Crops Marketing and Management Update

Grains and Forage Center of Excellence

Dr. Todd D. Davis

Assistant Extension Professor – Department of Agricultural Economics

Vol. 2017 (4) **April 18, 2017**

Topics in this Month's Update:

Topic 1. April 11th *WASDE* Update: Big South American Crops Get Bigger

The April *WASDE* is the last report that focuses solely on the 2016 crops as USDA provides initial 2017 marketing-year estimates in the May report. Since North American corn and soybean plantings are just starting, the April report's update on South American corn and soybean production was a market driver. USDA confirmed that Argentina and Brazil are expected to increase corn production over 2016 by 36.5 Million Metric Tons (MMT), which is about 1.436 billion bushels of corn. Argentina and Brazil's soybean crop is projected to be 13.7 MMT (500 million bushels) larger than the 2016 crop.

Table 1. U.S. Corn Supply and Use

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	Change from 15-16
Planted Area (million)	95.4	90.6	88.0	94.0	+6.0
Harvested Area (million)	87.5	83.1	80.8	86.7	+5.9
Yield (bushels/acre)	158.1	171	168.4	174.6	+6.2
	---------- Million Bushels ----------				
Beginning Stocks	821	1,232	1,731	1,737	+6
Production	13,829	14,216	13,602	15,148	+1,546
Imports	36	32	67	55	-12
Total Supply	14,686	15,479	15,401	16,940	+1,539
Feed and Residual	5,040	5,323	5,131	5,500	+369
Food, Seed & Industrial	6,493	6,560	6,635	6,895	+260
Ethanol and by-products	5,124	5,200	5,206	5,450	+244
Exports	1,920	1,864	1,898	2,225	+327
Total Use	13,454	13,748	13,664	14,620	+956
Ending Stocks	1,232	1,731	1,737	2,320	+583
Stocks/Use	9.2%	12.6%	12.7%	15.9%	+3.2%
Days of Stocks	33	46	46	58	+12
U.S. Marketing-Year Average Price ($/bu)	$4.46	$3.70	$3.61	$3.40	-$0.21

Source:April 2017 WASDE - USDA: WAOB.

The April report made minor adjustments for corn use by reducing feed and residual use by 50 million bushels and increasing corn for ethanol use by the same amount. There was no adjustment to ending stocks or for the projected U.S. marketing-year average (MYA) farm price. Analysts surveyed before the report's release expected corn stocks to increase slightly based on the March 31st *Grain Stocks* report.

Global corn stocks are projected to be 11.1 MMT larger than last year. China holds about 46% of the global stocks. China is expected to have trimmed 8.46 MMT of corn from their inventory this marketing-year with a goal of further declines in future marketing-years.

Table 2. U.S. Soybean Supply and Use

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	Change from 15-16
Planted Area (million)	76.8	83.3	82.7	83.4	+0.7
Harvested Area (million)	76.3	82.6	81.7	82.7	+1.0
Yield (bushels/acre)	44	47.5	48.0	52.1	+4.1
	---------- Million Bushels ----------				
Beginning Stocks	141	92	191	197	+6
Production	3,358	3,927	3,926	4,307	+381
Imports	72	33	24	25	+1
Total Supply	3,570	4,052	4,140	4,528	+388
Crushings	1,734	1,873	1,886	1,940	+54
Exports	1,638	1,843	1,936	2,025	+89
Seed	97	96	97	104	+7
Residual	10	49	24	14	-10
Total Use	3,478	3,862	3,944	4,083	+139
Ending Stocks	92	191	197	445	+248
Stocks/Use	2.6%	4.9%	5.0%	10.9%	+5.9%
Days of Stocks	10	18	18	40	+21.5
U.S. Marketing-Year Average Price ($/bu)	$13.00	$10.10	$8.95	$9.55	+$0.60

Source:April 2017 WASDE - USDA: WAOB.

The April report made minor adjustments to projected soybean use by increasing seed use by 9 million bushels reflecting the substantial increase in 2017 planted area. The projected soybean residual was reduced by 19 million bushels, which provided a net increase in projected soybean ending stocks of 10 million bushels. Soybean ending stocks at 445 million bushels would be a 248 million bushel increase over last year. Strong prices in the first half of the marketing-year are supporting a U.S. MYA price larger than last year.

Global soybean stocks are projected to increase by 10.28 MMT from last year with the U.S. and Brazil driving the increase in stocks.

Table 3. U.S. Wheat Supply and Use

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	Change from 15-16
Planted Acres (million)	56.2	56.8	55.0	50.2	-4.8
Harvested Acres (million)	45.3	46.4	47.3	43.9	-3.4
Yield (bushels/acre)	47.1	43.7	43.6	52.6	+9.0
	---------- Million Bushels ----------				
Beginning Stocks	718	590	752	976	+224
Production	2,135	2,026	2,062	2,310	+248
Imports	173	149	113	110	-3
Total Supply	3,026	2,766	2,927	3,395	+468
Food	955	958	957	960	+3
Seed	77	79	67	61	-6
Feed and Residual	228	122	152	190	+38
Exports	1,176	854	775	1,025	+250
Total Use	2,436	2,014	1,952	2,236	+284
Ending Stocks	590	752	976	1,159	+183
Stocks/Use	24.2%	37.3%	50.0%	51.8%	+1.8%
Days of Stocks	88	136	183	189	+7
U.S. Marketing-Year Average Price ($/bu)	$6.87	$5.99	$4.89	$3.85	-$1.04

Source:April 2017 WASDE - USDA: WAOB.

The April report reduced imports by 5 million bushels but reduced feed use by 35 million bushels. The net change was a 30 million bushel increase in ending stocks. At 1.159 billion bushels, U.S. wheat stocks are at a stocks-use ratio over 51%. The U.S. MYA farm price is projected to be $1.04/bushel less than last year's price.

Global wheat stocks are projected to have increased by 10.5 MMT to 252.26 MMT for the 2016-17 marketing-year. The growth in U.S., Chinese and FSU wheat stocks offset the 5 MMT and 5.3 MMT decline in stocks in Canada and the EU, respectively. Clearly, the U.S. and the world have plenty of wheat. Low prices will attempt to stimulate demand for this abundance.

Topic 2. March 31st *Prospective Planting*: Market Buys Soybean Acres from Corn

The futures market has been signaling through the soybean-corn price ratio that the market wants U.S. farmers to plant more soybeans and less corn in 2017. Throughout the Extension farmer-meeting season, market outlook talks and projected profitability analysis showed soybeans (even 2nd-year soybeans) to be more profitable than corn in many states. Still, farmers' preference for planting corn created some uncertainty about how much acreage soybeans would gain over corn in the bidding for planted area.

The March 31 *Prospective Plantings* report, summarized in Table 4, projects 2017 corn area to decrease by 4 million acres; soybean area to increase by 6 million acres; wheat area to fall by 4.09 million acres; and cotton area to increase by 2.16 million acres from 2016. Nearly every Midwestern state is projected to reduce corn area with only Kansas projected to increase corn area over 2016. The largest projected reduction in corn area is in Iowa by 600 thousand acres. Other Western Corn Belt States of Minnesota, Missouri, and Nebraska are projected to decrease corn area by 450, 400, and 300 thousand acres from last year (Table 4). The Southern region is also projected to reduce corn area by 1.5 million acres with Texas farmers planting 450 thousand fewer acres this year. The Delta states are projected to reduce corn plantings by 160, 120, and 220 thousand acres for Arkansas, Louisiana, and Mississippi, respectively.

The Midwest is projected to plant 4.9 million more soybean acres in 2017 with Kansas increasing planted area by 950 thousand acres over last year. The core production states of Minnesota, Iowa, Nebraska, Indiana, and Illinois increased area by 700, 600, 500, 350, and 100 thousand acres, respectively (Table 4). The South is also projected to

increase soybean area by 1.1 million acres with Arkansas, Louisiana, and Mississippi increased area by 370, 170, and 210 thousand acres, respectively, over last year.

Table 4. Potential Corn, Soybean, Wheat and Cotton Acres for 2017 with Change from 2016 Acres (Thousands).

	Corn (1,000 Acres)		Soybeans (1,000 Acres)		Wheat (1,000 Acres)		Cotton (1,000 Acres)	
		Change from		Change from		Change from		Change from
	2017	2016	2017	2016	2017	2016	2017	2016
Illinois	11,300	-300	10,200	100	480	-40		
Indiana	5,600	0	6,000	350	260	-70		
Iowa	13,300	-600	10,100	600	25	0		
Kansas	5,200	100	5,000	950	7,500	-1,000	56	24
Michigan	2,300	-100	2,350	280	430	-180		
Minnesota	8,000	-450	8,250	700	1,304	-17		
Missouri	3,250	-400	5,650	50	620	-70	285	5
Nebraska	9,550	-300	5,700	500	1,110	-260		
North Dakota	3,300	-150	6,900	850	6,615	-975		
Ohio	3,550	0	5,000	150	470	-110		
South Dakota	5,400	-200	5,400	200	1,844	-426		
Wisconsin	4,000	-50	2,150	190	220	-50		
Midwest Total	74,750	-2,450	72,700	4,920	20,878	-3,198	341	29
Alabama	240	-90	450	30	160	-70	430	85
Arkansas	600	-160	3,500	370	195	0	500	120
Florida	70	-10	25	-6	20	-5	85	-17
Georgia	340	-70	250	-10	160	-20	1,300	120
Kentucky	1,320	-180	1,900	110	490	-20	0	0
Louisiana	500	-120	1,400	170	20	-5	190	50
Mississippi	530	-220	2,250	210	60	-5	550	115
North Carolina	950	-50	1,750	60	460	40	340	60
Oklahoma	330	-70	550	65	4,500	-500	470	165
South Carolina	340	-35	420	0	90	30	230	40
Tennessee	840	-40	1,750	90	390	-10	300	45
Texas	2,450	-450	180	15	4,800	-200	6,917	1,250
Virginia	480	-10	620	10	190	-20	80	7
South Total	8,990	-1,505	15,045	1,114	11,535	-785	11,392	2,040
West Total	2,814	-57			12,820	-166	500	90
East Total	3,442	4	1,737	15	826	54		
United States	89,996	-4,008	89,482	6,049	46,059	-4,095	12,233	2,159

Source: 2017 Prospective Plantings report. March 31, 2017.

Wheat farmers continue to reduce planted area with the Midwest states projected to reduce wheat acres by 3.19 million and Southern states by 785 thousand acres from 2016. Kansas, North Dakota, and Oklahoma are projected to plant 1 million, 975 thousand, and 500 thousand fewer acres, respectively, than last year.

Cotton acre is projected to increase by 2.15 million acres from 2016 with Texas projected to increase area by 1.25 million acres. Georgia, Arkansas, Louisiana, and Mississippi are projected to increase cotton by 120, 120, 50, and 115 thousand acres over last year.

At this point, a bumper soybean crop could be perilous for the soybean market. In contrast, a trend yield for corn could allow stocks to start to decline and potentially higher prices. As always, Mother Nature will determine final planted area and the supply fundamentals.

Topic 3. Corn and Soybean Storage Risk Management Alternatives for May Delivery

Let us look at the alternatives available to manage price risk if storing corn and soybeans to May 2017. Table 5 illustrates the effectiveness of a cash forward contract (CFC), hedging with futures, or purchasing a put option to create a price floor in protecting positive returns over 2016 input costs, cash rent, and storage from harvest to May 2017. Table 5 provides a range of harvested 2016 corn yields reflecting the challenges of profitably pricing stored corn if there

was a production loss. Notice how the per bushel cost of inputs, land rent, and storage from October 2016 to May 17 is $0.47/bushel lower for the farm harvesting 170-bushel corn as compared to the farm harvesting 150-bushel corn. As always, managers are strongly encouraged to use their firm's cost and production information in making this, and all other, marketing risk management decision (Table 5).

Table 5 is an elaborate way to illustrate that the corn market is not providing opportunities to use price risk tools to lock in a profitable return to 2016 input costs, land rent, and storage for most cost structures.

Table 5. Western Kentucky Risk Management Opportunities for Corn Storage until May 2017 for Various Cost Structures.

Storage Hedge: May 2017	Corn			
Yield	130	150	170	190
TVC+Rent ($/acre)	$599	$599	$599	$599
TVC+Rent+$0.26 storage ($/bu)	$4.87	$4.25	$3.78	$3.41
CFC @ $3.71	-$1.15	-$0.54	-$0.07	+$0.30
Hedge @ $3.78 +$0.06 basis = $3.84	-$1.03	-$0.41	+$0.06	+$0.43
Put: $3.80 strike @$0.123 = $3.73 floor	-$1.13	-$0.52	-$0.05	+$0.32
Strategies Evaluated on:	April 13, 2017			

The potential of being profitable is for the farm harvesting 190-bushel corn as the firm's per bushel costs are low enough to lock in a return of $0.43/bushel through hedging with futures or hedge to arrive (HTA) contracts. Otherwise, the risk products are not able to protect a profitable return at lower yields and higher costs (Table 5).

Table 6 is also an elegant way to illustrate that the soybean market continues to provide risk management opportunities for stored 2016 soybeans. The potential to lock in profits above inputs, land, and storage is available for those farms with 2016 soybean yields at 50 bushels/acre or greater. The largest returns are with hedging or a hedge-to-arrive (HTA) contract with slightly lower returns by using CFC to lock in a cash price. For those managers wanting to maintain the flexibility of benefiting from higher prices from now until May, the put option may be able to establish a price floor at profitable levels.

Table 6. Western Kentucky Risk Management Opportunities for Soybean Storage until May 2017 for Various Cost Structures.

Storage Hedge: May 2017	Soybeans			
Yield	30	40	50	60
TVC+Rent ($/acre)	$441	$441	$441	$441
TVC+Rent+$0.45 storage ($/bu)	$15.15	$11.48	$9.27	$7.80
CFC @ $9.39	-$5.76	-$2.08	+$0.12	+$1.59
Hedge @ $9.66 + $0.02 basis = $9.68	-$5.47	-$1.79	+$0.41	+$1.88
Put: $9.70 strike @$0.292 = $9.43 floor	-$5.72	-$2.05	+$0.16	+$1.63
Strategies Evaluated on:	April 13, 2017			

If the July 2017 soybean contract rallies from now until May, there is a potential to obtain even higher prices above the floor established by the put option. In this example, the put creates a floor at $9.43/bushel, which could lock in a return of $0.16/bushel for a 50-bushel yield to about $1.63/bushel for a 60-bushel yield (Table 6).

Topic 4. Projected Returns to On-Farm and Off-Farm Storage for Corn and Soybeans

Tables 7 to 10 show the projected returns over storage, shrink and opportunity costs for both on-farm and off-farm storage for corn and soybeans. These tables may help guide the timing of marketing grain in storage. The historical basis for locations in Western Kentucky from 2001 to 2015 is used with current futures market quotes to develop price expectations for each month from November 2016 to July 2016. The Kentucky Farm Bureau Federation provides this updated basis information. The mechanics of how these returns are calculated can be found in the November 2016 newsletter posted online at the Agricultural Economics website (the URL is listed in Topic 9).

Table 7 provides the projected returns to on-farm storage for corn. Remember that the returns in Table 7 for the cash-forward-contract price (CFC) have the most certainty as the CFC guarantees a selling price with certainty by a contract. The rest of the returns in Table 7 are subject to futures market and basis volatility.

On April 13, the CFC bids show the returns in April to be greater than returns in May through July (Table 7). Typical basis appreciation suggests the potential for even late spring; however, CFC bids do not suggest that level of basis appreciation at this time. Managers need to have low-cost storage and managerial skills to keep grain in quality

condition in warm and humid weather. The risk of bids declining in late spring and early summer remains as South America reenters the export market. This export competition will pressure old crop corn prices, as there is potential for an increase in 2016-17 ending stocks from the current projections if old-crop exports decline.

Table 7. Projected Returns to On-Farm Storage for Corn from October 2016 to July 2017 [1/]

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Expected Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.266	+$0.340	+$0.353	+$0.443
Median Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.241	+$0.290	+$0.326	+$0.345
CFC (DTN)	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.227	+$0.210	+$0.210	+$0.158
10th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.175	+$0.188	+$0.204	+$0.165
25th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.212	+$0.266	+$0.268	+$0.224
75th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.316	+$0.397	+$0.402	+$0.511
90th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.187	+$0.398	+$0.589	+$0.583	+$0.761

1/ Cash market data for Western Kentucky locations are used to calculate daily basis for the nearby futures contract from 2001 to 2015. The monthly average basis are used with current futures prices to forecast cash market prices for November 2016 to July 2017. The expected basis is the average each month for the 15 years. The median basis is the 50th percentile or the middle of the distribution of the monthly average basis. CFC (DTN) is cash-forward-contract prices as reported on DTN for Western Kentucky locations. The 10th, 25th, 75th and 90th percentiles are the basis level where 10%, 25%, 75% and 90% of the basis are at or below those levels, respectively. The 10th percentile basis represents a very wide basis while the 90th percentile represents a very narrow basis level. The only forecast which is certain is the CFC (DTN) as those are contracted prices. The rest are subject to market risk and basis volatility.

Returns to Storage Evaluated on: April 13, 2017

The returns to storage include the opportunity cost of not selling corn at harvest. This example assumes a 5% annual interest rate opportunity cost. Farms highly leveraged with higher interest rates also have larger opportunity costs.

Table 8 presents the projected returns to off-farm corn storage, which shows the challenge of the larger storage fees budgeted in this example. This analysis assumes a flat storage fee from harvest until January 31 with a $0.04/bushel monthly charge starting in February. The CFC bids suggest the return to off-farm storage is not projected to improve significantly over the next three months.

Table 8. Projected Returns to Off-Farm Storage for Corn from October 2016 to July 2017 [1/]

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Expected Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	-$0.028	+$0.050	+$0.066	+$0.159
Median Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	-$0.053	+$0.000	+$0.039	+$0.061
CFC (DTN)	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	-$0.067	-$0.080	-$0.077	-$0.125
10th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	-$0.118	-$0.102	-$0.083	-$0.119
25th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	-$0.082	-$0.025	-$0.019	-$0.060
75th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	+$0.022	+$0.107	+$0.114	+$0.227
90th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.110	+$0.105	+$0.299	+$0.295	+$0.477

1/ Cash market data for Western Kentucky locations are used to calculate daily basis for the nearby futures contract from 2001 to 2015. The monthly average basis are used with current futures prices to forecast cash market prices for November 2016 to July 2017. The expected basis is the average each month for the 15 years. The median basis is the 50th percentile or the middle of the distribution of the monthly average basis. CFC (DTN) is cash-forward-contract prices as reported on DTN for Western Kentucky locations. The 10th, 25th, 75th and 90th percentiles are the basis level where 10%, 25%, 75% and 90% of the basis are at or below those levels, respectively. The 10th percentile basis represents a very wide basis while the 90th percentile represents a very narrow basis level. The only forecast which is certain is the CFC (DTN) as those are contracted prices. The rest are subject to market risk and basis volatility.

Those waiting for the average basis appreciation into May and June should examine how risk management may protect profitable returns to storage. Serious analysis of your local basis is important to gauge if the basis is likely to appreciate to profitable levels by late Spring.

Table 9 provides the projected returns to on-farm storage for soybeans. The large South American soybean crop coupled with the large projected increase in 2017 soybean area has caused soybean futures prices to erode significantly since March 1. The May 17 contract has declined $0.43/bushel since March 14 and $1.16 since February 15. Similarly, the July 17 soybean futures contract has fallen by about the same amounts since February 15.

Table 9. Projected Returns to On-Farm Storage for Soybeans from October 2016 to July 2017 [1/]

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Expected Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.561	-$0.439	-$0.491	-$0.063
Median Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.551	-$0.451	-$0.459	-$0.260
CFC (DTN)	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.782	-$0.725	-$0.730	-$0.927
10th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.767	-$0.759	-$0.806	-$0.838
25th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.627	-$0.531	-$0.552	-$0.592
75th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.493	-$0.304	-$0.361	+$0.490
90th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.302	-$0.403	-$0.249	-$0.306	+$0.940

[1/] Cash market data for Western Kentucky locations are used to calculate daily basis for the nearby futures contract from 2001 to 2015. The monthly average basis are used with current futures prices to forecast cash market prices for November 2016 to July 2017. The expected basis is the average each month for the 15 years. The median basis is the 50th percentile or the middle of the distribution of the monthly average basis. CFC (DTN) is cash-forward-contract prices as reported on DTN for Western Kentucky locations. The 10th, 25th, 75th and 90th percentiles are the basis level where 10%, 25%, 75% and 90% of the basis are at or below those levels, respectively. The 10th percentile basis represents a very wide basis while the 90th percentile represents a very narrow basis level. The only forecast which is certain is the CFC (DTN) as those are contracted prices. The rest are subject to market risk and basis volatility.

Returns to Storage Evaluated on: April 13, 2017

The CFC bids do not suggest a return to profitable prices even with basis appreciation at average levels. Only an extremely strong basis would provide the potential for positive returns to storage if held until July.

The returns for soybeans stored off-farm are more pessimistic than on-farm storage because of the increase in storage costs. The market is currently not signaling any reward for storing soybeans with CFC bids providing a negative return to storage of $0.95/bushel in May to a loss of $1.15/bushel if held to July (Table 10).

Table 10. Projected Returns to Off-Farm Storage for Soybeans from October 2016 to July 2017[1/]

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Expected Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.786	-$0.664	-$0.715	-$0.287
Median Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.776	-$0.675	-$0.683	-$0.484
CFC (DTN)	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$1.006	-$0.949	-$0.954	-$1.151
10th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.991	-$0.983	-$1.030	-$1.062
25th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.852	-$0.755	-$0.776	-$0.816
75th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.717	-$0.528	-$0.585	+$0.266
90th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.526	-$0.627	-$0.473	-$0.530	+$0.716

[1/] Cash market data for Western Kentucky locations are used to calculate daily basis for the nearby futures contract from 2001 to 2015. The monthly average basis are used with current futures prices to forecast cash market prices for November 2016 to July 2017. The expected basis is the average each month for the 15 years. The median basis is the 50th percentile or the middle of the distribution of the monthly average basis. CFC (DTN) is cash-forward-contract prices as reported on DTN for Western Kentucky locations. The 10th, 25th, 75th and 90th percentiles are the basis level where 10%, 25%, 75% and 90% of the basis are at or below those levels, respectively. The 10th percentile basis represents a very wide basis while the 90th percentile represents a very narrow basis level. The only forecast which is certain is the CFC (DTN) as those are contracted prices. The rest are subject to market risk and basis volatility.

Returns to Storage Evaluated on: April 13, 2017

Topic 5. 2017 Corn, Soybean and Wheat Risk Management Opportunities

A topic repeatedly discussed in these newsletters is that sometimes the best pricing opportunities occur before the corn and soybean crops are planted or emerge. Tables 11-13 analyze the effectiveness of CFC, hedging with futures, or put options in protecting revenue that covers total input costs plus cash rent for corn, soybeans, and wheat.

Table 11 presents risk management alternatives for Western Kentucky corn production for 2017. Several yield projections are provided to show what yield is needed to find profitable pricing opportunities. Three risk management alternatives are compared. A cash-forward-contract at $3.75/bushel is based on DTN bids for Western Kentucky locations. The second marketing alternative is to hedge with commodity futures, or HTA contracts, that would lock in an expected cash price at $3.85/bushel assuming a -$0.10/bushel harvest-time basis. The third alternative is to establish a price floor at $3.63/bushel by buying a put option with a $4 strike price that costs $0.267.

Table 11 reminds managers that the corn market continues to lack risk management opportunities for the 2017 crop unless the farm routinely harvests corn yields of 180 bushels, as hedging with futures may lock in a positive return over input costs and rent of $0.30/bushel.

Table 11. Risk Management Alternatives for 2017 Western Kentucky Corn for Various Yield Objectives.

Yield	140	150	160	170	180	190
TVC+Rent ($/acre)	$639	$639	$639	$639	$639	$639
TVC+Rent ($/bu)	$4.56	$4.26	$3.99	$3.76	$3.55	$3.36
CFC @ $3.75	-$0.81	-$0.51	-$0.24	-$0.01	+$0.20	+$0.39
Hedge @ $3.95 + -$0.10 basis = $3.85	-$0.72	-$0.42	-$0.15	+$0.09	+$0.30	+$0.48
Put: $4 strike @$0.267 = $3.63 floor	-$0.93	-$0.63	-$0.36	-$0.13	+$0.08	+$0.27

Strategies Evaluated on: April 13, 2017

Those farms that routinely produce 180-bushel corn may be able to lock-in a profit above input costs and cash rent. Farms with lower expected yields do not have profitable risk management opportunities at current prices (Table 11).

Table 12. Risk Management Alternatives for 2017 Western Kentucky Soybeans for Various Yield Objectives.

Yield	25	35	45	55	65
TVC+Rent ($/acre)	$486	$486	$486	$486	$486
TVC+Rent ($/bu)	$19.44	$13.89	$10.80	$8.84	$7.48
CFC @ $9.29	-$10.16	-$4.60	-$1.52	+$0.45	+$1.81
Hedge @ $9.62 + -$0.10 basis = $9.52	-$9.92	-$4.37	-$1.28	+$0.68	+$2.04
Put: $9.60 strike @$0.517 = $8.98 floor	-$10.46	-$4.90	-$1.82	+$0.15	+$1.51

Strategies Evaluated on: April 13, 2017

The largest projected returns for soybeans are from using hedging with CFC providing a lower return. Those managers seeking to place a floor on price may be able to lock in a minimum return more than $0.15/bushel protected with put options with 55-bushel yields (Table 12).

Table 12 illustrates the potential of using risk management products to lock in a profitable return on input costs and cash rent for 2017 soybeans if managers routinely obtain yields greater of 55 bushels/acre or higher.

It should be no surprise that the wheat market currently is not offering profitable risk management opportunities unless the farm average yield has been 90-bushel wheat or larger (Table 13). The wheat example assumes that double-crop soybeans are also produced, so the pricing target only covers all wheat input costs and 50% of land costs. Managers that routinely produce large yields may be able to use risk management to protect returns (Table 15).

Table 13. Risk Management Alternatives for 2017 Western Kentucky Wheat for Various Yield Objectives.

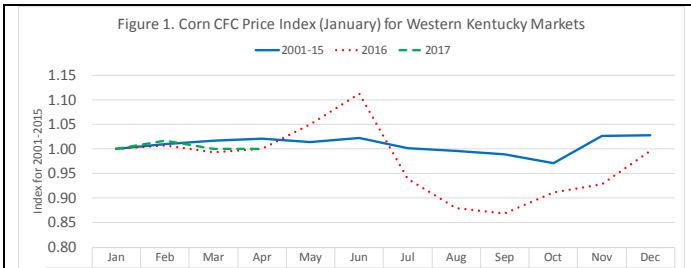
Yield	50	60	70	80	90
TVC+50% Rent ($/acre)	$371	$371	$371	$371	$371
TVC+Rent ($/bu)	$7.42	$6.18	$5.30	$4.64	$4.12
CFC @ $4.33	-$3.08	-$1.85	-$0.96	-$0.30	+$0.21
Hedge @ $4.23 - $0.10 basis = $4.13	-$3.29	-$2.06	-$1.17	-$0.51	+$0.01
Put: $4.45 strike @$0.177 = $4.17 floor	-$3.25	-$2.01	-$1.13	-$0.46	+$0.05
Strategies Evaluated on:	April 13, 2017				

Those managers that routinely yield 90-bushel wheat may be able to lock in a profitable return through CFC. Those with lower wheat yields will rely on the double-crop soybeans to provide the potential for this enterprise to be profitable (Table 13). This reinforces the need to protect soybean price risk to improve the wheat / double-crop soybean enterprise.

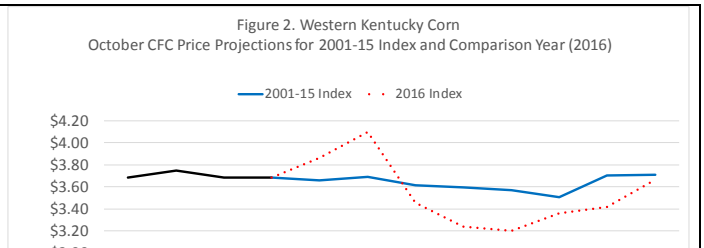
Topic 6. Using CFC Price Indices to Forecast Harvest Corn and Soybean Prices

The seasonality associated with the harvest CFC contracts for corn and soybeans was discussed in the January 2017 newsletter to illustrate how CFC bids for harvest delivery tend to increase throughout spring with swift depreciation in bids from late summer into harvest. The same data are presented below but cast in a different light. Figure 1 shows the average CFC monthly bids for corn for Western Kentucky markets relative to the bid in January. The blue line is the average CFC corn bid from 2001-2015 while the red line is the monthly corn bids in 2016. On average, CFC bids decline 5% from April to October. Every year is a little different. The 2016 index shows how last year's production problem in South America provided pricing opportunities into June with a swift decline into harvest. The green line in Figure 1 is the monthly average bids for 2017. The 2017 bids are closely following those for 2016. What does this imply for harvest time prices?

Figure 2 uses the historical CFC index to project potential monthly CFC prices for Western Kentucky corn. The black line in Figure 2 represents the monthly average prices to date. The blue line represents the price forecast using the average prices from 2001-2015. The historical average price change suggests the potential for pricing in June at similar levels currently being offered. What is important is to note the price erosion into harvest with the possibility for harvest-time prices to be $0.18/bushel below current prices (Figure 2).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001-15	1.00	1.01	1.02	1.02	1.01	1.02	1.00	1.00	0.99	0.97	1.03	1.03
2016	1.00	1.01	0.99	1.00	1.05	1.11	0.94	0.88	0.87	0.91	0.93	1.00
2017	1.00	1.02	1.00	1.00								



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017 Realized	$3.69	$3.75	$3.68	$3.68								
2001-15 Index				$3.68	$3.66	$3.69	$3.62	$3.59	$3.57	$3.50	$3.71	$3.71
2016 Index				$3.68	$3.87	$4.10	$3.46	$3.24	$3.20	$3.36	$3.42	$3.67

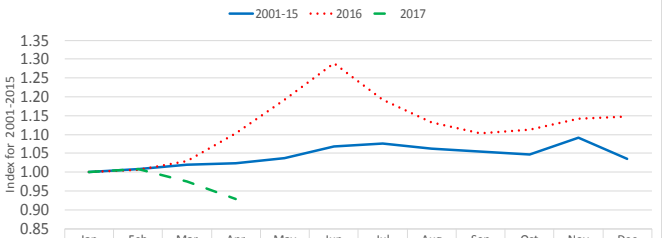
Will 2017 CFC bids continue to follow the pattern established in 2016? That would require a tremendous change in the market fundamentals. With planted corn area down a projected 4 million acres, a weather event that would provide a below-trend yield might create that type of price moment similar to 2016. Figure 2 also illustrates how quickly prices can erode as the 2016 price decline by 20% from June to October. Managers should use a marketing plan to guide pricing at profitable levels with some of the emotion removed from the decision process.

A similar analysis is provided for soybeans in Figure 3 and Figure 4. The CFC soybean bid for Western Kentucky tends to increase by about 7.6% from January to July and decline into harvest. Five years (2002, 2003, 2007, 2010, and 2012) experienced harvest-time prices that were higher than the January price, which causes the 2001-15 average in

October to be 4.6% greater than the January average. This is not a typical price pattern. If those five years were excluded, the average price in October would be 8% lower than the January price.

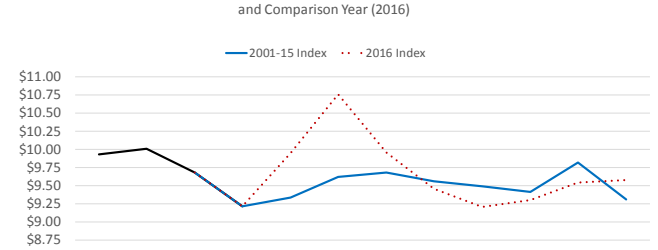
The other interesting lesson from Figure 3 is that the 2017 monthly CFC bids have eroded by 8% from February to April. This price decline is illustrated in Figure 4, as the black line is the realized 2017 CFC soybean bids, which have declined from $10.01 in February to $9.21 in April. If soybean bids follow the average price pattern, managers might be able to forward contract soybeans in June at $9.60/bushel. However, soybean prices are projected to decline into harvest. The red line in Figure 4 illustrates the price pattern if the soybean market can recreate the price appreciation experienced in 2016. The fundamentals are not likely to experience another 2016. However, managers should remind themselves how quickly prices can erode which was 18% from June to September 2016 (Figure 4).

Figure 3. Soybean CFC Price Index (January) for Western Kentucky Markets



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001-15	1.000	1.008	1.020	1.024	1.037	1.069	1.076	1.062	1.054	1.046	1.091	1.035
2016	1.000	1.006	1.030	1.104	1.192	1.288	1.193	1.133	1.103	1.113	1.143	1.147
2017	1.000	1.008	0.975	0.928								

Figure 4. Western Kentucky Soybean October CFC Price Projections for 2001-15 Index and Comparison Year (2016)



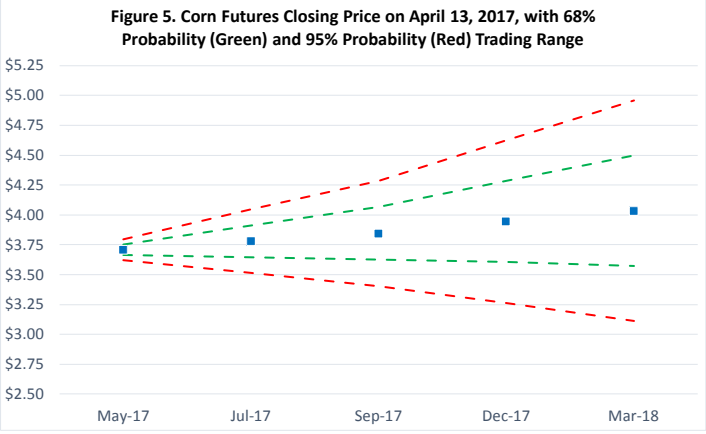
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017 Actual	$9.93	$10.01	$9.68	$9.21								
2001-15 Index			$9.68	$9.21	$9.33	$9.61	$9.68	$9.56	$9.49	$9.42	$9.82	$9.31
2016 Index			$9.68	$9.21	$9.95	$10.75	$9.96	$9.45	$9.20	$9.30	$9.54	$9.58

Of course, there is no guarantee that CFC bids will recover to $3.69 for corn or $9.68 for soybeans. This analysis is to help managers fine-tune their marketing plans heading into spring and early summer.

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

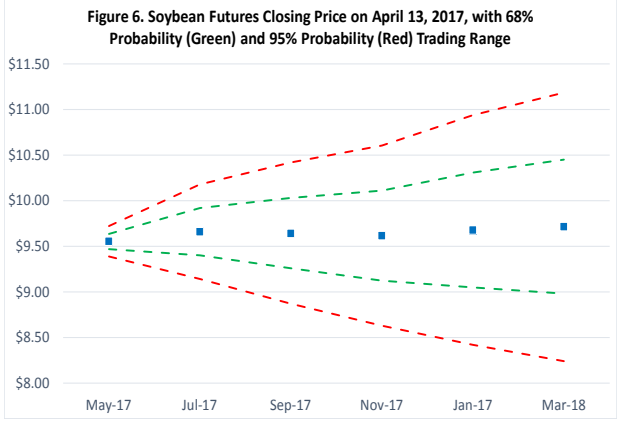
Understanding the probabilistic trading ranges based on current futures market volatility will help managers gauge the likelihood of reaching their pricing objectives. Figures 5 – 7 provide the projected futures price trading range, by futures contract month, based on the contracts' actual volatility 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 projected trading range. Notice how these projections fan out for the contracts that will expire later this year or early 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. Corn Futures Closing Price on April 13, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



Trading range calculated on April 13, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on April 13, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 6. Soybean Futures Closing Price on April 13, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



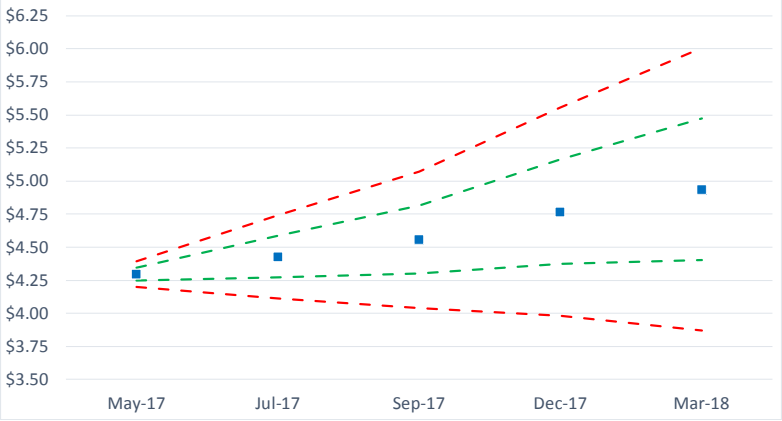
Trading range calculated on April 13, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on April 13, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 5 provides the probabilistic trading range for the corn futures contracts from May 2017 to December 2018. There is a 68% probability that the December 2017 corn contract will trade between $3.60 and $4.29 and a 95%

probability that the December 2017 corn contract will trade between $3.26 and $4.63 (Figure 5). Looking at the potential to hedge stored corn from the 2017 harvest, the 68% trading range for the March 2018 corn contract is $3.57 to $4.50 (Figure 5).

Figure 6 provides the probabilistic trading range for soybean futures contracts from May 2017 to March 2018. The November 2017 soybean futures have a 68% probability of trading between $9.12 to $10.11 with a 95% likelihood of trading between $8.63 and $10.60 (Figure 6). For hedging stored 2017 soybeans, the March 2018 soybean contract has a 68% probability trading range of $8.98 to $10.45 (Figure 6).

Figure 7. Wheat Futures Closing Price on April 13, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



Trading range calculated on April 13, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on April 13, 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 May 2017 to March 2018 contracts. The July 2017 futures contract has a 68% probability of trading between $4.30 to $4.82 (Figure 7). The 95% probability trading range is $4.04 to $5.07 (Figure 7).

Topic 8. Preliminary Risk Management Game Plans for 2017 Corn and Soybeans

The January 2017 newsletter provided an initial risk management game plan for 2017 corn and soybeans and provides detail about this example of developing a pre-harvest risk management plan that combines Revenue Protection insurance to protect the pre-harvest sales from production risk. This month will provide an update on the progress in implementing the risk plans with revisions to the soybean plan in response to the price erosion since February.

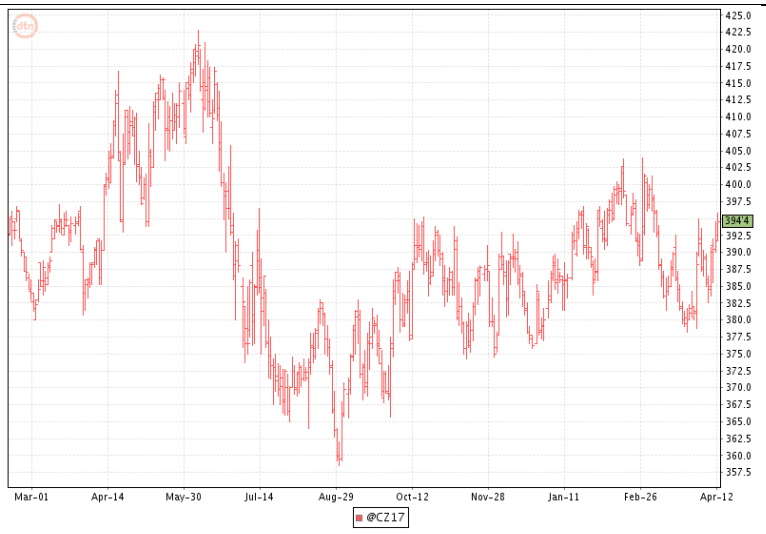


Figure 8. December 2017 Corn Futures Contract Chart (as of April 13, 2017)

The December 2017 corn futures contract reached $4.02 ¾ on February 15, and then steadily declined to $3.80 on March 27. While volatile, the December 2017 contract has recovered about $0.15/bushel and closed at $3.94 ½ on April 13.

Resistance is at $3.95 and again at $4.00-$4.02. Support would be at the $3.80 level if the corn market were to move lower. The next support before the basement would be in the $3.75 neighborhood. If the DEC contract could break through the $4.02 resistance levels, the psychology of a more bullish market may provide opportunities to implement the risk management plan at the higher target objectives.

What might push corn higher? A weather event in the Midwest may provide this opportunity. If corn area is reduced by 4 million acres, the market will become more sensitive to weather events. Currently, domestic stocks are more than adequate. However, a yield that is below-trend would allow stocks to decline and build potential for higher prices.

Table 14 defines the pricing objectives, bushels priced, and date priced as part of the pre-harvest risk plan. The DEC 2017 contract closed at 4.02 ¾ on Feb 15. The other pricing objectives are in anticipation of pre-planting report fundamental news that may push prices swiftly above $4.15 /bushel. A movement above $4.15 will be noteworthy as the DEC 17 corn futures has been trading below $4.05 for several months and a lurch higher may be a sign of the potential for greater movement. The revised objectives and percentage of expected production priced are $4.15 (10%), $4.40 (15%), and $4.65 (15%). This plan prices 50% of expected priced before harvest at an average price $4.35/bushel (Table 14). The pricing tools used are either CFC prices, or hedge-to-arrive (HTA) contracts net of fees.

Table 14. 2017 Corn Risk Management Game Plan as of April 13, 2017.

Expected Corn Production (bushels/acre)		175
Date Priced	Priced Realized	Bushels Priced
2/15/17	$4.02	17.5
Revised Objective	$4.15	17.5
Revised Objective	$4.40	26.25
Revised Objective	$4.65	26.25
Bushels Priced		87.5
Average Price	$4.35	

Note: RP Insurance at the 80% coverage level will be purchased. This assumes an APH yield of 175 bu/acre and a Projected Price of $3.96/bu. The expected revenue protection is $554/acre which is $77/acre greater than the budgeted corn production cost. The RP insurance protection will protect 140 bushels/acre to be forward contracted or contracted with Hedge-to-Arrive contracts (HTA). This is a conservative strategy on the quantity priced. There is some hope involved that the corn market can break higher to these prices.

The first objective was met on February 15 as the DEC contract closed above the $4 target (green shade). Given the current futures market fundamentals, the $4.40 and $4.65 opportunities may be priced only due to a weather event or a surprise from USDA in 2017 projections. Managers should have a plan in place to capture these opportunities after reflecting on what fundamentals caused the corn market to breakout to such higher trading levels (Table 14).

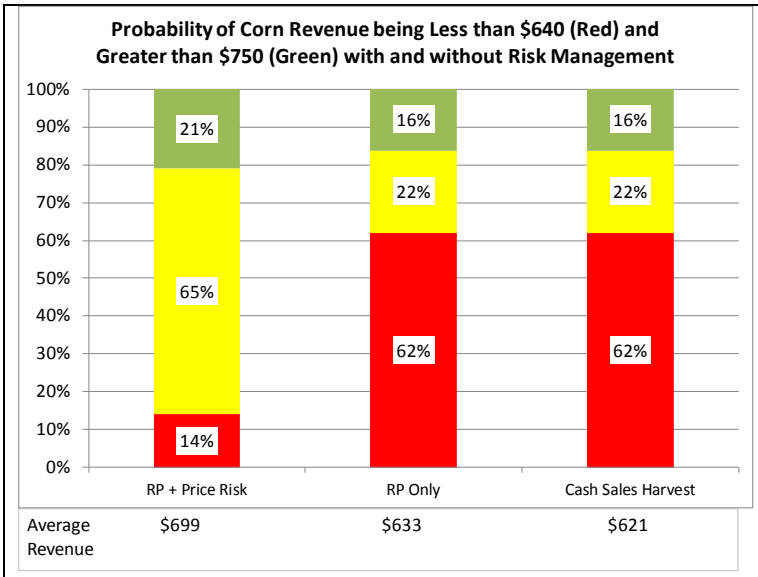


Figure 9. The Probability of 2017 Corn Revenue being Below or Above Critical Revenue Levels with and without risk management tools.

If the complete risk management plan is implemented, the combination of price risk tools and RP insurance could reduce the revenue risk from a 62% probability of revenue being below $640/acre (projected variable costs plus cash rent) to a 14% likelihood of not covering inputs and cash rent. If the full risk plan is implemented, there is a 21% projected probability of revenue being above $750/acre. This critical value includes overhead costs and a projected allocation to family living expense. The price risk management complements the revenue protection provided by insurance by increasing the projected mean revenue by $66/acre over the RP insurance only strategy. The cash sale at harvest without risk management has a lower average return than purchasing RP insurance or combining insurance with price risk management.

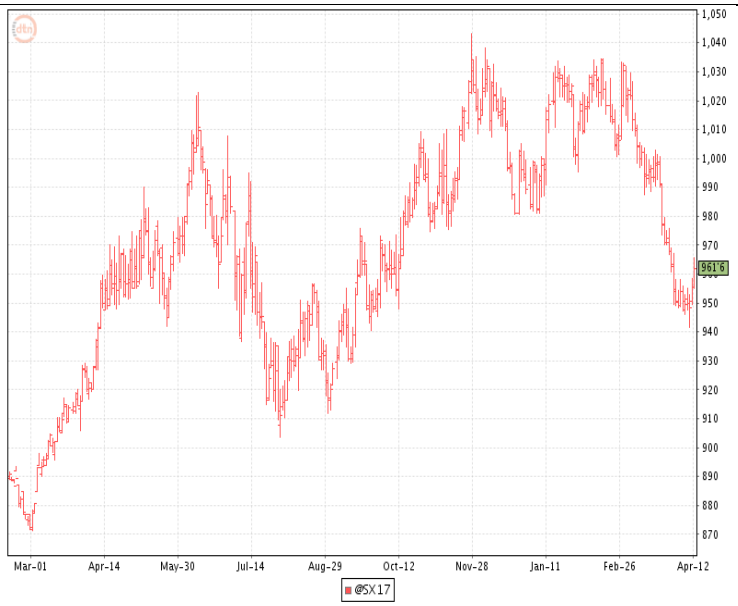


Figure 10. November 2017 Soybean Futures Contract Chart (as of April 13, 2017)

Previous newsletters emphasized the concern that a large South American soybean crop combined with a significant increase in intended soybean acres would prove unbearable to the November 2017 soybean contract. Figure 10 illustrates how the November 2017 futures contract has fallen $0.72 ½ / bushel from February 15 to April 13.

Support appears to be at the $9.50 level and again at $9.40 and $9.30. The last support before the basement is $9.10/bushel.

The chart is full of resistance levels, which will challenge upside potential. One could suggest several resistance levels in $0.10/bushel increments from $9.70/bushel and higher.

The 2017 soybean game plan has been revised in response to the swift decline in the November 2017 futures contract and the headwinds established by the significant potential increase in 2017 planted area (Table 15).

Table 15. 2017 Soybean Risk Management Game Plan as of April 13, 2017.

Expected Soybean Production (bushels/acre)		55
Date Priced	Priced Realized	Bushels Priced
2/1/17	$10.12	5.5
2/8/17	$10.28	5.5
Revised Objective	$10.10	11.0
Revised Objective	$10.40	16.5
Bushels Priced		38.5
Average Price	$10.26	

Note: RP Insurance at the 75% coverage level will be purchased. This assumes an APH yield of 55 bu/acre and a Projected Price of $10.19/bu. The expected revenue protection is $420/acre which is $103/acre greater than the budgeted soybean production cost. The RP insurance protection will protect 41.25 bushels/acre to be forward contracted or contracted with Hedge-to-Arrive contracts (HTA). This is an aggressive strategy reflecting a belief that the soybean market faces limited upside potential unless there is a strong change in fundamentals.

The NOV 2017 soybean futures contract closed at $10.12 on Feb 1 and $10.28 on Feb 8 (green shade). Given the erosion in the November 2017 futures contract, the remaining objectives are revised to $10.10 and $10.40. Both objectives might only be met using hedging or hedge-to-arrive contracts. If the $10.10 objective is reached, the plan will sell 20% of planned production. The plan is to sell 30% of planned production at the $10.40 price objective.

If the soybean risk plan is achieved, the average pre-harvest price will be $10.26 for 70% of expected production. Current market fundamentals will not support reaching these prices unless the fundamental outlook changes to that of having a 2017 production concern.

If the complete risk management plan is implemented, the combination of price risk tools and RP insurance could reduce the revenue risk from a 34% probability of income being below $486/acre (projected variable costs plus cash rent) to a 5% likelihood of not covering inputs and cash rent (Figure 11). If the full risk plan is implemented, there is a 24% projected probability of revenue being above $596/acre. This critical value includes overhead costs and a projected allocation to family living expense. The price risk management complements the income protection provided by insurance by increasing the projected mean revenue by $14/acre over the RP insurance only strategy. The cash sale at harvest without risk management has a lower average return than purchasing RP insurance or combining insurance with price risk management.

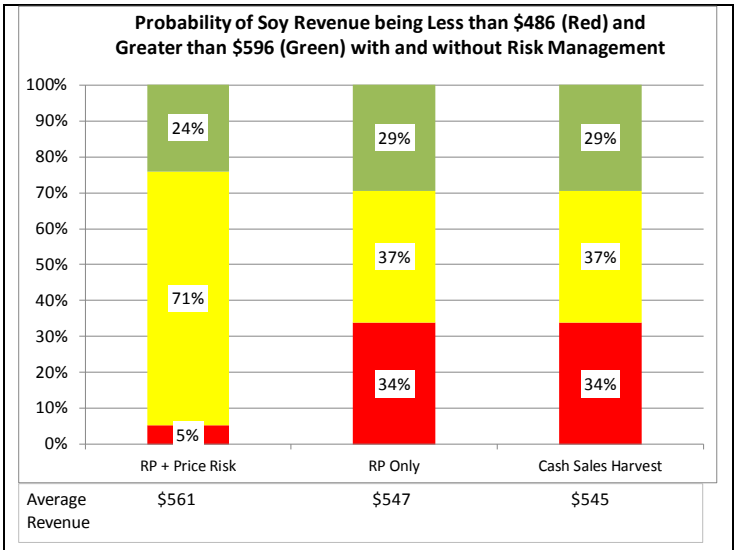


Figure 11. The Probability of 2017 Soybean Revenue being Below or Above Critical Revenue Levels with and without risk management tools.

These risk management plans are provided to illustrate that marketing and crop insurance should be used together to price bushels before harvest when profitable opportunities arise. Notice that this plan is not trying to capture the highest possible price. The design of this plan is to reduce risk and to avoid a near fatal blow to the firm's revenue that creates liquidity and solvency problems.

This exercise is also to help managers start thinking about what they might do to take advantage of pricing opportunities that are available before harvest. The market will react to fundamentals, primarily weather, that could push prices temporarily higher to a profitable pricing point. Having a plan will help guide risk management without being swept up in the emotion of the market and giddiness of the potential for even higher than expected prices.

Topic 8. How Do I Get on the Email Distribution List to Receive this Newsletter?

If you would like to receive each month's newsletter by email, send an email to todd.davis@uky.edu and request to be added to the email distribution list. 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

College of Agriculture, Food and Environment
Agricultural Economics

Todd D. Davis
Assistant Extension Professor
Extension Economist
Crop Economics Marketing & Management

University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service