farmdoc DAILY

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Weekly Farm Economics: Release of 2018 Farm Bill What-If Tool

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The 2018 Farm Bill What-If Tool has been released (click here to download). This Microsoft Excel spreadsheet will estimate Price Loss Coverage (PLC) and Agricultural Risk Coverage at the county level (ARC-CO) for specific prices and yields that a user enters. Currently, the tool contains data for all counties and crops for which the Farm Service Agency (FSA) plans on offering ARC-CO. Updates will be made to the tool as more data becomes available, and as prices and yields come into clearer focus.

Output of the Tool

Figure 1 is a view of the main page showing calculated payments for PLC and ARC-CO for the 2019 and 2020 program years given a specific set of prices and yields. Users can make entries in boxes with a yellow background and blue numbers or letters. Users should first choose the state, county, and crop of interest. In the example shown in Figure 1, results are given for corn grown in DeKalb County, Illinois. Based on these selections, the model will show available practices to distinguish irrigated from non-irrigated where applicable, or include all practices. For corn in DeKalb county, the only practice is "all".

Figure 1. Main Output Screen from 2018 Farm Bill What-If Tool

2019 and 2020 ARC-CO PLC WHAT-IF COMPARISON

Input

State	Illinois
County	DeKalb
Crop	Corn
Practice	All
PLC Yield	172

Use Defaults

Help

Print

FAST

View 2014 Farm Bill Payments

Calculation of PLC and ARC-CO Payments

Year	County Yield[1]	MYA Price[2]	Payment[3,4] PLC	Payment[3,4] ARC-CO	ARC-CO Calculations: Benchmark Yield[5]	Benchmark Price[6]	Guarantee[7]	County Revenue[8]
			$/base acre		Bu.	$/Bu	$ per base acre	
2018	200							
2019	208	3.80	$0	$0	209.1	3.70	665.39	790.44
2020	210	3.80	$0	$0	204.6	3.70	651.07	797.58

1 County yields impact ARC-CO payments. 2018 yields enter into 2020 ARC-CO benchmark calculations. The 2018 yield is an estimate.

2 Market year average (MYA) prices impact both PLC and ARC-CO payments.

3 PLC payments equal PLC yield x (effective reference price - higher of MYA price or loan rate) x .85. PLC payment calculations are shown in Table 1 below.

4 Equals .85 x minimum of (ARC guarantee - county revenue) or (10% of benchmark yield x benchmark price), when county revenue is less than ARC guarantee, zero otherwise. Guarantee and revenue calculations are shown in the green ARC-CO Calculations box.

5 Benchmark yield calculations are shown in Table 2 and 3 below.

6 Benchmark price calculations are shown in Table 4 below.

7 Guarantee equals .86 x benchmark yield x benchmark price.

8 County revenue equals county yield x MYA price.

For estimates of expected values of ARC-CO and PLC payments see the Gardner Program Payment Calculator at:
https://fd-tools.ncsa.illinois.edu

Support provided by:

Gardner Agricultural Policy Program

USDA OFFICE OF THE CHIEF ECONOMIST
United States Department of Agriculture

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The model will bring in defaults for:

- PLC yield — these are the yields used in PLC calculations. Default values are average PLC yields by commodity and county from the Farm Service Agency (FSA).
- County yields for 2018, 2019, and 2020. Yields for 2018 have not been released by the FSA. A default yield based on available information is given for 2018. For the example in Figure 1, the 2018 default yield is 200 bushels per acre. Also included are default yields for 2019 and 2020. Currently these defaults are at trend levels. In Figure 1, trend levels are 208 bushels per acre for 2019 and 210 bushels per acre for 2020. Future versions of the tool will update these values as more information on yields become available
- Prices for 2019 and 2020. Currently the estimated prices for 2019 and 2020 are USDA projections for 2019. For corn, a $3.80 per bushel price is used for both 2019 and 2020.

Users can change the default PLC and county yields, and prices. As shown in the tan box in Figure 1, the default prices and yields result in PLC and ARC-CO payments of $0 per base acre for both 2018 and 2019 in this example.

The model will allow users to view the calculations of various items including:

- ARC-CO guarantee and revenues (green box in Figure 1);
- Effective reference prices and PLC payments (Table 1 from the model in the appendix)
- Benchmark yields for ARC-CO (Tables 2 and 3 of the model shown in the appendix, and
- Benchmark prices for ARC-CO (Table 4 of the model shown in this appendix).

Uses of Tool

At this point, 2019 yields still are uncertain, but are beginning to come into clearer focus as harvest progresses. An ARC-CO payment of $0 per base acre is expected given a 208 bushel per acre yield for corn in DeKalb County (see Figure 1). Yields likely will be lower than 208 bushel per acre in 2019. The following payments were calculated for different yields:

- 165 bushels per acre results in a $33 per base acre payment for ARC-CO,
- 170 bushel per acre results in a $16 per base acre payment for ARC-CO, and
- 175 and higher yields results in a $0 per base acre payment.

The above payments were calculated used a MYA price of $3.80 per bushel. ARC-CO payments also will vary with higher and lower MYA prices.

Comparison to Gardner Payment Calculator

The Gardner-*farmdoc* Payment Calculator provides expected payments and likelihood of payments for ARC-CO and PLC for years from 2019 through 2022. These estimates are based on a simulation model encompassing historical relationships between price and yield changes. The Microsoft Excel spreadsheet does not include this historical information and allows a user to enter their own estimates of a set of prices and yields to see what ARC-CO and PLC payments result. The Excel tool also is useful if a detailed understanding of ARC-CO and PLC calculations is desired. Used together, the Gardner-*farmdoc* Payment Calculator will provide information on expectations of payments while the 2018 Farm Bill What-If tool will provide analysis of scenarios.

Continuing Work

Work will continue on both the Gardner-*farmdoc* Payment Calculator and the Microsoft Excel based 2018 Farm Bill What-If Tool. Continue to check back as we update yields and prices in both tools. Crops will be added to the Gardner-*farmdoc* Payment Calculator. An ARC-IC and yield updating utility will be added to the 2018 Farm Bill What if Tool.

Appendix

Table 1. Calculation of PLC Payments

2019 Payment		2020 Payment	
Year	MYA Price	Year	MYA Price
	$/Bu		$/Bu
2013	4.46	2014	3.70
2014	3.70	2015	3.61
2015	3.61	2016	3.36
2016	3.36	2017	3.36
2017	3.36	2018	3.61
85% of Olympic average[1]	3.02	85% of Olympic average[1]	3.00
Statutory reference price	3.70	Statutory reference price	3.70
Effective reference price[2]	3.70	Effective reference price[2]	3.70
2019 MYA price	3.80	2020 MYA price	3.80
Loan rate	2.20	Loan rate	2.20
Payment rate[3]	0.00	Payment rate[3]	0.00
2019 payment per base acre[4]	**$0**	**2020 payment per base acre[4]**	**$0**

1 Olympic average eliminates the high and low prices and averages the remaining three historical prices. Olympic average calculations are lagged by one year (e.g., the 2019 average does not include the 2018 price, but prices from 2013 to 2017).

2 The higher of 85% of the Olympic average or the statutory reference price, capped at 1.15 times the statutory reference price.

3 Effective reference price minus the higher of the MYA price or loan rate when MYA price is below the effective reference price.

4 Equals .85 x PLC yield x payment rate.

For additional information on PLC see the following article on farmdocDaily

farmdocDaily, September 24, 2019

Table 2. Calculation of 2019 Benchmark Yield for ARC-CO

Year	County Yield[1]	80% of T-yield	Higher of Actual or 80% of T-yield[2]	Number of Years to Trend	Trend Yield Adjustment[4]	Trend Adjusted ARC-CO Yield[5]
	Bu/acre	Bu/acre	Bu/acre		Bu/acre	Bu/acre
2013	210.2	136.8	210.2	6	11.3	221.5
2014	199.0	136.8	199.0	5	9.4	208.4
2015	187.3	136.8	187.3	4	7.5	194.8
2016	223.6	136.8	223.6	3	5.6	229.3
2017	193.7	149.6	193.7	2	3.8	197.5
	Trend Adjustment[3]		1.88		**2019 Benchmark Yield[7]**	**209.1**

1 Crop yields are from data provided by Risk Management Agency

2 The higher of county yield or 80% of T-yield

3 In most cases, trend yield adjustments are the same as used for calculation Trend-Adjusted APH yields for crop insurance.

4 The trend adjustment times the number of years to trend.

5 Equals higher of actual yield or 80% of trend yield.

6 Olympic average of trend adjusted ARC-CO yields. An Olympic average eliminates the high and low values, and then averages the remaining values.

For additional information on ARC-CO see the following article on farmdocDaily:

farmdocDaily, September 17, 2019

Table 3. Calculation of 2020 Benchmark Yield for ARC-CO

Year	County Yield[1]	80% of T-yields	Higher of Actual or 80% of T-yield[2]	Number of Years to Trend	Trend Yield Adjustment[4]	Trend Adjusted ARC-CO Yield[5]
	Bu/acre	Bu/acre	Bu/acre			
2014	199.0	136.8	199.0	6	11.3	210.3
2015	187.3	136.8	187.3	5	9.4	196.7
2016	223.6	136.8	223.6	4	7.5	231.1
2017	193.7	149.6	193.7	3	5.6	199.3
2018	200.5	149.6	200.5	2	3.8	204.2
	Trend Adjustment[3]		1.88		**2020 Benchmark Yield[7]**	**204.6**

See footnotes at end of Table 2.

Note the trend adjustment and 2018 T-yield may differ from those used here.

Table 4. Calculation of Benchmark Prices for ARC-CO

	2019 Calculation				2020 Calculation		
Year	MYA Price[1]	Effective Reference Price[2]	Used in Benchmark[3]	Year	MYA Price[1]	Effective Reference Price[2]	Used in Benchmark[3]
	$/Bu	$/Bu	$/Bu		$/Bu	$/Bu	$/Bu
2013	4.46	3.70	4.46	2014	3.70	3.70	3.70
2014	3.70	3.70	3.70	2015	3.61	3.70	3.70
2015	3.61	3.70	3.70	2016	3.36	3.70	3.70
2016	3.36	3.70	3.70	2017	3.36	3.70	3.70
2017	3.36	3.70	3.70	2018	3.61	3.70	3.70
	2019 Benchmark Price		**3.70**		**2020 Benchmark Price**		**3.70**

[1] Market Year Average (MYA) price.

[2] See Table 1 for the calculation of effective reference prices.

[3] Higher of MYA price or effective reference price.

[4] Olympic average of five previous years' prices, with a year lag. An Olympic average eliminates the high and low values, and then averages the remaining values.

For additional information on ARC-CO see the following article on farmdocDaily:

farmdocDaily, September 17, 2019