

DECISIONS UNDER 2014 FARM BILL

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DEPARTMENT OF
AGRICULTURAL AND
RESOURCE ECONOMICS

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Important Caveat

- This presentation does not include information about many important administrative details (deadlines, necessary documentation, timing of payments, for example). Your local FSA (Farm Service Agency) office is the best source for information about these details.
- Many of those details are now in the final stages of preparation, and will be announced soon.

Crop Commodity Program Decisions

- What Program will you participate in for the next 5 years?
 - Price Loss Coverage (PLC)
 - With or without participation in supplemental coverage option (SCO)
 - Agricultural Risk Coverage, County option (ARC – CO)
 - Agricultural Risk Coverage , Individual option (ARC – IN)
- Update base acres?
- Update yields?

Price Loss Coverage (PLC) Program

- Provides a payment when **prices** fall sufficiently below a threshold (price guarantee) level, referred to as the “reference price”.
- Payment is based on “base acres” and “program yields” not current production.
- Virtually identical to the Countercyclical Payment Program under the previous farm bills.
- This is the “default” option – if a farm fails to make an explicit election of other programs, it will be enrolled in the PLC.
- Choice between PLC and county ARC can be done crop by crop.

Corn example:

- Corn reference price: \$3.70
- Marketing year average price 2014-15 in this example: \$3.50
- Corn **base acres** for this example farm: 470
- Corn **program yields** for this example farm: 142.2
- PLS payment for 2014-15:
 $(3.70 - 3.50) \times .85 \times 470 \times 142.2 = \$11,361.78$



County level Agricultural Risk Coverage (ARC – CO) Program

- Provides a payment when **average county revenues per acre** fall below a threshold (revenue guarantee) level.
- Payment is based on “base acres”, commodity-by-commodity.
- Steps to determine ARC-CO payment for a commodity.
 - Determine county benchmark revenue.
 - Determine County Revenue Guarantee.
 - Determine actual county revenue per acre for current year.
 - Determine payment per acre.
 - Determine total payment

Step 1. Calculating the County level Benchmark Revenue

- Find the average county yield for the commodity for the past 5 years. (See [here](#) for our example numbers. Example past average corn yield: 125 bushels/acre)
- Find the ARC price for the commodity for the past 5 years. (See [here](#) for our example numbers.)
 - Example past average ARC price: \$4.81/bushel
- Multiply the two to get county level benchmark revenue per acre:
 - Example: $125 \times \$4.81 = \601.25 per acre

[Return to description of county revenue guarantee.](#)

[Return to calculation of county ARC payment.](#)



Step 2. Calculating the County level Revenue Guarantee

- Multiply the county level benchmark revenue per acre by **0.86.**

Example:

$$.86 \times \$ 601.25 = \$ 517.08 \text{ per acre}$$

Where does this come from? It is written into the law that the revenue guarantee will be 86% of the benchmark revenue. It bears some conceptual similarity to revenue insurance at the 86% coverage level; however it is different in many important details.

Where does this come from?
It is the county benchmark revenue.

[Return to calculation of county ARC payment.](#)



Step 3. Calculating the Actual County level Revenue for the current year.

- Find county average crop yield for current year.
Example:
 - Current year county corn yield 135 bushels/acre.
- Find the actual ARC price for the commodity for the current year.
 - Example: MYA Corn price \$3.50/bushel
- Actual county level revenue for corn: multiply the above two together:
 - Example: $135 \times 3.50 = \$472.50$ per acre.

Step 4. Calculate per acre ARC payment for county by commodity.

- Calculate the difference between the county revenue guarantee for the crop and the actual county revenue for the crop.
 - Example: $517.08 - 472.50 = \$44.58$
- Calculate 10% of the county revenue benchmark:
 - Example: $.10 \times 601.25 = \$60.12$
- ARC payment is the smaller of the two numbers: \$44.58 is lower than \$60.12, so that is the ARC payment.

Step 5. Calculate county ARC payment by commodity.

- Multiply ARC payment per acre by 85% of base acres for the crop:

- $\underline{\$44.58} \times .85 \times 470 \text{ acres} = \$17,809.71$
 $\underbrace{\hspace{10em}}$
85% of base acres.

Both PLC and county ARC make payments on base acres. When is county ARC higher?

- County ARC can make payments when prices are too high to trigger PLC payments.
 - PLC would pay only if national price < 3.70 for corn; but county ARC could pay out at higher prices -- if prices fell below recent 5 year average prices and yields were stable.
 - Example: Program yield 122. ARC county 5 year average price \$5.00; ARC county 5 year average yield 120. So county revenue guarantee is $.86 \times 120 \times 5.00 = 516$. Current price = \$3.80. Current county yield 125. So current revenue is $125 \times 3.80 = 475$.
 - PLC payment: \$0 per .85 x base acre. (3.80 is higher than 3.70 trigger price for PLC payment.)
 - County ARC: $(516-475) = \$41$ per .85 x base acre.



When are county ARC payments higher?

- County ARC payments could reflect yield growth, while PLC payments are based on a fixed program yield.
- Example: Program yield = 122. County ARC price is \$3.70. County yields have risen so county ARC yield is 170. Current year price falls to \$3.45, and county yield falls to 145. County ARC revenue guarantee is $.86 \times 3.70 \times 170 = \541 . County revenue = $3.45 \times 145 = 500$
 - PLC payment per .85 base acre = $(3.70 - \$3.45) \times 122 = \30.5 per .85 base acre.
 - County ARC payment $(541 - 500) = \$41$ per .85 base acre.

When would PLC payments be higher than county ARC?

- Low national price and high county yields:
 - County revenues are high (relative to benchmark) because of high yields, so county ARC payments are low or zero.
 - But low prices trigger PLC payments.
 - Example: County ARC average price \$4. County ARC average yields 120. Guaranteed county revenue $4 \times 120 \times .86 = 412.8$
Current year price \$3.20, Current year county yield 160. Current year revenue \$512. No county ARC payment, but PLC payment.
- County ARC payments are capped at 10% of benchmark.
 - So with stable yields, price declines of more than 10% would not be reimbursed by the county ARC program, but would be reimbursed by the PLC program.

How do things look for this year (2014) in Harford County for corn

	2009	2010	2011	2012	2013	Olympic average
Yield	143.0	106.2	108.0	129.3	142.1	126.4

	2009	2010	2011	2012	2013	Olympic average
ARC price	3.70	3.70	6.22	6.89	4.50	4.80

Benchmark revenue $126.4 \times 4.80 = 607.80$

Revenue guarantee 86% of benchmark = $.86 \times 406.20 = 522.71$

Estimated 2014 corn yield: 150 b/acre

USDA estimated 2014/15 MYA corn price: 3.65-4.35

How do things look for this year (2014) in Harford County for corn

- Benchmark revenue $126.4 \times 4.80 = 607.80$
- Revenue guarantee 86% of benchmark = $.86 \times 607.80 = 522.71$.
- Estimated 2014 corn yield: 150 b/acre
 - Nationally, USDA estimates an increase in corn yields from 146 bushels/planted acre in 2013 to 151.3 bushels per planted acre in 2014.
- USDA estimated 2014/15 MYA corn price: 3.65-4.35

Price	2014 county rev	Short of guarantee	10% benchmark	Payment per .85 base acre
3.65	547.5	0	60.78	0
4.00	600.0	0	60.78	0
4.35	652.5	0	60.78	0



How do things look for this year (2014) in Harford County for corn

- How low would county yields need to be to trigger a county ARC payment this year?
- County revenue guarantee: 522.71
- Price = 3.65: Yields need to be below 143.21
- Price = 4.00 Yields need to be below 130.68
- Price = 4.35 Yields need to be below 120.16



How do things look for this year (2014) in Harford County for corn

Price	ARC-CO Payment per .85 base acre	PLC payment per .85 base acre
3.65	0	.05 x program yield
4.00	0	0
4.35	0	0

Example: If corn program yield for your farm is 120 bushels per acre, PLC would pay \$6 x .85 x corn base acres for 2014.

Harford County Example

- Does this example prove that it doesn't matter? That government payments will be close to zero no matter what?
- NO. This is only for current crop. What happens next year?

	2010	2011	2012	2013	2014	Olympic average
Yield	106.2	108.0	129.3	142.1	150	126,4

	2010	2011	2012	2013	2014	Olympic average
ARC price	3.70	6.22	6.89	4.50	4.00	4.90

Benchmark rises from \$607.80 to \$620.44.

Guarantee rises from \$522.71 to 620.44

PLC participation allows farmer to choose supplemental coverage option (SCO) crop insurance.

- Details of SCO.
 - Only for crops enrolled in PLC.
 - Private insurance, but with especially high premium subsidy.
 - Covers revenue losses between 86% and the (lower) coverage level chosen by the farmer for insurance on that crop.
 - Example: if farmer chose revenue insurance at 75% coverage, SCO would pay out when revenues were higher than 75% of insured level, but less than 86% of insured level.
 - SCO insurance indemnity payments are based on current county yields compared to county average yields (but on individual farm yield history). See separate powerpoint on SCO for more details.

SCO example 1

- Historical Average County corn yield 140 b/acre
- Historical average farm yield: 140 b/acre
- Expected corn price at planting: \$4.50
- Acres planted to corn: 500
- Crop insurance election: Revenue insurance at 76%.

- Current year county yield: 120 b/acre
- Current year farm yield: 120 b/acre
- Current year harvest price: \$4.00

- SCO benchmark: $140 \times 4.5 = 630$
- SCO trigger: $.86 \times 140 \times 4.50 = 541.8$
- “Insured Revenue” under crop insurance $.76 \times 140 \times 4.50 = 478.8$
- Maximum SCO payment: $630 \times (.86 - .76) = 63$

- Actual insured income: $120 \times 4 = 480$ (county and farm)
- Actual income as % of SCO benchmark: $480/630 = .7619$
- % of income covered by SCO = $.86 - .7619 = .0981$
- SCO coverage as percent of maximum SCO coverage: $.0981/ (.86 - .76) = .9810$
- SCO indemnity payment: per acre: $63 \times .9810 = 61.80$
- SCO indemnity payment: $61.80 \times 500 = 30,900$

Crop insurance is available for coverage at 70 or 75% but not 76%. The 76% number in this illustration is chosen to provide “continuous” coverage under the ARC-CO example, which limits payments to 10% of benchmark.



SCO example 2

- Historical Average County corn yield 140 b/acre
- Historical average farm yield: 140 b/acre
- Expected corn price at planting: \$4.50
- Acres planted to corn: 500
- Crop insurance election: Revenue insurance at 76%.

- Current year county yield: 110 b/acre
- Current year farm yield: 110 b/acre
- Current year harvest price: \$4.00

- SCO benchmark: $140 \times 4.5 = 630$
- SCO trigger: $.86 \times 140 \times 4.50 = 541.8$
- “Insured Revenue” under crop insurance $.76 \times 140 \times 4.50 = 478.8$
- Maximum SCO payment: $630 \times (.86 - .76) = 63$

- Actual insured income: $110 \times 4 = 440$ (county and farm)
- Actual income as % of SCO benchmark: $440/630 = .6984$
- % of income covered by SCO larger of $(.86 - .6984)$ or $(.86 - .76) = .10$
- SCO coverage as percent of maximum SCO coverage: $.10/ (.86 - .76) = 1.00$
- SCO indemnity payment: per acre: $63 \times 1 = 63$
- SCO indemnity payment: $63 \times 500 = 31,500$

Crop insurance is available for coverage at 70 or 75% but not 76%. The 76% number in this illustration is chosen to provide “continuous” coverage under the ARC-CO example, which limits payments to 10% of benchmark.



Individual Farm Agricultural Risk Coverage (Individual ARC)

- Individual farm ARC (or ARC-IN) covers all commodity crops – cannot be chosen for an individual commodity, while other program commodities are enrolled in PLC, for example.
- Uses farm level yields rather than county level yields in determining revenue guarantees and actual revenues.
- Probably will be limited in use to farms whose yields are not highly correlated with county average yields – farms in very large, geographically diverse counties, for example.

Individual ARC example

- Step 1. Calculate ARC revenue for each covered crop for past five years.
- Step 2. Calculate Olympic average revenue for each crop.
- Step 3. Calculate acres planted to the crop as a percentage of total acres planted.
- Step 4. Calculate benchmark farm revenue as acreage-weighted average of individual crop revenues.
- Step 5. Calculate farm revenue guarantee as 86% of benchmark.
- Step 6. Calculate current year farm revenue.
- Step 7. Calculate individual ARC payment rate.
- Step 8. Calculate individual ARC payment (on 65% of base acres).



Yearly ARC revenue for each crop and Olympic average

- Find “ARC price” – higher of marketing year average price or PLC guarantee price.
- Find individual farm yield.
- Multiply the two together

- Corn example:

	2009	2010	2011	2012	2013	Olympic average
ARC price	3.70	3.7	6.22	6.89	4.50	
Farm yield	138	100	105	115	150	
Farm revenue	510.6	370	653.1	792.35	675	612.9



Acres planted to each crop and weighted average: Farm benchmark revenue and farm revenue guarantee

Crop	Acres planted	% acres planted	Olympic average rev.	Weighted revenue
Corn	500	50%	612.9	306.4
Wheat	250	25%	434.9	108.7
Soybeans	250	25%	462.5	115.6
Benchmark				530.8

Farm revenue guarantee: 86% of benchmark: $.86 \times 530.8 = 456.5$

Individual farm average revenue, ARC payment rate, and ARC payment

Crop	Acres planted	Current year yield	Current year price	Revenue
Corn	500	130	4	260,000
Wheat	250	75	6.50	121,875
Soybeans	250	30	8	60,000
Total				441,875

Average farm revenue per acre: 441.9

Farm revenue guarantee: 456.5

ARC payment rate: $456.5 - 441.9 = 14.6$ per acre

Total farm base acres: 970.

Individual ARC payment: $14.6 \times .65 \times 970 = \$9,205.30$

Good year in wheat, and good corn yields keep the payment low



A more comprehensive farm safety net.

- Crop Insurance and commodity programs are both elements of the safety net.
 - Some examples, assuming a farmer buys 76% revenue insurance for his crop.
 - Insured revenue is based on 4-10 year individual yield average on the farm, and post-harvest price as predicted by the futures market prior to planting. Notice that this is different from ARC county revenue guarantee calculation.
 - For simplicity, we will assume that futures market comes close to accurately predicting the marketing year average price. But this is not always the case.
 - To examine the way the safety net works, we will look at a situation in which farm revenues are quite low compared to history.

Unrealistic (“wrong”) Assumptions that illustrate the programs intent.

- County ARC historical yield average 140 b/acre.
- Farm “actual production history” insurance yield: 140 b/acre
- Program yield: 140 b/acre
- Historical average price for ARC calculation: \$4.80
- Projected price for insurance purposes: \$4.80
- Actual corn acres: 500
- Base corn acres: 500
- Revenue insurance coverage: 76%
- Actual current year county yield: 120 b/acre
- Actual current year individual farm yield: 120 b/acre
- Actual current year price (assumed to be insurance payout price): \$3.20



Example with unrealistic assumptions:

All historical yields and program yields are the same; all historical prices and expected futures prices are the same; program payments on 100% (instead of actual 85%) of base acres.

	Market income	Program payment	Insurance Indemnity	SCO Indemnity	Total
County ARC + rev. insur.	192,000	33,600	63,360	0	288,960
PLC + rev. insurance	192,000	35,000	63,360	0	290,360
PLC + rev. ins. + SCO	192,000	35,000	63,360	33,360	323,960

“Shallow loss” coverage. Insurance guarantees revenue of $192,000 + 63,360 = 255,360$, or 76% of “normal” revenue. Programs increase the guarantee to 86%.

“Normal” or average corn income: $500 \text{ acres} \times 140 \text{ b/acre} \times \$4.80/\text{b} = \$336,000$

86% of normal income: **\$288,960**

Low farm and county yields, but high price, and payments on 85% of base acres.

- County ARC historical yield average 140 b/acre.
- Farm “actual production history” insurance yield: 160 .
- Historical average price for ARC calculation: \$4.80
- Actual current year price: \$4
- Projected price for insurance purposes: \$4.50.
- Actual current year county yield: 115.
- Actual current year individual farm yield: 110.
- Actual corn acres: 500
- Base corn acres: 470
- Program yield: 122



Low yields, “high” prices.

	Market income	Program payment	Insurance Indemnity	SCO Indemnity	Total
County ARC + rev. insur.	220,000	26,846	53,600	0	300,446
PLC + rev. insurance	220,000	0	53,600	0	273,600
PLC + rev. ins. + SCO	220,000	0	53,600	31,500	305,100

“Normal” or average corn income: $500 \text{ acres} \times 160 \text{ b/acre} \times \$4.80/\text{b} = \$384,000$

86% of normal income: \$330,240

High farm and county yields, but low price.

- County ARC historical yield average 140 b/acre.
- Farm “actual production history” insurance yield: 160 .
- Historical average price for ARC calculation: \$4.80
- Actual current year price: \$3.20
- Projected price for insurance purposes: \$4.50.
- Actual current year county yield: 180.
- Actual current year individual farm yield: 180.
- Actual corn acres: 500
- Base corn acres: 470
- Program yield: 122

High yields, low prices.

	Market income	Program payment	Insurance Indemnity	SCO Indemnity	Total
County ARC + rev. insur.	288,000	767	0	0	288,767
PLC + rev. insurance	288,000	24,370	0	0	312,370
PLC + rev. ins. + SCO	288,000	24,370	0	0	312,370

“Normal” or average corn income: $500 \text{ acres} \times 160 \text{ b/acre} \times \$4.80/\text{b} = \$384,000$

86% of normal income: \$330,240

Appendix

- With more detail about example calculations.

Prices used for calculating PLC payments and ARC payments.

- PLC payments are triggered when the national average marketing year average price (MYA) falls below the reference or threshold price for the commodity.
- ARC payments are triggered by low revenues, and MYA is used to calculate current revenues and target revenues.
- These MYA prices are published by USDA every year.
- Our examples use current year MYA prices that are at the low end of prices that can reasonably be expected. This is so that we illustrate how the program works when payments are made.
- For the example, the MYA corn price for the current year is assumed to be \$3.50.

“Reference prices”, or price guarantees under the PLC

- These are established by law, crop by crop. No calculations are necessary.
 - Corn: \$3.70
 - Wheat \$5.50
 - Soybeans \$8.40
 - Barley \$4.95

For other crops, click [here](#).

[Return to PLC description.](#)

[Return to corn PLC example.](#)

Sample county yields for our County ARC example.

Crop	Actual county yield 2009	Actual county yield 2010	Actual county yield 2011	Actual county yield 2012	Actual county yield 2013	Olympic average county yield
corn	146	128.3	101	96.2	164	125
wheat	59.5	63.5	65.4	68.1	67	65
soybeans	42.5	40.1	40.9	49.7	35.5	41
barley	73	58.8	71.9	71.4	88	72

[Return to county ARC corn example.](#)

↑
[Where does this come from?](#)

The “yield plug” exception to calculating county level yields does not apply here because annual yields are always greater than 70% of the five year average.



Sample prices for our County ARC example.

Crop	Actual MYA price 2009/10	Actual MYA price 2010/11	Actual MYA price 2011/12	Actual MYA price 2012/13	Actual MYA price 2013/14
corn	3.55	3.7	6.22	6.89	4.50
wheat	4.87	5.38	7.24	7.77	6.87
soybeans	9.59	11.3	12.5	14.4	12.7
barley	3.89	4.4	5.44	6.43	6.06

Before calculating ARC price: When actual MYA price is below PLC reference price, it is replaced with PLC reference price. (Red circles.)

Crop	ARC price 2009/10	ARC price 2010/11	ARC price 2011/12	ARC price 2012/13	ARC price 2013/14	5 year Olympic Average
corn	3.70	3.7	6.22	6.89	4.50	4.81
wheat	5.5	5.5	7.24	7.77	6.87	6.54
soybeans	9.59	11.3	12.5	14.4	12.7	12.17
barley	4.95	4.95	5.44	6.43	6.06	5.48

→ Defined here.

[Return to county ARC corn example.](#)
[Return to individual AFC example.](#)



Sample prices for our County ARC example.

Crop	5 year Olympic Average	Current year MYA price
corn	4.81	3.50
wheat	6.54	5.70
soybeans	12.17	8.00
barley	5.48	4.55



Where do these
come from?



These are
hypothetical for
the purposes of
our example.

[Back to slide on calculating county revenue guarantee for ARC.](#)

[Back to slide on calculating current county revenue for ARC.](#)

Using Loan Rate instead of current year MYA is not relevant in this example because $MYA > LR$.



Revenue insurance for the example

- Farm average yield history. (For example 140 b/acre).
- Expected price at harvest or post-harvest. (Expected price is the price of a futures contract for a harvest or post-harvest month, at the time of planting. For example, in May 2015, futures contracts for Feb. 2016 are trading at \$4.80; the insurance price is \$4.80).
- A farmer chooses the percentage coverage: in our example 76%.
- In this example, the insurance contract pays the farmer an indemnity whenever actual crop revenue falls below $140 \times 4.80 \times .76 = 510.72$ per insured acre.

[Back to the comprehensive safety net examples.](#)

“Olympic” averages

- The average of a series of numbers after the highest and lowest values have been eliminated. (Used in scoring certain events in the Olympics such as ice-skating.)

[Return to slide on sample County yields for the county ARC example.](#)

[Return to slide on sample prices for the county ARC example.](#)