Crops Marketing and Management Update

Grains and Forage Center of Excellence

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1. March *WASDE*: USDA Punts until *Acreage* Report
2. 2019 Corn, Soybean, and Wheat Basis vs. Previous Years
3. Projected Corn, Soybean, and Wheat Futures Trading Ranges to Harvest 2020
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Topic 1. March *WASDE*: USDA Punts until *Acreage* Report

The March report typically does not provide market-moving information because the market waits for the *Prospective Plantings* report released March 31.

Table 1. U.S. Corn Supply and Use.

	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Area (million)	94.0	90.2	88.9	89.7	+0.8
Harvested Area (million)	86.7	82.7	81.3	81.5	+0.2
Yield (bushels/acre)	174.6	176.6	176.4	168.0	-8.4
	---------- Million Bushels ----------				
Beginning Stocks	1,737	2,293	2,140	2,221	+81
Production	15,148	14,609	14,340	13,692	-648
Imports	57	36	28	50	+22
Total Supply	16,942	16,939	16,509	15,962	-547
Feed and Residual	5,472	5,304	5,432	5,525	+93
Food, Seed & Industrial	6,883	7,056	6,791	6,820	+29
Ethanol and by-products	5,432	5,605	5,376	5,425	+49
Exports	2,293	2,438	2,065	1,725	-340
Total Use	14,649	14,799	14,288	14,070	-218
Ending Stocks	2,293	2,140	2,221	1,892	-329
Stocks/Use	15.7%	14.5%	15.5%	13.4%	-2.1%
Days of Stocks	57	53	57	49	-8
U.S. Marketing-Year Average Price ($/bu)	$3.36	$3.36	$3.61	$3.80	+$0.19

Source:March 2020 WASDE - USDA - WAOB.

The analysts surveyed before the report's release expected corn stocks to decline by 7 million bushels from the February report. USDA did not adjust any of the supply or demand estimates from the February report, which kept stocks unchanged. USDA did reduce the U.S. marketing year average (MYA) farm price lower by $0.50/bushel from the February report to a projected $3.80/bushel (Table 1).

Analysts expected USDA to increase Argentina's corn crop by 0.1 million metric tons (MMT) and to reduce the Brazilian corn crop by 0.1 MMT from the previous report. USDA did not adjust either country's corn crops in the March report.

Table 2. U.S. Soybean Supply and Use.

	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Area (million)	83.4	90.2	89.2	76.1	-13.1
Harvested Area (million)	82.7	89.5	87.6	75.0	-12.6
Yield (bushels/acre)	52	49.3	50.6	47.4	-3.2
	---------- Million Bushels ----------				
Beginning Stocks	197	302	438	909	+471
Production	4,296	4,412	4,428	3,558	-870
Imports	22	22	14	15	+1
Total Supply	4,515	4,735	4,880	4,482	-398
Crushings	1,901	2,055	2,092	2,105	+13
Exports	2,174	2,129	1,748	1,825	+77
Seed	105	104	89	99	+10
Residual	34	9	43	29	-14
Total Use	4,213	4,297	3,971	4,058	+87
Ending Stocks	302	438	909	425	-484
Stocks/Use	7.2%	10.2%	22.9%	10.5%	-12.4%
Days of Stocks	26	37	84	38	-45.3
U.S. Marketing-Year Average Price ($/bu)	$9.47	$9.33	$8.48	$8.70	+$0.22

Source:March 2020 WASDE - USDA - WAOB.

Analysts expected USDA to increase soybean stocks by 15 million bushels from the previous report. USDA made offsetting changes to the seed and residual categories, which left the ending stocks projections unchanged from the February report. USDA did adjust the U.S. MYA price lower by $0.50/bushel from the previous report to a projected $8.70/bushel (Table 2).

Analysts expected USDA to increase the Argentina soybean crop by 0.4 MMT from the previous estimate. USDA did increase the soybean crop, but by 1 MMT from the February report. Similarly, USDA increased the Brazilian soybean crop by 1 MMT when the analysts expected no change.

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

	2016-17	2017-18	2018-19 Estimated	2019-20 Projected	Change from 18-19
Planted Acres (million)	50.1	46.1	47.8	45.2	-2.6
Harvested Acres (million)	43.9	37.6	39.6	37.2	-2.4
Yield (bushels/acre)	52.7	46.4	47.6	51.7	+4.1
	---------- Million Bushels ----------				
Beginning Stocks	976	1,181	1,099	1,080	-19
Production	2,309	1,741	1,885	1,920	+35
Imports	118	157	135	105	-30
Total Supply	3,402	3,079	3,119	3,105	-14
Food	949	964	955	955	+0
Seed	61	63	59	60	+1
Feed and Residual	156	51	90	150	+60
Exports	1,055	901	936	1,000	+64
Total Use	2,222	1,980	2,039	2,165	+126
Ending Stocks	1,181	1,099	1,080	940	-140
Stocks/Use	53.2%	55.5%	53.0%	43.4%	-9.5%
Days of Stocks	194	203	193	158	-35
U.S. Marketing-Year Average Price ($/bu)	$3.89	$4.72	$5.16	$4.55	-$0.61

Source:March 2020 WASDE - USDA - WAOB.

Analysts expected wheat stocks to increase by 3 million bushels from the February report. USDA did not adjust any of the wheat supply and demand projections.

The U.S. MYA wheat price is projected at $4.55 per bushel. If realized, the 2019-20 MYA price would be $0.61/bushel below the price for the 2018-19 marketing year.

Topic 2. 2019 Corn, Soybean and Wheat Basis vs. Previous Years

Figure 1, Figure 2, and Figure 3 show the monthly average corn, soybean, and wheat spot basis, respectively, for twelve Western Kentucky markets. For each figure, the red line is the basis for the 2016 crop. The green line is the 2017 basis, while the black line represents the 2018 basis. The blue triangles represent the 2019 basis.

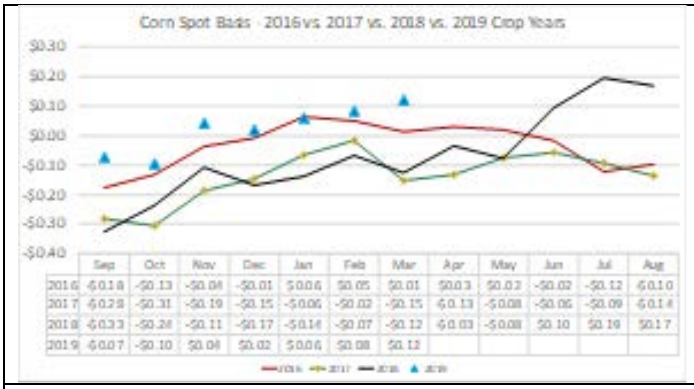


Figure 1. Western Kentucky Corn Spot Market Basis Appreciation from September to August for the 2016 to 2019 Crop Years.
Basis Calculated on March 13, 2020

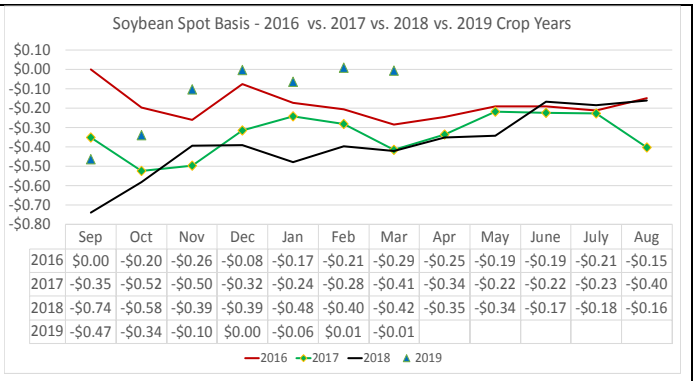


Figure 2. Western Kentucky Soybean Spot Market Basis Appreciation from September to August for the 2016 to 2019 Crop Years.
Basis Calculated on March 13, 2020

The corn basis is $0.12/bushel above the May corn contract, which is a $0.24/bushel increase from the 2018 basis in March. Last year, the corn basis appreciated from October to February by $0.17/bushel, which was $0.12/bushel less than the amount of appreciation in the basis for the 2017 corn crop from harvest to February. The current corn basis appreciation from October for the 2019 corn crop is $0.22/bushel (Figure 1).

The average soybean basis, as of March 13, 2020, was -$0.01/bushel under the May 2020 soybean contract. The basis is $0.41 per bushel narrower than the 2018 basis in March (Figure 2). Last year, the basis appreciated $0.18/bushel from October to February, but the 2017 crop's basis appreciated $0.24/bushel from harvest to February. For the 2019 crop, the appreciation from October is $0.33 (Figure 2).

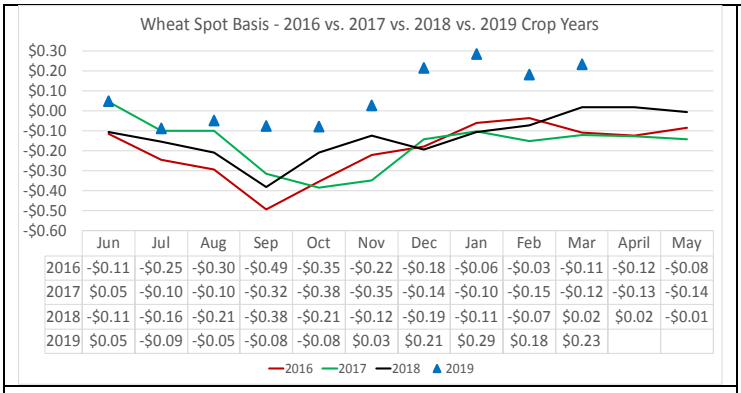


Figure 3. Western Kentucky Wheat Spot Market Basis Appreciation from June to May for the 2016 to 2019 Crop Years.
Basis Calculated on March 13, 2020

The average wheat spot basis has been strengthening since January 2019. The average basis for the 2018 crop (black line) has been narrower than the 2017 crop since March 2018 and is much stronger than the basis for the 2016 wheat crop.

The 2019 wheat basis is $0.23/bushel above the May futures contract. The 2019-wheat basis is still narrower than the basis for 2018, 2017, and 2016 crops in March. Managers using HTA contracts for 2020 July wheat should monitor the basis for opportunities to fix the basis at stronger levels than previous crop year's basis.

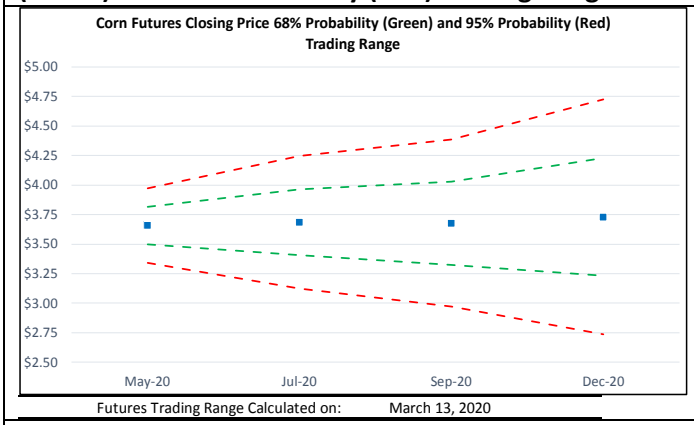
Topic 3. Projected Corn, Soybean, and Wheat Futures Trading Ranges to Harvest 2020

Figures 4–6 provide the projected futures price trading range by futures contract month, based on the contracts' volatility for the previous 21-day period for corn, soybeans, and wheat. The green lines represent the range that describes the 68% probability of the projected trading range with the red line representing a 95% likelihood of the expected trading range. Notice how these projections fan out for the contracts that will expire later in 2020. That is because there is more time until the contract's expiration; thus, there is a wider potential trading range for these deferred futures contracts.

Figure 4 provides the probabilistic trading range for the corn futures contracts from May 2020 to December 2020. There is a 68% probability that the July 2020 corn contract will trade between $3.40 and $3.97 and a 95% probability that the July 2020 corn contract will trade between $3.12 and $4.25. Managers considering managing price risk for the 2020 crop should monitor the December 2020 contract, which has a 68% probability of trading between

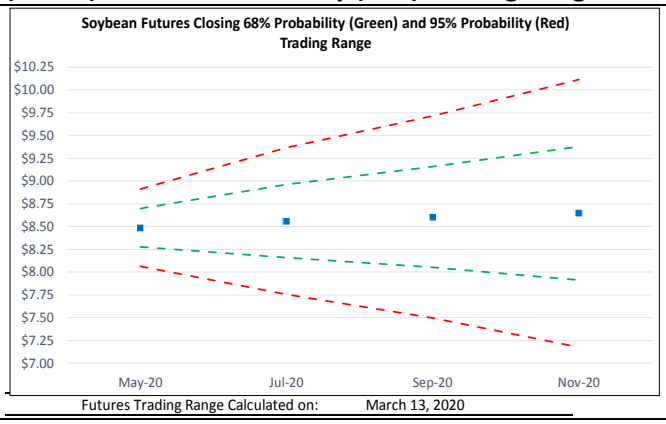
$3.23 and $4.23 per bushel. The December 2020 corn contract has a 95% probability of trading between $2.74 and $4.72 per bushel, which reflects the volatility in the corn futures contracts for the deferred months (Figure 4).

Figure 4. Corn Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



Trading range calculated on March 13, 2020, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on March 13, 2020, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

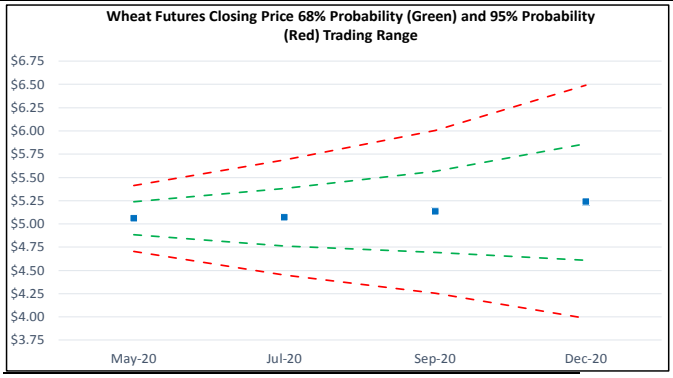
Figure 5. Soybean Futures Closing Price 68% Probability (Green) and 95% Probability (Red) Trading Range.



Trading range calculated on March 13, 2020, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on March 13, 2020, 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 soybean futures contracts from May 2020 to November 2020. Managers planning to store soybeans into late spring should monitor the July 2020 soybean contract. The July 2020 contract has a 68% probability of trading between $8.16 and $8.96 per bushel. The November 2020 soybean contract has a 68% probability of trading between $7.91 and $9.38 per bushel (Figure 5).

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



Trading range calculated on March 13, 2020, using the average volatility of the previous 21-day period. The 68% probability range is the closing futures price on March 13, 2020, plus and minus one standard deviation. The 95% probability range is the closing price plus and minus two standard deviations.

Figure 6 provides the probabilistic trading range for the wheat futures contract from May 2020 to December 2020 contracts. The July 2020 contract has a 68% chance of trading between $4.76 and $5.38/bushel. Managers planning to store wheat should monitor the deferred contracts. The December 2020 wheat contract has a 68% probability of trading between $4.61 and $5.86/bushel (Figure 6).

Topic 4. Pre-Harvest 2020 Corn, Soybean, Wheat and Double-Crop Soybean Risk Management Opportunities

Tables 4-7 analyze the effectiveness of using hedging with futures, forward contracts, and put options in protecting revenue that covers total input costs, cash rent, overhead, and family living for corn, soybeans, and double-crop soybeans in 2020. Managers should monitor the futures market for opportunities because sometimes the best pricing opportunities occur several weeks before planting. These examples are provided to help raise awareness of risk

management opportunities available now for managers planning their 2020 production. I am using the same costs as 2019 because I do not anticipate input costs or rental rates to decline significantly from 2019.

Table 4. Risk Management Alternatives for 2020 Western Kentucky Corn for Various Yield Objectives.

Yield	150	160	170	180	190	200
TVC+Rent+Overhead+Family Living ($/acre)	$714	$714	$714	$714	$714	$714
TVC+Rent+Overhead+Family Living ($/bu)	$4.76	$4.46	$4.20	$3.97	$3.76	$3.57
Hedge @ $3.73+ -$0.30 basis = $3.43	-$1.33	-$1.03	-$0.77	-$0.54	-$0.33	-$0.14
Forward Contract at $3.48	-$1.28	-$0.99	-$0.72	-$0.49	-$0.28	-$0.09
Put: $3.80 strike @$0.303 = $3.20 floor	-$1.56	-$1.27	-$1.00	-$0.77	-$0.56	-$0.37
Strategies Evaluated on:	March 13, 2020					

Table 4 presents risk management alternatives for Western Kentucky corn production for 2020. Several yield projections are provided to show what yield is needed to find profitable pricing opportunities. Three risk management alternatives are compared. The first marketing alternative is to hedge with commodity futures, or HTA contracts, that would lock in an expected cash price at $3.43/bushel assuming a -$0.30/bushel harvest-time basis. The second alternative is to lock in a cash price through a forward contract at $3.48/bushel. The third alternative is to establish a price floor at $3.20/bushel by buying a put option with a $3.90 strike price that costs $0.251 (Table 4).

Table 4 demonstrates that the $0.31/bushel decline in the December 2020 contract from January 13, 2020, to March 13, 2020, has removed hedging opportunities for yields less than 200-bushels. Seasonality in the December futures contract suggests a planting and early-season opportunity might exist to provide another risk management opportunity for bushels to be sold at harvest.

Table 5 illustrates the risk management potential for full-season soybeans in 2020. Current prices are providing an opportunity to lock in a return over total economic costs plus family living for yields of 65 bushels/acre or greater. The November 2020 soybean futures contract has lost $1.16/bushel from January 2, 2020, to March 13, 2020, which has eliminated pricing opportunities for most assumed costs and yields less than 65-bushels.

Table 5. Risk Management Alternatives for 2020 Western Kentucky Soybeans for Various Yield Objectives.

Yield	45	50	55	60	65
TVC+Rent+Overhead+Family Living ($/acre)	$532	$532	$532	$532	$532
TVC+Rent+Overhead+Family Living ($/bu)	$11.82	$10.64	$9.67	$8.87	$8.18
Hedge @ $8.65+ -$0.40 basis = $8.25	-$3.58	-$2.40	-$1.43	-$0.62	+$0.06
Forward Contract at $8.38	-$3.45	-$2.26	-$1.30	-$0.49	+$0.19
Put: $8.60 strike @$0.424 = $7.78 floor	-$4.05	-$2.86	-$1.90	-$1.09	-$0.41
Strategies Evaluated on:	March 13, 2020				

Table 6. Risk Management Alternatives for 2020 Western Kentucky Wheat for Various Yield Objectives.

Yield	80	85	90	95	100
TVC+50% Rent+Overhead+Family Living ($/acre)	$470	$470	$470	$470	$470
TVC+50% Rent+Overhead+Family Living ($/bu)	$5.88	$5.53	$5.22	$4.95	$4.70
Hedge @ $5.07 + $0.15 basis = $5.22	-$0.65	-$0.31	-$0.00	+$0.27	+$0.52
Forward Contract at $5.24	-$0.64	-$0.29	+$0.01	+$0.29	+$0.54
Put: $5.10 strike @$0.291 = $4.96 floor	-$0.92	-$0.57	-$0.26	+$0.01	+$0.26
Strategies Evaluated on:	March 13, 2020				

Table 6 illustrates the risk management potential for wheat in 2020. The costs in Table 6 assume that rent and family living expenses are split evenly between wheat and double-crop soybeans. Current prices are providing an opportunity to lock in a return over total economic costs plus family living for yields of 90 bushels/acre or larger. The July 2020 wheat contract has lost $0.74/bushel from January 21, 2020, to March 13, 2020, which has reduced the opportunities and benefits of hedging for lower yields.

Table 7. Risk Management Alternatives for 2020 Western Kentucky Double-Crop Soybeans for Various Yield Objectives.

Yield	35	40	45	50	55
TVC+Rent+Overhead+Family Living ($/acre)	$380	$380	$380	$380	$380
TVC+Rent+Overhead+Family Living ($/bu)	$10.86	$9.50	$8.44	$7.60	$6.91
Hedge @ $8.65+ -$0.40 basis = $8.25	-$2.61	-$1.26	-$0.20	+$0.65	+$1.34
Forward Contract at $8.38	-$2.48	-$1.12	-$0.07	+$0.78	+$1.47
Put: $8.60 strike @$0.424 = $7.78 floor	-$3.08	-$1.72	-$0.67	+$0.18	+$0.87
Strategies Evaluated on:	March 13, 2020				

The market is providing an opportunity to protect double-crop soybean risk for those that typically harvest 45-bushel double-crop soybeans or better (Table 7).

Topic 5. Combining Crop Insurance and Forward Contracts to Reduce Revenue Risk: Example Game Plans for 2020 Corn, Soybeans, and Wheat

This topic evaluates the potential risk protection provided by combining crop insurance with forward contracts to manage revenue risk for corn (Figure 7), full-season soybeans (Figure 8), wheat (Figure 9), and double-crop soybeans (Figure 10). The examples assume managers only consider the cash costs with farming. For instance, managers plan on covering 100% of inputs at $426/acre, and 100% of cash overhead costs at $14/acre. The Kentucky Farm Business Management reports indicate the average grain farm owns 25% of their land base, so these examples assume that managers only pay cash rent of $185/acre on 75% of the land farmed. Any grain not sold through the forward contract is assumed to be stored and sold after capturing a $0.25/bushel price appreciation.

The RP crop insurance projected price for corn is $3.88 per bushel and coverage at the 75% level. The marketing plan is to forward contract 50% of expected production (assuming the expected yield of 185-bushels) at $3.48 per bushel. At a harvested yield of 185-bushel (Figure 7 – green line), the return over budgeted costs is a minimum of $18/acre at a DEC 20 futures price of $3.10/bushel ($2.80/bushel cash). If there is a 10% yield loss (Figure 7 – blue line), the maximum loss is -$17/acre at the DEC 20 futures price of $3.10/bushel ($2.80/bushel cash). The lines form a "V-shape" which reflects crop insurance indemnities paid from lower prices or yields. The gold-line demonstrates a 20% yield loss with the lowest return at -$52/acre at a DEC 20 futures price of $3.88/bushel ($3.58/bushel cash) (Figure 7). Because these examples ignore the economic costs that contribute to family living costs or other debt payments, a 20% yield loss would create liquidity problems and likely reduce working capital or increase debt.

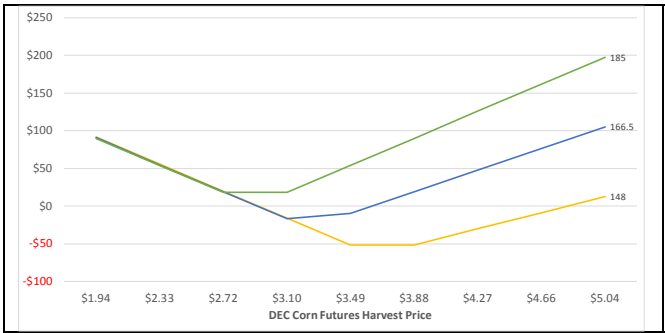


Figure 7. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Corn.

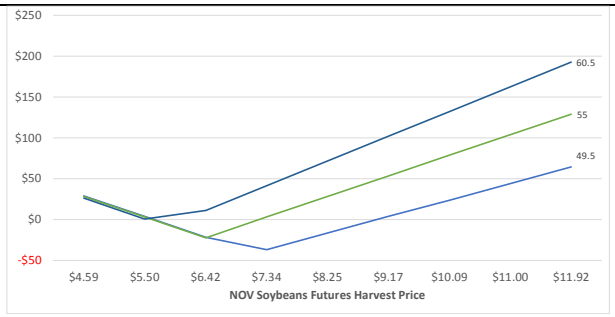


Figure 8. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Full Season Soybeans.

The return over total budgeted soybean costs for full-season soybeans is shown in Figure 8. The cost assumptions for the corn examples are applied for full-season soybeans. Total variable costs are budgeted at $264/acre with rent and overhead the same as for corn. The risk management plan is to purchase RP insurance at the 70% coverage level at a projected price of $9.17/bushel. The marketing plan is to forward contract 50% of expected production (assuming an expected yield of 55 bushels) at a cash price of $8.38 per bushel. Assuming a -$0.40/bushel basis, the November 2019 futures price would be $8.78/bushel to fulfill this marketing objective.

For the planned yield of 55 bushels/acre (Figure 8 -- green line), the minimum return over budgeted costs is -$37/acre at a futures price of $7.34/bushel ($6.94/bushel cash). If the yield is 60.5 bushels (10% higher), the minimum return of $1/acre is at a $5.50/bushel futures price ($5.10/bushel cash). If yields are 10% lower at 49.5 bushels/acre (Figure 8 – light blue), then returns are -$37/acre for a future price of $7.34/bushel.

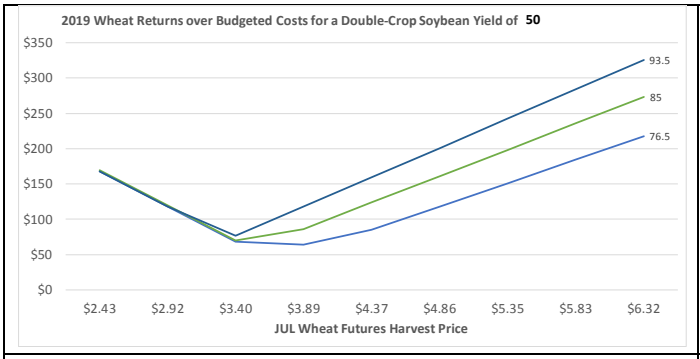


Figure 9. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Wheat-DC Soybeans for a Double-Crop Soybean Yield of 50 bushels/acre.

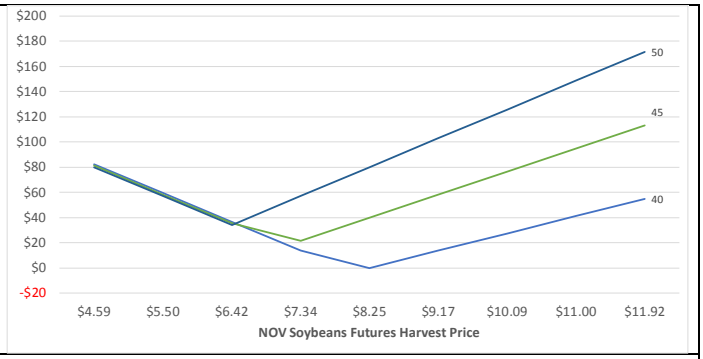


Figure 10. Return over Total Inputs, Land, and Overhead Costs for 2019 Western Kentucky Double-Crop Soybeans.

The risk management plan for wheat presented in Figure 9 assumes RP crop insurance was purchased at the 75% coverage level at the projected price of $4.86/bushel. The returns over budgeted costs in Figure 9 assume a return for the wheat / double-crop soybean enterprise, assuming a double-crop soybean yield of 50-bushels. The cost assumptions include covering the cash overhead costs and cash rent on the land base that is rented. The return in Figure 9 is net of the total input costs for wheat and double-crop soybeans. Because wheat prices have been better than typical for the last for crop years in spring, the plan is to forward contract 65% of expected production at $5.24/bushel. The rest is stored for an expected storage gain of $0.35/bushel.

The graph of the wheat enterprise returns over budgeted costs also includes the revenue from the double-crop soybeans at a yield of 50 bushels/acre. Double-crop soybean revenues are included in the graph to demonstrate how soybean revenue reinforces wheat profitability. For the planned yield of 85-bushels or larger, the wheat/double-crop soybeans enterprise is profitable with the minimum return of $70/acre at a JUL 20 wheat price of $3.40/bushel. Even with a 10% yield loss for wheat (76.5 bushels/acre), the enterprise is profitable with the minimum return over total costs of $64/acre at a $3.89 JUL 20 price (Figure 9)

Figure 10 shows the full-season soybean risk management plan applied to the double-crop soybean enterprise. The double-crop soybean plan assumes the same RP coverage level as full-season soybeans, and the same percentage forward contracted at the same price as full-season soybeans. Because of the lower cost structure, locking in a large percentage of expected production at $8.38/bushel in the spot market buoys the wheat enterprise. Figure 10 is shown to remind managers of the importance of locking in favorable margins when they exist.

Topic 6. How Do I Get on the Email Distribution List to Receive this Newsletter?

The *Crops Marketing and Management Update* is published monthly, usually after the release of the USDA: *WASDE* report. You can find this issue and past issue on the U.K. Agricultural Economics Department's website at http://www.uky.edu/Ag/AgEcon/extcmmu.php. Email todd.davis@uky.edu to receive the newsletter by email.

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