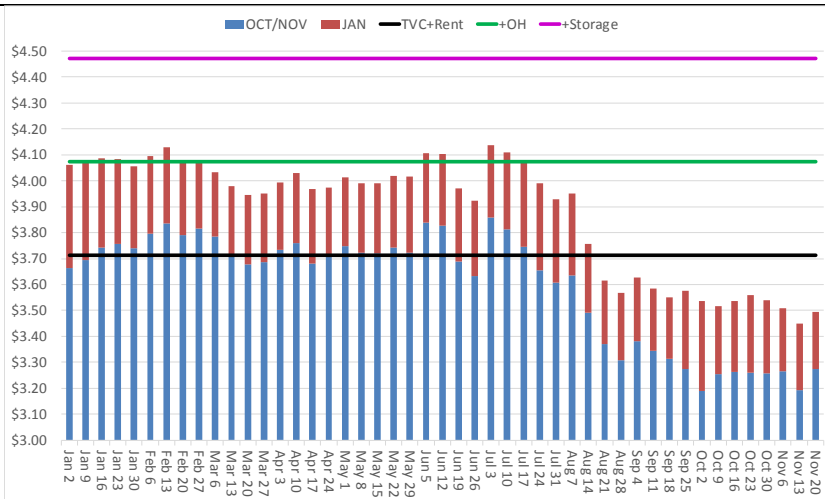


Figure 3. October 2017 and January 2018 Corn Cash Forward Bids with Per Bushel Costs for Inputs plus Rent, Overhead, and Storage.

Analyzed on November 22, 2017.

Figure 3 compares the October corn CFC (blue column), January CFC (red column) to production costs plus rent (black line), overhead costs (green line) and minimum storage costs to January (purple line).

While not covering storage costs, the August 7th weekly average January CFC provided the last best risk management opportunity for those wanting to lock in a price before January delivery. Current bids are well below the cost of inputs, overhead, and storage to January 2018 (Figure 3).

Figure 3 reminds managers that profitable risk management opportunities may occur months before harvest.

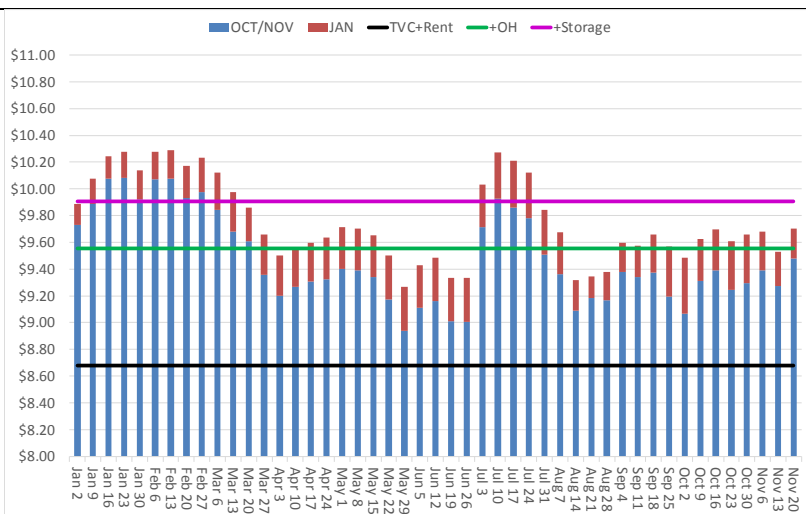


Figure 4. October 2017 and January 2018 Soybean Cash Forward Bids with Per Bushel Costs for Inputs plus Rent, Overhead, and Storage.

Analyzed on November 22, 2017.

Managers are not anticipated to be able to lock in a soybean price that covers economic costs plus storage to January (Figure 4). This pricing opportunity was available in January and February with the futures rally in July providing another risk management opportunity. The January 2018 forward contract has been improving in price and managers currently are losing less money in soybeans than in corn

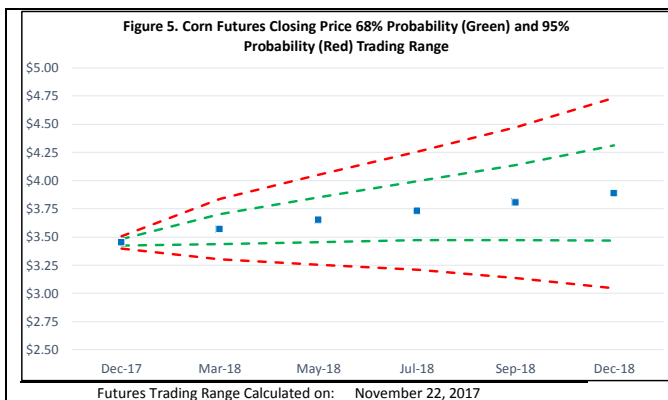
Figures 3 and 4 is a reminder of why managers need to understand their per bushel costs to guide their marketing. Knowing what is needed from the market will help managers price stored grain and to recognize opportunities when they arise.

Topic 7. Projected Corn, Soybean, and Wheat Futures Trading Ranges to Harvest 2018

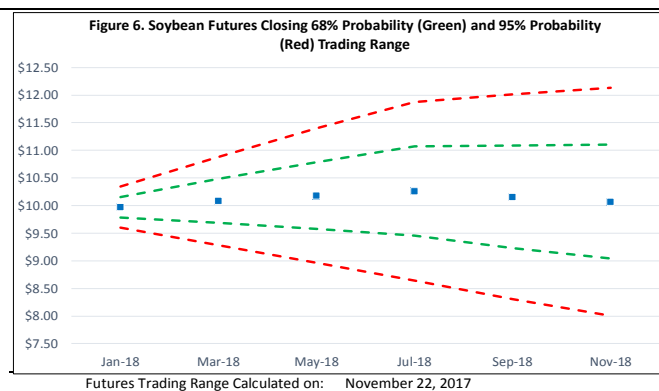
Understanding the probabilistic trading ranges based on current futures market volatility will help managers gauge the likelihood of reaching their pricing objectives. Figures 5 – 7 provide the projected futures price trading range, by futures contract month, based on the contracts’ volatility for the 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 this year or 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 December 2017 to December 2018. There is a 68% probability that the July 2018 corn contract will trade between \$3.47 and \$3.99 and a 95% probability that the July 2018 corn contract will trade between \$3.21 and \$4.26 (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 \$3.47 and \$4.31 per bushel (Figure 5).

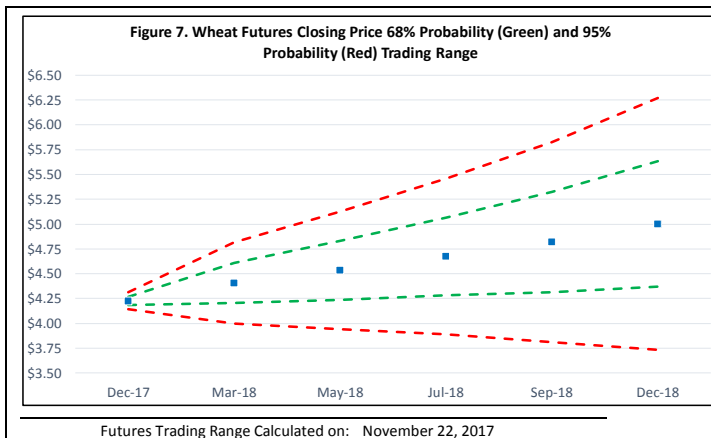


Trading range calculated on November 22, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on November 22, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.



Trading range calculated on November 22, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on November 22, 2017, 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 January 2018 to November 2018. The July 2018 soybean futures have a 68% probability of trading between \$9.45 to \$11.07 with a 95% likelihood of trading between \$8.65 and \$11.88 (Figure 6). For the 2018 soybean crop, the November 2018 futures contract has a 68% probability of trading between \$9.04 and \$11.10 per bushel (Figure 6).



Trading range calculated on November 22, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on November 22, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

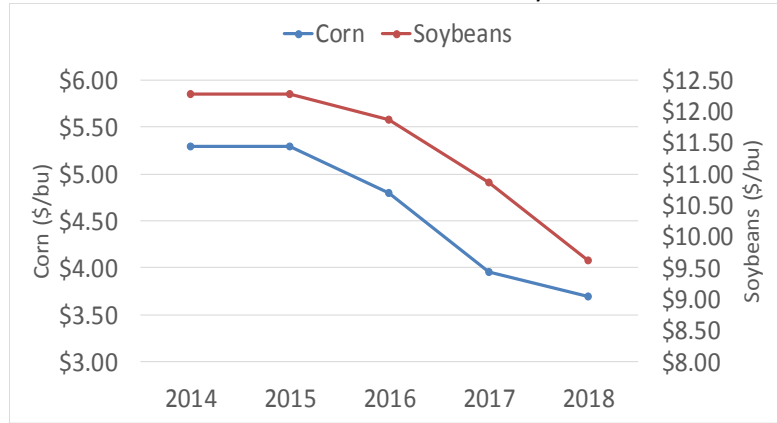
Figure 7 provides the probabilistic trading range for wheat futures contract from December 2017 to December 2018 contracts. The July 2018 wheat futures have a 68% probability of trading between \$4.28 and \$5.07 and a 95% probability of trading between \$3.89 and \$5.46. Those producing wheat in 2018 should monitor the July 2018 wheat contract for opportunities to manage price risk if pricing targets are reached.

Those that plan to store wheat into the fall may want to monitor the December 2018 corn contract. Currently, near \$5 per bushel, the December 2018 contract could help lock in profit potential for the 2018 wheat crop.

Topic 8. How Has the ARC-CO Price Protection Changed from 2014 to 2016 for Corn and Soybeans?

The declining commodity prices since 2014 has strained working capital and created liquidity problems for some grain farms. Another impact of lower grain prices is on the formulas used to calculate the ARC-CO revenue guarantee as defined in the 2014 Farm Bill. The ARC-CO program is a county-level revenue guarantee program where the price protection is based on the Olympic Average U.S. marketing year average price. The Olympic Average price captures the benefit of record high corn and soybean prices in 2010-13 into the safety net for the first three years of the farm bill. Then the price component of the safety net declines as lower prices enters into the formula replacing the record high prices.

Figure 8. Olympic Average Prices used in the ARC-CO Guaranteed Revenue from 2014 to 2018 for Corn and Soybeans



A component of the calculation of the Olympic Average Price is to substitute the PLC Target Price whenever the U.S. MYA price is less than the Target Price. The formula allows the Olympic Average price protection to converge to the PLC Target price during a period of low prices. The 2018 price guarantee in ARC-CO for corn is \$3.70 per bushel. The 2018 price is a \$1.59/bushel decrease from the \$5.29 price used in ARC-CO for 2014 and 2015.

The Olympic Average soybean price is projected at \$9.62 for 2018. The soybean price protection has declined by \$2.64 per bushel from the \$12.27/bushel price used in 2014 and 2015.

The initial reaction to Figure 8 is that the revenue protection is universally lower for corn and soybeans for the 2017 crop as compared to the first year of the program in 2014. That is not necessarily true. The other component of the ARC-CO revenue guarantee is the county's Olympic Average yield per planted acre. As every county has different yield histories and realized yields from 2014 to 2017, the ARC-CO revenue guarantee varies greatly. Table 10 provides an example of ARC-CO corn and soybean revenue guarantees for Muhlenberg County and Warren County. These counties are interesting because one county had an increasing Olympic Average yield while the other county's Olympic Average yield has declined from 2014 to the 2016 crop.

Table 10 shows how the corn revenue guarantee for Muhlenberg County has increased by \$49.85 per base acre. The increase is because the County's Olympic Average yield increased by 24 bushels per planted acre from the 2014 to 2016 crops. Muhlenberg County's Olympic Average soybean yield also increased by 5 bushels per acre from 2014 to 2016, which raised the ARC-CO revenue guarantee by \$36.60 per base acre (Table 10). The ARC-CO program did not trigger a payment in Muhlenberg County in 2014 for corn and soybeans but made maximum corn and soybean payments of \$66.10 and \$25.23 per base acre, respectively, in 2016.

Warren County is an example of a county at the other end of the spectrum where the Olympic Average yield has declined from 2014 to 2016. The corn and soybean Olympic Average yields have declined by 3 and 2 bushels per planted acre, respectively, since the start of the program. The combination of lower price and lower yield reduced the ARC-CO guaranteed revenue by \$76.86 and \$36.93 per planted acre, respectively, for corn and soybeans for the 2016 crop year (Table 10). The ARC-CO program paid maximum payments of \$79.35 and \$41.91 per base acre for corn and soybeans for the 2014 crop. However, the lower revenue guarantee in 2016 kept payments from being made despite lower prices.

Table 10. Comparison of ARC-CO Olympic Average Yields and Revenue Guarantee for 2014 and 2016 for Corn and Soybeans for Muhlenberg and Warren Counties, Kentucky.

	Olympic Average Yield (Bu/Planted Acre)		ARC-CO Revenue Guarantee (\$/Base Acre)		Change in Guarantee
	2014	2016	2014	2016	
----- Corn -----					
Muhlenberg	114	138	\$518.63	\$568.48	+\$49.85
Warren	150	147	\$682.41	\$605.55	-\$76.86
----- Soybeans -----					
Muhlenberg	42	47	\$443.19	\$479.79	+\$36.60
Warren	48	46	\$506.51	\$469.58	-\$36.93

What does this imply for the 2017 crops? Counties that harvested corn and soybean yields significantly greater than the Olympic Average yield are not likely to trigger ARC-CO payments as the yield increase would offset the effect of lower price. This reinforces the importance of proactive risk management as the ARC-CO program was not designed to protect from deep revenue losses. Other tools like crop insurance, hedging, options and forward contracts are available to mitigate revenue risk.

Topic 9. Projected 2018 Corn and Soybeans Profit Potential

Now that the 2017 crop is almost entirely in the bin, let us talk about the profitability potential of the 2018 corn and soybean crops. The futures market is still wrapping its arms around the size of both crops for 2017, and the daily ebbing and flowing of prices are signaling the market’s desire for corn and soybean acreage in 2018. Topic 2 discussed the corn market surplus weighing on price. In contrast, the soybean market is weathering the increase in stocks relatively well. The bullishness in the soybean market is due to expectations that USDA will increase projected use between now and the end of the marketing year.

Is this hope of reduced soybean stocks wide-eyed dreaming? Perhaps not. USDA has increased use and reduced ending stocks by an average of 125 million bushels from the November report to the end of the marketing year in eight of the last ten years. A 125 million bushel reduction in stocks would reduce the stocks-to-use ration to 6.8% and provide a boost to the soybean futures and cash market. In contrast, USDA has reduced corn stocks in five of the last ten years by an average of 266 million bushels. Given current projections, a 266 million bushel reduction in stocks is not going to provide a significant price response as corn stocks would still be greater than 2 billion bushels.

Table 11 uses cost estimates provided by Kentucky Farm Business Management (KFBM) Specialists. KFBM provides management education through using detailed and accurate farm financial records. As stressed in this newsletter, managers need detailed cost information to be able to establish pricing targets at levels that will cover their costs as best as possible given current market conditions. The KFBM cost projections are for total variable costs of \$528 and \$348 per acre for corn and soybeans, respectively, assuming a yield goal of 175 and 55 bushels per acre (Table 11). Land rent is assumed at \$175 per acre but will vary greatly by location.

Table 11. Preliminary 2018 Budgeted Return over Variable Cost and Land Rent for Western Kentucky Corn and Soybeans.		
	Rotation Corn	Rotation Soybean
Cash Price October 2018	\$3.60	\$9.22
Yield	<u>175.0</u>	<u>55.0</u>
Revenue	\$631	\$507
Total Variable Costs	\$528	\$348
Rent	<u>\$175</u>	<u>\$175</u>
Return over TVC+Rent	-\$72	-\$16

Evaluated November 17, 2017

The projected October 2018 corn and soybean price are from the December and November 2018 contracts, respectively, and are adjusted by the historical seasonality from the previous November to harvest. The three-year average basis of -\$0.20 and -\$0.26 for corn and soybeans, respectively. The assumed basis is narrower than experienced in 2017. The budgeted return is negative for both crops. Soybeans are less unprofitable than corn given the assumptions.

What if the basis is widened to the 2017 levels of -\$0.31 and -\$0.53 per bushel for corn and soybeans? The profitability signal does not change as soybeans are still more profitable than corn. If the corn yield is increased to 190 bushels/acre, then corn would be as profitable as soybeans in the budget (Table 11).

Is there an opportunity to use price risk management tools to protect revenue at profitable levels for the 2018 crops? Table 12 shows the frequency of the percentage of the days that the December and November 2018 contracts closed at or above the relevant breakeven levels. The breakeven prices are adjusted by the harvest basis to equate a cash market price to the futures market price. The December 2018 corn futures contract is offering protection over inputs but is not at a level to protect rent, overhead or family living expense (Table 12). The November 2018 soybean futures contract has been trading at levels that cover inputs and cash rent. A 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 (\$88,000 in family living expense divided by 2200 crop acres).

Table 12. 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.

	<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	0%	\$9.76	96%
+ Overhead	\$4.58	0%	\$10.66	0%
+ Family Living	\$4.81	0%	\$11.38	0%

Evaluated November 17, 2017

Topic 10. Post-Harvest Corn and Soybeans Risk Management Plan – November 2017 Update

The final topic updates the post-harvest risk management plan. The October 2017 discusses the cost assumptions and reviews the effectiveness of the pre-harvest risk plan. The game plan provides both price targets and a decision date to force action. At this time, the corn and soybean plans are not changed. The discussion will focus on where the futures market has been trading and a seasonal index based forecast of potential prices for the July 2018 corn and soybean futures contract.

Figure 9 shows the percentage of the days the July 2018 corn futures contract since July 1 (black line), and September 1 (blue line) closed at or above various prices. The blue line is condensed which shows the narrow trading range since September 1. Managers striving to price in the top 1/3 of the market currently need a price of \$3.80 per bushel or higher. The black line is spread out which indicates there was an opportunity to hedge stored corn at \$4 per bushel or higher last summer. This illustrates how commodity futures are a tool that expands the marketing window and should be considered by proactive managers.

Figure 10 uses the historical percentage change in monthly prices from November to the end of the futures contract in June to forecast the price potential for the July 2018 corn futures contract. The average price appreciation for the 2013 to 2015 crops implies the potential for \$3.80 futures in April. If the futures market has a similar appreciation as for the 2016 corn crop, then \$3.90 may be reached. A quick glance at Figure 9 reminds us that the July 2018 corn futures have not traded at or above \$3.90 per bushel since September 1, 2017, so significant appreciation may be limited.

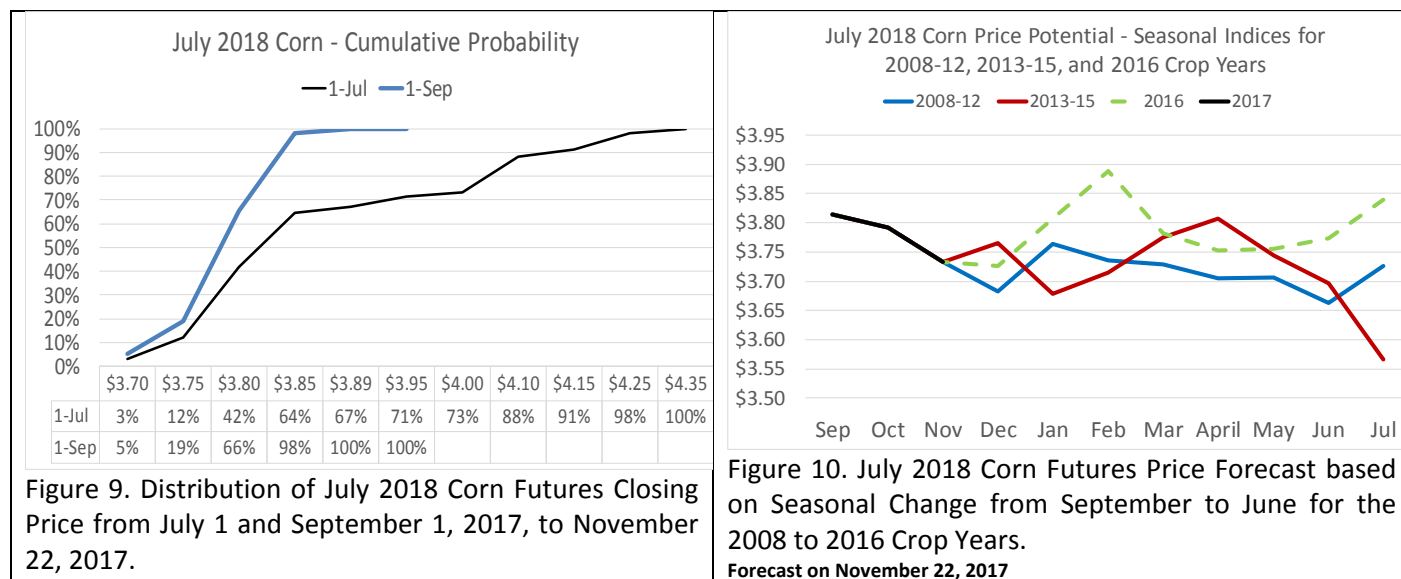


Table 13 provides an update on the projected profitability of the 2017 corn crop from both the pre-harvest and post-harvest marketing game plan. The game plan is to use HTA contracts to sell at a composite price of \$4.15 per bushel and capture the expected average basis of +\$0.06/bushel in May 2018. If realized, the plan will cover total economic costs but have a deficit for on-farm storage costs and family living (Table 13). The right side of Table 13 considers the profitability of all of the stored corn is priced with HTA contracts for the current net price of \$3.73 per

bushel. Table 13 is a reminder that pricing everything at current price levels will not achieve profitability goals, as there is a projected deficit of \$47/acre over inputs, land, and overhead (Table 13).

Projected Returns from Stored Corn Grain Risk Plan -- November Update				Projected Returns from Stored Corn Grain if HTA All Right Now			
	Bushels	\$/bushel	\$/Acre		Bushels	\$/bushel	\$/Acre
Pre-Harvest Risk Plan	52.5	\$3.79	\$199	Pre-Harvest Risk Plan	52.5	\$3.79	\$199
Stored Risk Plan	122.5	\$4.21	<u>\$516</u>	HTA all Stored Corn Now	122.5	\$3.73	<u>\$457</u>
Total Revenue			\$715	Total Revenue			\$656
Return over Total Economic Costs			\$12	Return over Total Economic Costs			-\$47
Return over Storage Costs		-\$0.37	-\$45	Return over Storage Costs		-\$0.85	-\$104
Return over Family Living		-\$0.76	-\$93	Return over Family Living		-\$1.24	-\$152

Figure 11 shows the percentage of the days the July 2018 soybean futures contract has closed at or above various prices. The black line illustrates the frequency of trades since July 1, 2017, while the blue line shows the frequency of closing prices since September 1, 2017. Notice that the blue line is not as spread out like the black line. The blue line shows that the July 2018 soybean contract has been trading higher and has not traded below \$9.80 per bushel since September 1, 2017. Managers determined to price in the top 1/3 of the trading range have a target of \$10.15 per bushel (Figure 11).

Figure 12 provides a forecast of potential July 2018 future prices using historical percentage change in monthly futures prices. The July 2018 contract may reach \$10.50 in January or February 2018 based on previous years. The concern for soybeans is if the futures market moves in a similar pattern as last year. The green line in Figure 12 shows the potential downside risk in soybeans once South America reenters the export market and the market stops rewarding farmers to store soybeans. The dichotomy in soybeans is that the stocks are relatively tight and may generate prices at \$11 per bushels if the 2013-15 crop year price patterns are repeated. The green line in Figure 12 is a reminder of downside risk.

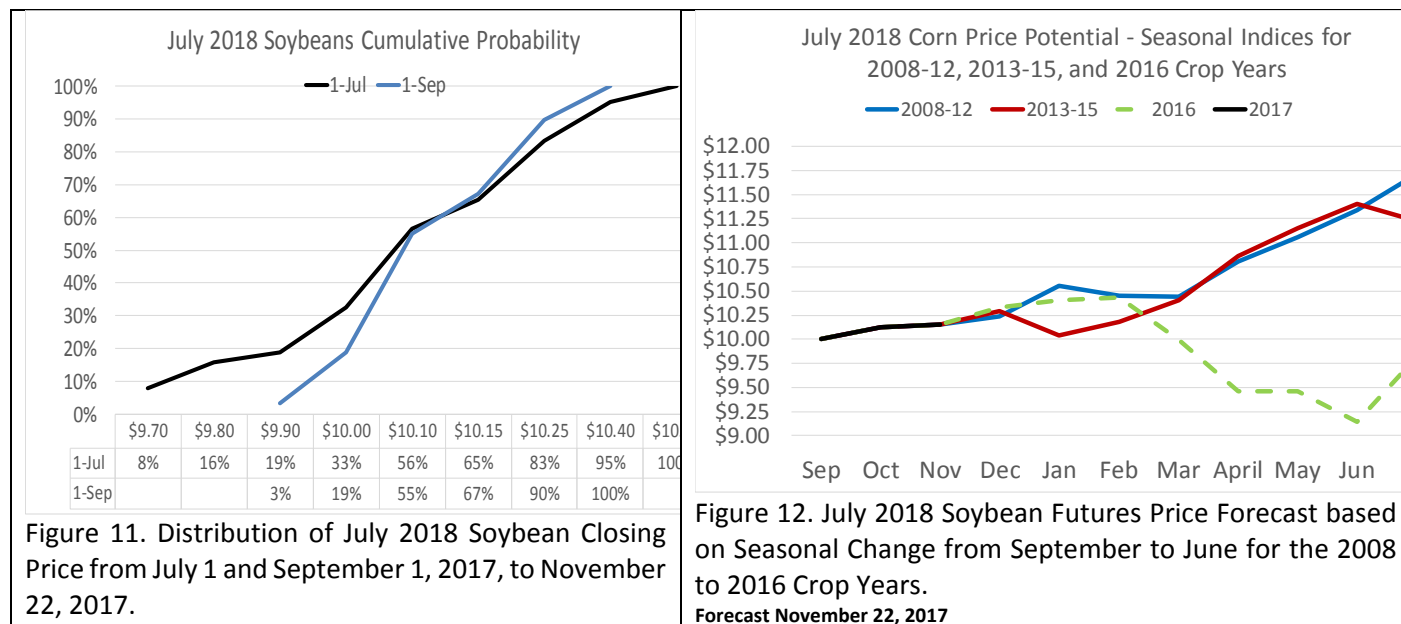


Table 14 provides a comparison of expected profitability if the stored soybean game plan is achieved. While the plan is to price stored soybeans at an aggregate price of \$10.80 per bushel, the revenue is not sufficient to entirely cover expected family living costs. An additional \$0.32/bushel on 39.5 bushels/acre stored is needed to cover family living expense fully (Table 14). If all stored soybeans are priced with a hedge-to-arrive contract at a current price of \$10.20 per bushel for May delivery, then the deficit over family living expense would increase to -\$38/acre (Table 14).

Managers should not feel rushed to price stored soybeans but should remain cognizant of price potential in the New Year to mitigate price risk if prices erode like last year.


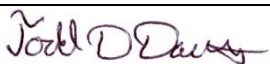

Table 14. Risk Management Game Plan and Projected Profitability for Stored 2017 Soybeans.

Projected Returns from Stored Soybeans Grain Risk Plan -- November Update				Projected Returns from Stored Soybeans Grain Risk Plan -- November Update			
	Bushels	\$/bushel	\$/Acre		Bushels	\$/bushel	\$/Acre
Pre-Harvest Risk Plan	16.5	9.85	\$163	Pre-Harvest Risk Plan	16.5	9.85	\$163
Stored Risk Plan	39.5	\$10.83	<u>\$428</u>	HTA All Stored Now	39.5	\$10.20	<u>\$403</u>
Total Revenue			\$590	Total Revenue			\$565
Return over Total Economic Costs			\$55	Return over Total Economic Costs			\$30
Return over Storage Costs			\$35	Return over Storage Costs			\$10
Return over Family Living		-\$0.32	-\$13	Return over Family Living		-\$0.95	-\$38

The post-harvest game plan is a work in progress with updates throughout the winter and spring. Regardless, managers should monitor the futures market and basis for opportunities. Given the significant corn inventories and building soybean stocks, the opportunity to price from storage may be fleeting with the marketing window closing in February and March when Southern Hemisphere harvest begins.

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

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