Crops Marketing and Management Update

Grains and Forage Center of Excellence

Dr. Todd D. Davis

Assistant Extension Professor – Department of Agricultural Economics

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Topics in this Month's Update:

Topic 1. March 9th *WASDE* Update: USDA Provides South American Surprise

March *WASDE* reports that trigger moves in the futures market usually do so through their projections of the Southern Hemisphere crops. The bearish surprise in the March report was the sharp increase in Brazil's corn and soybean crop. USDA increased Brazil's projected corn crop by 5 million metric tons (MMT) to 91.5 MMT. Similarly, the report increased the Brazilian soybean crop by 4 MMT to 108 MMT. If realized, Brazil's corn and soybean crops will increase by 24.5 and 11.5 MMT, respectively, from 2016. Similarly, USDA is projecting the Argentina corn crop up 1 MMT from the February report to 37.5 MMT. If realized, Argentina will produce 8.5 MMT more corn than last year. Even with the massive flooding in central Argentina, the March report did not adjust the projected soybean production pegged at 55.5 MMT.

While the March *WASDE* provided an update on projected domestic ending stocks, the market is already looking with anticipation for the March 31 *Prospective Plantings* report for the first projections of 2017 planted corn and soybean area based on farmer surveys. Previous acreage projections are based on economic models.

The March report made minor changes to the corn demand projections (Table 1). Feed and residual use was decreased by 50 million bushels; however, USDA increased corn used in ethanol production by the same amount. There was no net change in projected ending stocks or the U.S. marketing-year average (MYA) farm price of $3.40/bushel (Table 1). Analysts did not expect the corn ending stocks to change in this report.

USDA surprised analysts by increasing soybean ending stocks by 15 million bushels to a projected level of 435 million bushels (Table 2). The report reduced exports by 25 million bushels but increased crushing use by 10 million bushels. Analysts expected soybean stocks to decline and USDA's stocks estimate was near the upper range of analysts' expectations. The soybean market, already under pressure of a large expected increase in 2017 planted area, viewed the slowing of demand coupled with the large South American crop as more bearish news for this market. USDA did increase the 2016-17 U.S. MYA soybean price by $0.10/bushel to $9.60/bushel (Table 2).

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	5,550	+419
Food, Seed & Industrial	6,493	6,560	6,635	6,845	+210
Ethanol and by-products	5,124	5,200	5,206	5,400	+194
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:March 2017 WASDE - USDA: WAOB.

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	95	-2
Residual	10	49	24	33	+9
Total Use	3,478	3,862	3,944	4,093	+149
Ending Stocks	92	191	197	435	+238
Stocks/Use	2.6%	4.9%	5.0%	10.6%	+5.6%
Days of Stocks	10	18	18	39	+20.6
U.S. Marketing-Year Average Price ($/bu)	$13.00	$10.10	$8.95	$9.60	+$0.65

Source:March 2017 WASDE - USDA: WAOB.

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	115	+2
Total Supply	3,026	2,766	2,927	3,400	+473
Food	955	958	957	960	+3
Seed	77	79	67	61	-6
Feed and Residual	228	122	152	225	+73
Exports	1,176	854	775	1,025	+250
Total Use	2,436	2,014	1,952	2,271	+319
Ending Stocks	590	752	976	1,129	+153
Stocks/Use	24.2%	37.3%	50.0%	49.7%	-0.3%
Days of Stocks	88	136	183	181	-1
U.S. Marketing-Year Average Price ($/bu)	$6.87	$5.99	$4.89	$3.85	-$1.04

Source:March 2017 WASDE - USDA: WAOB.

USDA made minor adjustments to the wheat balance sheet by reducing projected imports by 10 million bushels with a corresponding reduction in ending stocks. The wheat market continues to suffer from stocks that are equivalent to an 180-day supply in the bins on June 1, 2017.

Economists like to say, "The cure for low prices is low prices." The wheat market shows how Mother Nature can help or impede this process of curing low prices. Planted area has decreased by 6.6 million acres since 2014-15, but stocks have increased by 377 million bushels. Barring a weather event, this process of reducing ending stocks is tedious.

Topic 2. Updated Baseline Projections from the USDA 2017 Agricultural Outlook Forum

USDA provides updated long-term price projections as part of their February *Agricultural Outlook Symposium* held in Washington DC. The projections are based on economic models and do not reflect information gathered from farmer surveys. The market tends to focus on the latest projections on planted area in advance of the Prospective Plantings report released on March 31.

Table 4. 2017 Prelminary Baseline Projection for Corn for the 2017-18 Marketing Year.

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	2017-18 Projected	Change from 2016-17
Planted Area (million)	95.4	90.6	88	94	90.0	-4.0
Harvested Area (million)	87.5	83.1	80.8	86.7	82.4	-4.3
Yield (bushels/acre)	158.1	171	168.4	174.6	170.7	-3.9
	---------- Million Bushels ----------					
Beginning Stocks	821	1,232	1,731	1,737	2,320	+583
Production	13,829	14,216	13,602	15,148	14,065	-1,083
Imports	36	32	67	55	50	-5
Total Supply	14,686	15,480	15,400	16,940	16,435	-505
Feed and Residual	5,040	5,323	5,131	5,550	5,450	-100
Food, Seed & Industrial	6,493	6,560	6,635	6,845	6,870	+25
Ethanol and by-products	5,124	5,200	5,206	5,400	5,400	+0
Exports	1,920	1,864	1,898	2,225	1,900	-325
Total Use	13,453	13,747	13,664	14,620	14,220	-400
Ending Stocks	1,233	1,733	1,736	2,320	2,215	-105
Stocks/Use	9.2%	12.6%	12.7%	15.9%	15.6%	-0.3%
Days of Stocks	33	46	46	58	57	-1
U.S. Marketing-Year Average Price ($/bu)	$4.46	$3.70	$3.61	$3.40	$3.50	+$0.10

Source:March 2017 WASDE - USDA: WAOB., 2017 Agricultural Outlook Conference Projections

USDA projects 2017 corn planted area to decline by 4 million acres to 90 million acres. These projections are based upon comparisons of relative profitability among the row crops produced in each state. The projections also assume a return to average yields, which implies a 14.065 billion bushel crop (Table 4). The current projection is for corn production to be reduced by 1.08 billion bushels from last year's record crop. Given the projected increase in beginning stocks, the 2017 corn supply is expected to decrease by 505 million bushels.

Corn use is projected to decline by 400 million bushels from the 2016-17 projected use. Exports are expected to be 325 million bushels lower than in 2016 due to the return of South American export competition coupled with the

stronger U.S. dollar. The bottom-line is that 2017-18 ending stocks are projected to decline by 105 million bushels. The 2017-18 U.S. marketing-year average (MYA) price is expected to increase slightly to $3.50/bushel due to the continuing sufficient level of corn stocks.

The soybean futures market has been bidding aggressively since November 2016 for soybean acres. The budgeted profitability of soybeans is greater than that of competing enterprises throughout several states. Soybean planted area is projected to increase to 88 million acres which are 4.6 million more than planted in 2016 (Table 5). The projections use a 48-bushel trend yield, which implies the 2017 soybean crop would be 4.18 billion bushels. Given the larger carry-in in 2017, the projected soybean supply is projected 112 million bushels greater than in 2016. A surprising forecast is that use will increase by 112 million bushels keeping 2017 ending stocks at the same level as in 2016. The key assumption in soybean demand is that exports will increase in 2017. That may be difficult given South American export competition. Still, the consistent demand for soybeans keeps the prospect of soybean stocks at about 10% stocks-use from being burdensome on price (Table 5).

Table 5. 2017 Prelminary Baseline Projection for Soybeans for the 2017-18 Marketing Year.

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	2017-18 Projected	Change from 2016-17
Planted Area (million)	76.8	83.3	82.7	83.4	88.0	+4.6
Harvested Area (million)	76.3	82.6	81.7	82.7	87.1	+4.4
Yield (bushels/acre)	44	47.5	48	52.1	48.0	-4.1
	---------- Million Bushels ----------					
Beginning Stocks	141	92	191	197	436	+239
Production	3,358	3,927	3,926	4,307	4,180	-127
Imports	72	33	24	25	25	+0
Total Supply	3,571	4,052	4,141	4,529	4,641	+112
Crushings	1,734	1,873	1,886	1,940	1,945	+5
Exports	1,638	1,843	1,936	2,025	2,080	+55
Seed & Residual	107	145	121	128	135	+7
Total Use	3,479	3,861	3,943	4,093	4,205	+112
Ending Stocks	92	191	198	436	436	+0
Stocks/Use	2.6%	4.9%	5.0%	10.7%	10.2%	-0.5%
Days of Stocks	10	18	18	39	38	-1
U.S. Marketing-Year Average Price ($/bu)	$13.00	$10.10	$8.95	$9.60	$9.60	+$0.00

Source:March 2017 WASDE - USDA WAOB., 2017 Agricultural Outlook Conference Projections

Table 6. 2017 Prelminary Baseline Projection for Wheat for the 2017-18 Marketing Year.

	2013-14	2014-15	2015-16 Estimated	2016-17 Projected	2017-18 Projected	Change from 2016-17
Planted Acres (million)	56.2	56.8	55	50.2	46.0	-4.2
Harvested Acres (million)	45.3	46.4	47.3	43.9	39.0	-4.9
Yield (bushels/acre)	47.1	43.7	43.6	52.6	47.1	-5.5
	---------- Million Bushels ----------					
Beginning Stocks	718	590	752	976	1,130	+154
Production	2,135	2,026	2,062	2,310	1,837	-473
Imports	173	149	113	115	120	+5
Total Supply	3,026	2,765	2,927	3,401	3,087	-314
Food	955	958	957	960	965	+5
Seed	77	79	67	61	61	+0
Feed and Residual	228	122	152	225	190	-35
Exports	1,176	854	775	1,025	975	-50
Total Use	2,436	2,013	1,951	2,271	2,191	-80
Ending Stocks	590	752	976	1,130	896	-234
Stocks/Use	24.2%	37.4%	50.0%	49.8%	41.3%	-8.5%
Days of Stocks	88	136	183	182	149	-32
U.S. Marketing-Year Average Price ($/bu)	$6.87	$5.99	$4.89	$3.85	$4.30	+$0.45

Source:March 2017 WASDE - USDA WAOB., 2017 Agricultural Outlook Conference Projections

Wheat acreage is projected to continue to decline in 2017 to 46 million acres (Table 6) down 4.2 million from 2016. If realized, wheat planted area will have decreased by 10.8 million acres since the 2014-15 marketing-year. USDA assumes a trend yield of 47.1 bushels/acre, which would produce a 1.837 billion bushel crop. This smaller crop is needed to provide the potential for wheat stocks to decline.

Total wheat use is projected to be 80 million bushels less than the amount used in 2016. This decline is driven by reduced wheat exports. The reduced wheat export market share is weighing heavily on the market. The reduction in supply is projected to allow wheat stocks to drop by 225 million bushels to ending stocks of 905 million bushels. Still, the wheat market would have a 150-day supply in the bins on June 1, 2018. However, it would be a step in the right direction if realized (Table 6). Declining wheat stocks would support an increased US MYA price of $4.30/bushel (Table 6).

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 7 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 7 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 7).

Table 7 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. 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 $0.22/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 7).

Table 7. 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 @ $3.63	-$1.24	-$0.62	-$0.15	+$0.22
Hedge @ $3.72 +$0.06 basis = $3.78	-$1.09	-$0.47	-$0.00	+$0.37
Put: $3.70 strike @$0.174 = $3.59 floor	-$1.28	-$0.67	-$0.20	+$0.17
Strategies Evaluated on:	March 10, 2017			

Table 8 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 an 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. 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 $9.79/bushel, which could lock in a return of $0.52/bushel for a 50-bushel yield to about $2.00/bushel for a 60-bushel yield (Table 8).

Table 8. 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 @ $9.86	-$5.29	-$1.62	+$0.59	+$2.06
Hedge @ $10.16 + $0.02 basis = $10.18	-$4.97	-$1.29	+$0.91	+$2.38
Put: $10.20 strike @$0.426 = $9.79 floor	-$5.36	-$1.68	+$0.52	+$1.99
Strategies Evaluated on:	March 10, 2017			

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

Tables 9 to 12 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 2015 newsletter posted online at the Agricultural Economics website (the URL is listed in Topic 8).

Table 9 provides the projected returns to on-farm storage for corn. Remember that the returns in Table 9 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 6 are subject to futures market and basis volatility.

On March 10, the CFC bids show the returns in April to be $0.01/bushel larger than for March (Table 9). The CFC bids also suggest an opportunity in early summer (May and June) for those willing to protect those returns through contract. Managers need to have low-cost storage and managerial skills to keep grain in quality condition in warm and

humid weather. The average basis strengthens into late spring, which has historically provided larger returns to storage. 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 9. 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	+$0.184	+$0.198	+$0.280	+$0.293	+$0.391
Median Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.152	+$0.173	+$0.230	+$0.266	+$0.292
CFC (DTN)	-$0.003	+$0.089	+$0.244	+$0.296	+$0.134	+$0.144	+$0.129	+$0.168	+$0.073
10th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.062	+$0.108	+$0.128	+$0.144	+$0.112
25th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.087	+$0.144	+$0.206	+$0.208	+$0.171
75th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.252	+$0.248	+$0.337	+$0.342	+$0.458
90th Percentile Basis	-$0.003	+$0.089	+$0.244	+$0.296	+$0.337	+$0.331	+$0.529	+$0.523	+$0.708

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: March 10, 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 10 presents the projected returns to off-farm corn storage, which tell a similar story like that of on-farm storage. The challenge with off-farm storage is 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 10. 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	-$0.113	-$0.095	-$0.010	+$0.006	+$0.107
Median Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.145	-$0.120	-$0.060	-$0.021	+$0.009
CFC (DTN)	-$0.312	-$0.218	-$0.059	-$0.004	-$0.163	-$0.150	-$0.161	-$0.119	-$0.210
10th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.235	-$0.186	-$0.162	-$0.143	-$0.172
25th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.210	-$0.149	-$0.085	-$0.079	-$0.112
75th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	-$0.045	-$0.045	+$0.047	+$0.054	+$0.174
90th Percentile Basis	-$0.312	-$0.218	-$0.059	-$0.004	+$0.040	+$0.037	+$0.239	+$0.235	+$0.425

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: March 10, 2017

There is a lot more red ink for the projected returns to off-farm storage. Previous analysis has shown more red ink for all of the basis expectations. Those waiting for the average basis appreciation into May and June should examine how risk management may protect profitable returns to storage.

Table 11 provides the projected returns to on-farm storage for soybeans. When this was written, the soybean futures market complex was suffering from the bearish March *WASDE* that increased projected U.S. soybean carryout coupled with news of a large South American soybean crop. The CFC bids suggest little profitable pricing opportunities through using CFC with significant appreciation in the soybean basis needed to provide positive returns (Table 11).

Table11. 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	-$0.021	-$0.051	+$0.061	+$0.009	+$0.352
Median Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.009	-$0.041	+$0.049	+$0.041	+$0.155
CFC (DTN)	-$0.105	+$0.150	+$0.186	+$0.173	-$0.257	-$0.270	-$0.257	-$0.362	-$0.432
10th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.258	-$0.257	-$0.259	-$0.306	-$0.423
25th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	-$0.103	-$0.117	-$0.031	-$0.052	-$0.177
75th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	+$0.097	+$0.017	+$0.196	+$0.139	+$0.905
90th Percentile Basis	-$0.105	+$0.150	+$0.186	+$0.173	+$0.170	+$0.107	+$0.251	+$0.194	+$1.355

[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: March 10, 2017

Table 12. 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	-$0.246	-$0.276	-$0.164	-$0.215	+$0.128
Median Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.233	-$0.266	-$0.175	-$0.183	-$0.069
CFC (DTN)	-$0.329	-$0.074	-$0.038	-$0.051	-$0.482	-$0.494	-$0.481	-$0.586	-$0.656
10th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.482	-$0.481	-$0.483	-$0.530	-$0.647
25th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.327	-$0.342	-$0.255	-$0.276	-$0.401
75th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.127	-$0.207	-$0.028	-$0.085	+$0.681
90th Percentile Basis	-$0.329	-$0.074	-$0.038	-$0.051	-$0.054	-$0.117	+$0.027	-$0.030	+$1.131

[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: March 10, 2017

The returns to off-farm soybean storage (Table 12) has very little black ink illustrating the concern of the market's fundamentals overwhelming the futures market. Returns from using CFC were small losses in December through February 2017. Current projections are for significant losses from off-farm storage.

These tables are to remind managers that grain storage is a valuable tool to add value to the crop. If possible, managers should consider sales based on the best return instead of sales dictated solely by cash flow demands. These examples also reinforce the need for managers to know their storage costs to be able to determine the projected return from an additional month of storage expense. Use the market signals and cost information to guide marketing decisions.

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 while the seed is still in the bag. Tables 13-15 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 13 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 $3.68/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 $3.77/bushel assuming a -$0.10/bushel harvest-time basis. The third alternative is to establish a price floor at $3.47/bushel by buying a put option with a $3.90 strike price that costs $0.334.

Table 13 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 $0.22/bushel.

Table 13. 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 @ $3.68	-$0.89	-$0.58	-$0.32	-$0.08	+$0.13	+$0.31
Hedge @ $3.87 + -$0.10 basis = $3.77	-$0.80	-$0.50	-$0.23	+$0.01	+$0.22	+$0.40
Put: $3.90 strike @$0.334 = $3.47 floor	-$1.10	-$0.79	-$0.53	-$0.29	-$0.08	+$0.10

Strategies Evaluated on: March 10, 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 13).

Table 14 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 than 45 bushels/acre.

Table 14. 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 @ $9.71	-$9.73	-$4.17	-$1.09	+$0.88	+$2.24
Hedge @ $10.00 + -$0.10 basis = $9.90	-$9.54	-$3.99	-$0.90	+$1.06	+$2.42
Put: $10 strike @$0.624 = $9.28 floor	-$10.16	-$4.61	-$1.52	+$0.44	+$1.80
Strategies Evaluated on:	March 10, 2017				

The largest projected returns 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 $0.44/bushel protected with put options at 55-bushel yields (Table 14).

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 15). 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 15. 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 @ $4.43	-$2.99	-$1.75	-$0.87	-$0.20	+$0.31
Hedge @ $4.56 - $0.10 basis = $4.46	-$2.96	-$1.72	-$0.84	-$0.18	+$0.34
Put: $4.60 strike @$0.27 = $4.23 floor	-$3.19	-$1.95	-$1.07	-$0.41	+$0.11
Strategies Evaluated on:	March 10, 2017				

Those managers that routinely yield 90-bushel wheat may be able to lock in a profitable return through CFC or hedging. Those with lower wheat yields will rely on the double-crop soybeans to provide the potential for this enterprise to be profitable (Table 15). The importance of soybeans reinforces the need to protect soybean price risk to improve the wheat / double-crop soybean enterprise.

Topic 6. 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 the actualized 2017 RP projected price guarantees for corn and soybeans.

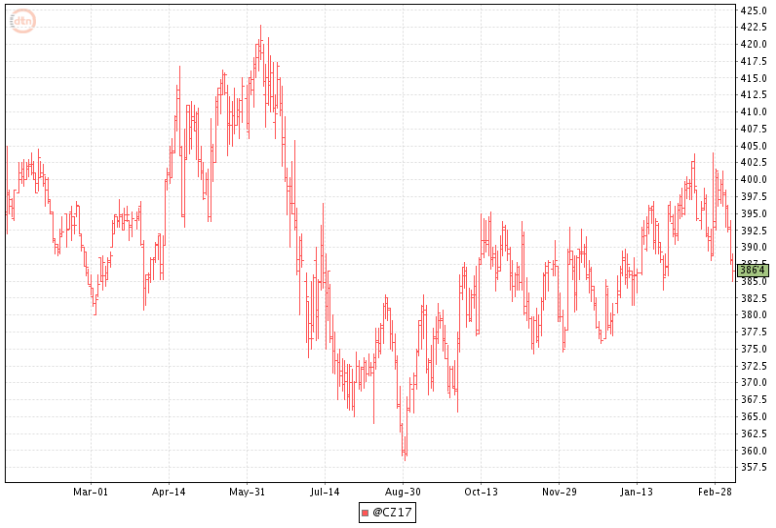


Figure 1. December 2017 Corn Futures Contract Chart (as of March 10, 2017)

The December 2017 corn futures contract reached $4.02 ¾ on February 15 and traded sideways until March 1. Since then, the DEC 2017 corn contract has steadily declined to $3.86 ½ on March 10, 2017.

Resistance is at $3.95 and again at $4.00-$4.02. Support would be at the $3.90 level and again at $3.80 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 $4.05 and $4.10 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 or key Southern Hemisphere production regions may provide this opportunity. If the *Prospective Plantings* report shows a larger than expected reduction in corn area, the DEC 2017 corn contract may push higher and provide some pricing opportunities.

Table 16 presents the risk management plan for 2017 corn. The foundation of the risk management plan is crop insurance. The projected price is $3.96/bushel with an assumed APH corn yield of 175 bushels/acre. The risk plan assumes an 80% coverage level. The revenue protection provided through RP insurance is $554/acre, which is $90/acre greater than the projected input costs.

Table 16 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 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 sideways 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 13). The pricing tools used are either CFC prices, or hedge-to-arrive (HTA) contracts net of fees.

Table 16. 2017 Corn Risk Management Game Plan as of March 10, 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 $544/acre which is $77/acre greater than the budgeted corn production cost. The RP insurance protection will protect 87.5 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 market has traded sideways and a break through $4 DEC 2017 resistance may provide pricing opportunities through HTA contracts.

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 16).

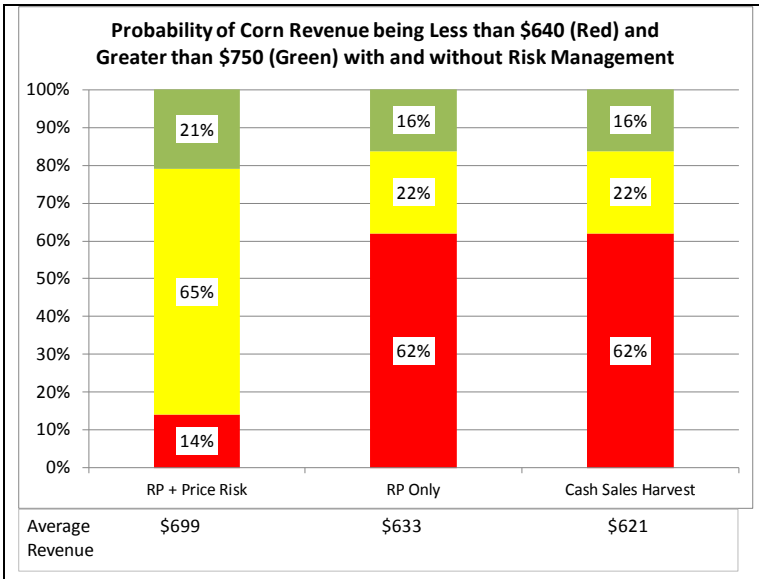


Figure 2. The probability of 2017 Corn Revenue being Below or Above Critical Revenue Levels with and without risk management tools.

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 average revenue by $63/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.

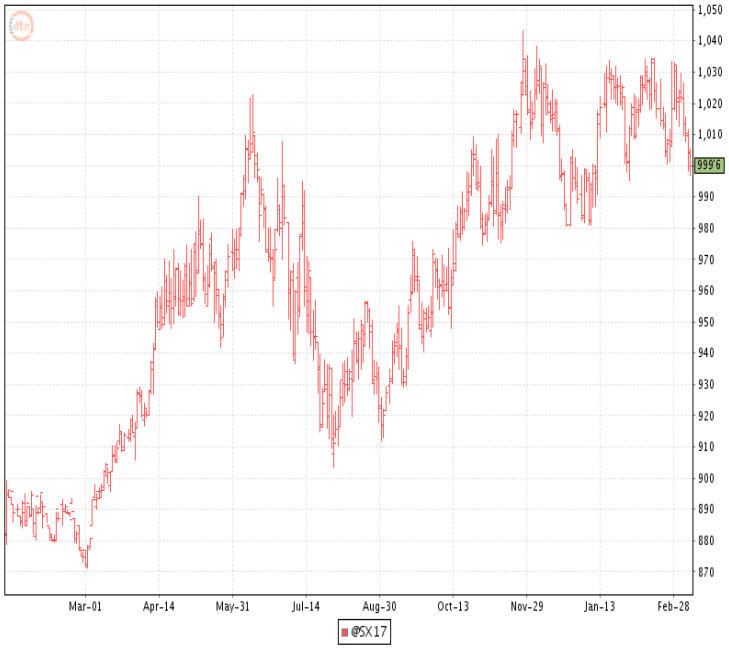


Figure 3. November 2017 Soybean Futures Contract Chart (as of March 10, 2017)

The November 2017 soybean chart illustrates the upward trend since the 2016 soybean harvest. The November 2017 contract has been trading in a sideways pattern since November 2016 with support from the $9.80 range and resistance at the $10.30 price level.

The overall concern in the 2017 soybean market is the potential of a larger than expected acreage increase and beneficial weather building stocks and pushing price lower. Reports of outstanding South American soybean crops has contributed to recent declines in the November 2017 contract. If the November 2017 contract breaks through the $9.80 support, there is room to fall lower with support levels perhaps at $9.70, $9.50 and $9.30 based on the chart pattern and previous lows. Managers should have expectations of the futures contract moving lower barring a weather event that provides fundamental support for higher prices.

The soybean risk plan in Table 17 assumes RP insurance at the 70% coverage level is purchased assuming an APH yield of 55 bushels/acre and a projected price of $10.19/bushel. Insurance would provide an initial revenue guarantee of $392/acre, which is $78/acre greater than the budgeted soybean production costs. RP insurance will protect the production of 38.5 bushels/acre. The proposed pricing plan is aggressive given the concern of limited upside potential needing the insurance guarantee of 38.5 bushels/acre (Table 17).

Table 17. 2017 Soybean Risk Management Game Plan as of March 10, 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	$10.70	11
Revised Objective	$10.95	16.5
Bushels Priced		38.5
Average Price	$10.66	

Note: RP Insurance at the 70% 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 $392/acre which is $78/acre greater than the budgeted soybean production cost. The RP insurance protection will protect 38.5 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 how quickly the first two pricing objectives were met, the remaining objectives are at higher targets in anticipation of potentially higher price movement. The $10.70 objective sells 25% of planned production, and the $10.95 would price 35% of planned production (Table 17). The plan is aggressive. A weather event may be needed to improve the probability of reaching the higher targets

If the soybean risk plan is achieved, the average pre-harvest price will be $10.63 on 70% of expected production. The November 2017 soybean contract closed at $10 on March 10, 2017, which is $0.70 and $0.90 below the remaining price objectives (Table 17). Current market fundamentals will not support reaching these prices unless the fundamental outlook changes to that of having a 2017 production concern.

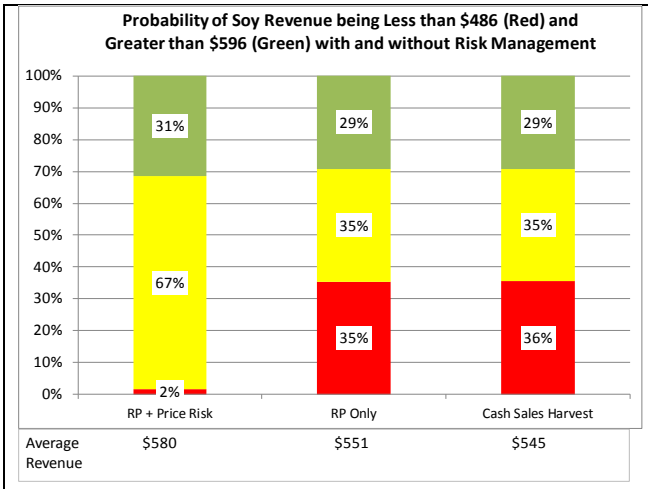


Figure 4. The probability of 2017 Soybean Revenue being Below or Above Critical Revenue Levels with and without risk management tools.

If the complete risk management plan is implemented, the combination of price risk tools and RP insurance could reduce the revenue risk from a 36% probability of revenue being below $486/acre (projected variable costs plus cash rent) to a 2% likelihood of not covering inputs and cash rent. If the full risk plan is implemented, there is a 31% 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 revenue protection provided by insurance by increasing the projected average revenue by $29/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.

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 prices.

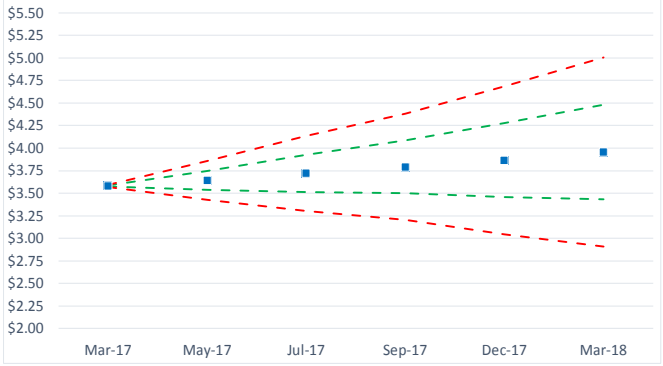
Topic 7. Projected Corn, Soybean, and Wheat Futures Trading Ranges to March 2018

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 expected 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 provides the probabilistic trading range for the corn futures contracts from March 2017 to March 2018. There is a 68% probability that the December 2017 corn contract will trade between $3.45 and $4.28 and a 95% probability that the December 2017 corn contract will trade between $3.04 and $4.69 (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 $3.43 to $4.48 (Figure 5).

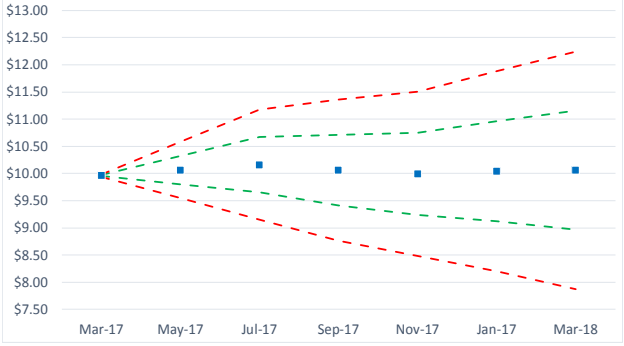
Figure 6 provides the probabilistic trading range for soybean futures contracts from March 2017 to March 2018. The November 2018 soybean futures have a 68% probability of trading between $9.24 to $10.75 with a 95% likelihood of trading between $8.49 and $11.51 (Figure 6). For hedging stored 2017 soybeans, the March 2018 soybean contract has a 68% probability trading range of $8.97 to $11.15 (Figure 6).

Figure 5. Corn Futures Closing Price on March 10, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



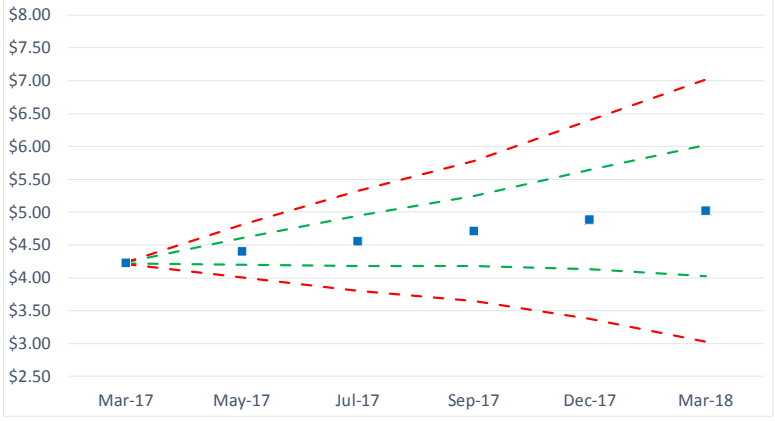
Trading range calculated on February 15, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on February 15, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 6. Soybean Futures Closing Price on March 10, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



Trading range calculated on February 15, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on February 15, 2017, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 7. Wheat Futures Closing Price on March 10, 2017, with 68% Probability (Green) and 95% Probability (Red) Trading Range



Trading range calculated on February 15, 2017, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on February 15, 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 March 2017 to March 2018 contracts. The July 2017 futures contract has a 68% probability of trading between $4.18 to $4.94 (Figure 7). The 95% probability trading range is $3.80 to $5.32 (Figure 7).

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