



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



Comparing ARC-CO to PLC: APAS Sample Farms and the ARC-CO - PLC Comparison Tool

Gary Schnitkey, Nick Paulson, and Jonathan Coppess

Department of Agricultural and Consumer Economics
University of Illinois

Carl Zulauf

Department of Agricultural, Environmental and Development Economics
Ohio State University

October 16, 2014

farmdoc daily (4):200

Recommended citation format: Schnitkey, G., N. Paulson, J. Coppess, and C. Zulauf. "Comparing ARC-CO to PLC: APAS Sample Farms and the ARC-CO - PLC Comparison Tool." *farmdoc daily* (4):200, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, October 16, 2014.

Permalink URL <http://farmdocdaily.illinois.edu/2014/10/comparing-arc-co-to-plc-apas-sample-farms.html>

Farmers and share-rent landowners will choose between three options for receiving commodity program payments: 1) Agricultural Risk Coverage – County Coverage (ARC-CO), 2) Price Loss Coverage (PLC), and 3) Agricultural Risk Coverage – Individual Coverage (ARC-IC). Here we focus on tools for making comparisons between the first two options: ARC-CO and PLC. The ARC-CO - PLC Comparison Tool will provide payments given user-entered input. APAS Sample farms will provide expected values of payments for different sets of prices and yields. The choice between ARC-CO and PLC likely will come down to three considerations: 1) payment expectations between ARC-CO and PLC, 2) type of risk the farmer wishes to avoid, and 3) availability of Supplemental Coverage Option (SCO).

Why Focus on ARC-CO and PLC?

There are two reasons to focus first on ARC-CO and PLC choice, and then making comparisons to ARC-IC. One, ARC-CO and PLC decisions can vary by crop while ARC-IC is a FSA farm decision. Choosing the best ARC-CO and PLC alternative for each crop will aid in making comparisons to ARC-IC. Two, ARC-IC likely will fit in more limited situations than ARC-CO and PLC. To make a decision to go to ARC-IC, one should first understand ARC-CO and PLC.

More detail on the ARC-CO comparison is provided in [Step 4](#) of the ARC-PLC Decision steps.

ARC-CO – PLC Comparison Tool

The ARC-CO - PLC Comparison Tool is a Microsoft Excel spreadsheet that compares payments under ARC-CO and PLC for user-entered county yields and market-year-average (MYA) prices for the years 2014

We request all readers, electronic media and others follow our citation guidelines when re-posting articles from *farmdoc daily*. Guidelines are available [here](#). The *farmdoc daily* website falls under University of Illinois copyright and intellectual property rights. For a detailed statement, please see the University of Illinois Copyright Information and Policies [here](#).

through 2018. The 2014 through 2018 time period is the legislated life of the 2014 Farm Bill. This Excel spreadsheet is part of the FAST series and can be downloaded [here](#) from the FAST section of *farmdoc* site.

An example output of the ARC-CO – PLC Comparison tool is shown in Figure 1. A user enters the following in the “Input” box:

- State – the state of the Farm Service Agency (FSA) farm. The example farm shown in Figure 1 is in Illinois.
- County – the county of the FSA farm. The example farm is in Logan County.
- Crop – the crop being evaluated. In the example, the crop is corn. After the state and county have been selected, the “crop” box will be populated with crops for which data exists. If no crops are listed, data does not exist for this county.
- Type – has three alternatives: 1) All, 2) Non-irrigated, and 3) Irrigated. If non-irrigated and irrigated series are selected and no data appears, then data is not available for these two options.
- PLC Payment Yield – is the yield for Price Loss Coverage payment calculations. These values are crop specific for each FSA farm. Note that this is the only farm specific input.

These inputs will bring in two histories for evaluating the ARC-CO and PLC decisions.

- Yield history from 2009 through 2013. In Figure 1, Logan County corn yields are 188 bushels per acre in 2009, 155 in 2010, 173 in 2012, 125 in 2012, and 198 in 2013.
- MYA price history from 2009 through 2013. Corn prices shown in Figure 1 are \$3.55 per bushel in 2009, \$5.18 in 2010, \$6.22 in 2011, \$6.89 in 2012, and \$4.45 in 2013. The MYA price is calculated by the U.S. Department of Agriculture and represents a national cash price. The market year for corn begins in September and ends in August. Hence the 2014 MYA price includes the months from September 2014 through August 2015. The 2014 MYA price will not be known with certainty till after August 2015.

Users then enter county yields and MYA prices for 2014 through 2018. In Figure 1, the 2014 county yield is 215 bushels per acre and the 2014 MYA price is \$3.40 per bushel. ARC-CO and PLC payments then are calculated for these entries.

ARC-CO

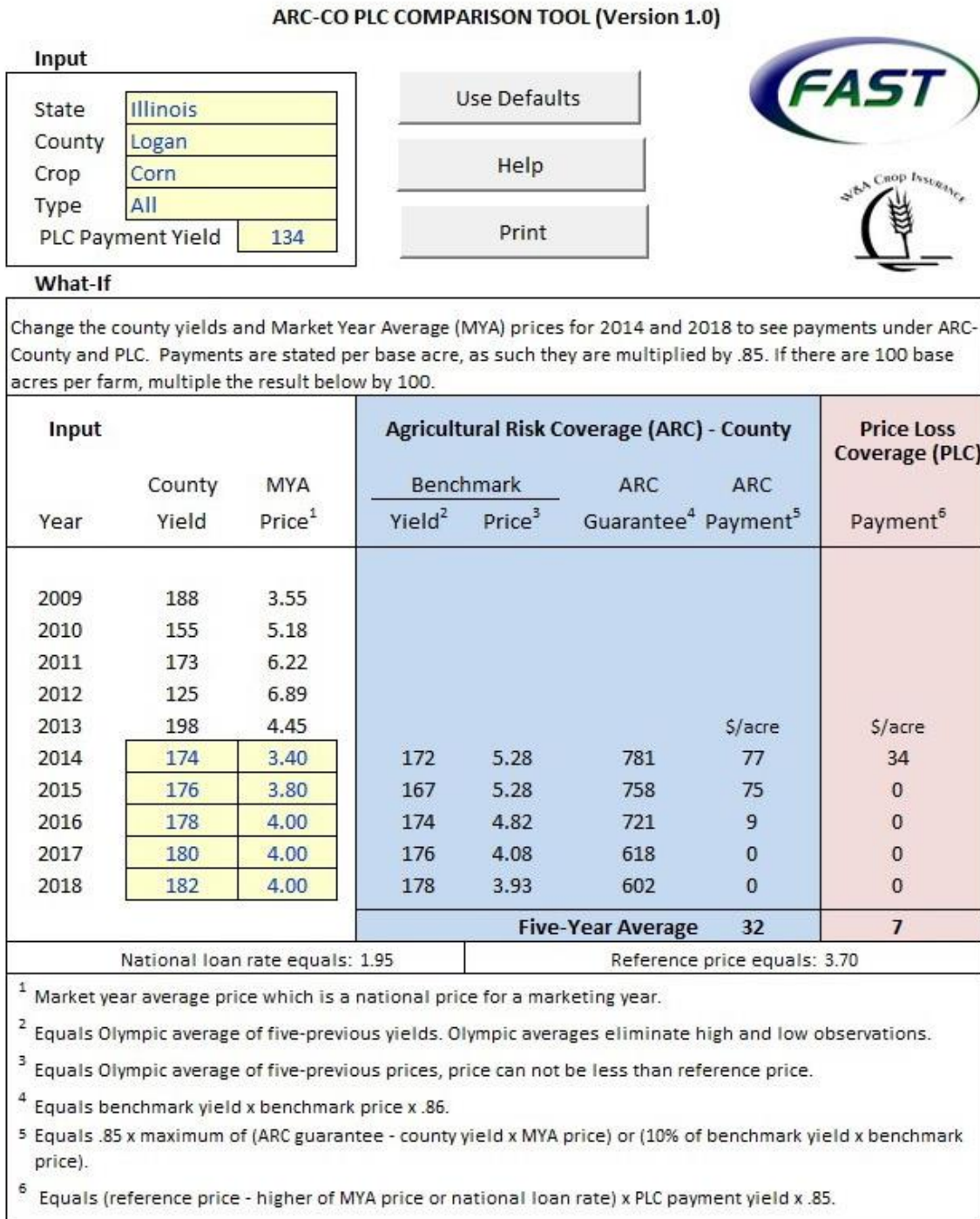
An ARC-CO payment occurs when county revenue (county yield times MYA price) is below a guarantee. There are four columns shown in Figure 1 that go into the calculation of the ARC-CO payment:

1. Benchmark yield is an Olympic average of the five-previous yields. An Olympic average ignores the high and low observations, and then averages the remaining observations. The 2014 benchmark yield of 172 bushels per acre is an average of 188 bushels per acre in 2009, 155 bushels per acre in 2010, and 173 bushels per acre in 2012 ($172 = (188 + 155 + 173) / 3$). The low yield of 125 bushels per acre in 2012 and the high yield of 198 bushels per acre in 2013 are not considered in the calculation.
2. Benchmark price is the Olympic average of the five-previous MYA prices. If an individual MYA price is below the reference price, the reference price is used rather than the actual price. For corn, the 2009 MYA price is \$3.55 per bushel and the reference price is \$3.70. A \$3.70 price is used for 2009. The \$5.28 benchmark price equals the average of the 2010, 2011, and 2013 prices (i.e., $5.28 = (\$5.18 \text{ in } 2010 + \$6.22 \text{ in } 2011 + \$4.45 \text{ in } 2013) / 3$). The low price in 2009 and high price in 2012 are not included in the Olympic average calculation.
3. ARC guarantee equals 86% of the benchmark yield times the benchmark price. The \$781 ARC guarantee for 2014 equals 0.86 times the 172 benchmark yield times the \$5.28 benchmark price.
4. ARC payment will occur when county revenue is less than the ARC guarantee. In 2014 an ARC payment will occur for a 215 bushel per acre county yield and a \$3.40 MYA price. The \$781 ARC guarantee is \$50 per acre higher than the \$731 county revenue (215 county yield x \$3.40). Since ARC-CO payments are made on 85% of base acres, the \$50 payment is multiplied by .85 to yield a \$43 payment per base acre. ARC payments cannot exceed 10% of the benchmark yield times the

benchmark price. The maximum 2014 payment is \$77 per acre (172 benchmark yield times \$5.28 benchmark price times .10 limit x .85 base acres).

Benchmark yields and prices will vary from year to year. As a result, ARC payments will vary from year-to-year. For example, the \$5.28 benchmark price for 2014 is relatively high compared to current market prices. If prices evolve according to the scenario shown in Figure 1 -- \$3.40 in 2014, \$3.80 in 2014, and \$4.00 in 2015 through 2018 -- the benchmark price will decline over time. In Figure 1, benchmark prices are \$5.28 in 2015, \$4.82 in 2016, \$4.08 in 2017, and \$3.93 in 2018.

Figure 1. Example Output from the ARC-CO and PLC Comparison Tool.



PLC

PLC is a reference price program that makes payments when the MYA price is below the reference price. Reference prices are set by legislation and will not vary from year-to-year. The reference price for corn is \$3.70. In Figure 1, the 2014 MYA price of \$3.40 will trigger a payment. In this case, the payment rate is \$.30 per bushel (\$3.70 reference price - \$3.40 MYA price). This rate is multiplied by PLC program yield times 0.85 (PLC pays on 85% of base acres). The 2014 payment is \$34 per base acre (((\$3.70 reference price - \$3.40 MYA price) x 134 PLC payment yield x .85).

Payment Comparisons

Payments can be examined under any different yield and price scenarios. Price expectations will play an important role in the choice between ARC-CO and PLC. To illustrate, prices are varied in the Logan County example while holding county yields constant at the levels shown in Figure 1. These scenarios are arranged from lowest price expectations to highest expectation.

1. The current USDA forecast has prices at \$3.50 for 2014, \$3.67 for 2014, \$3.38 for 2014, \$3.47 for 2017, and \$3.53 for 2018. These prices result in a an Average ARC-CO payment of \$36 per acre and a PLC payment of \$22 per acre
2. A FAPRI forecast has prices of \$3.50 for 2014, \$4.09 for 2015, \$4.09 for 2016, \$4.12 for 2017, and \$4.21 for 2018. This price series results in an average ARC-CO payment of \$21 per base acre and a PLC payment of \$5 per acre.
3. The Congressional Budget Office (CBO) forecast prices of \$3.50 for 2014, \$4.00 for 2014, \$4.19 for 2016, \$4.35 for 2017, and \$4.45 for 2018. This price series has an ARC payment of \$19 per acre and a PLC payment of \$5 per payment.

For corn, higher prices result in ARC-CO having higher payments than PLC. If the 2014 through 2018 MYA prices are set at the same value, MYA prices above \$3.30 result in higher payments to ARC-CO, given that payments occur. PLC results in higher payments when MYA prices are below \$3.30 per bushel.

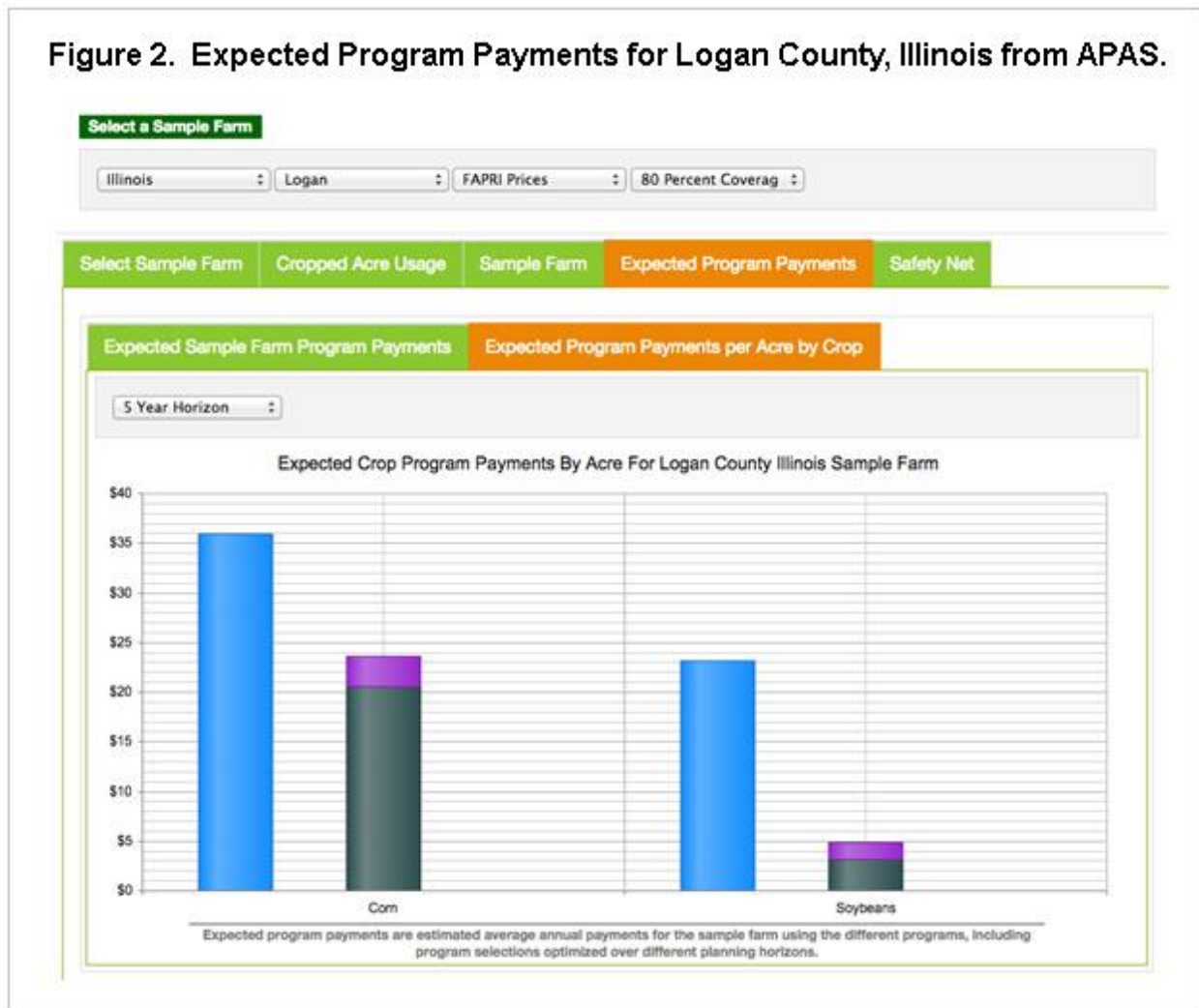
Thousands of different scenarios can be examined. The above examples only varied prices. County yields will vary as well. APAS evaluates many 1,000s of these scenarios and then presents summary results, thereby providing probabilistic estimates of expected program payments.

APAS Sample Farms

The Agriculture Policy Analysis System (APAS) is a web based tool that is available [here](#). A user can enter "APAS Sample Farm" and then make a state and county selection to receive expected payments for ARC-CO and PLC (click [here](#) for a video describing using APAS sample farm).

Figure 2 shows these payments for Logan County for an average over the five years of the Farm Bill. In Figure 1, the blue bars show ARC-CO payments, the black bars show PLC payments. Also shown in the purple bar it the expected payments minus farmer-paid premium for the Supplemental Coverage Option (SCO) given for a SCO product at an 80% coverage level. These expected payments are given for a "FAPRI" set of prices listed above, as indicated by drop down box at the top of the screen in Figure 2. For corn, the expected ARC-CO payment is \$36 per acre and the PLC payment is slightly over \$20 per acre. Expected payments can also be obtained for The CBO and USDA price series.

Figure 2. Expected Program Payments for Logan County, Illinois from APAS.



Unlike the Excel spreadsheet, the APAS payments are not over one set of yields and prices. Rather they are over many 1,000s of price and yield scenarios, with each scenario representing an event that could occur in the future. These scenarios are generated so as to accurately reflect possible yield and price outcomes. Historical variability is used in specifying these scenarios and correlations between yields and prices are preserved. The \$36 per acre payment represents an average over these different scenarios. Actual payments will vary from the \$36 per acre payments, but if we could repeat 2014 through 2018 a number of times, the average of the payments would be close to \$36 per acre. A feel for the variability and risk reductions associated with each program can be gained by viewing the “safety net” tab in APAS (see Figure 2).

The Choice

These two tools will be useful in evaluating the ARC-CO and PLC choice. Often the choice between the three will come down to three considerations:

- Expected payments from two options. Many farmers and landowners will want to choose the option that will give the highest payments. Of course, this is difficult to do because future yields and prices are not known. In the above examples, ARC-CO makes higher payments. However, this is based on a specific set of price expectations into the future. Individuals can enter their own price expectations into the tools. The APAS tool also allows user entered price expectations in the Build Your Own Farm section and have those prices enter into payment calculation.

- Type of risk the farm or landowner wishes to avoid. PLC will provide protection against very low prices. If prices go below \$3.00 per bushel and remain low for corn, PLC will make higher payments than ARC-CO. If a farmer want protection against very low prices that remain low, PLC would be more likely chosen. On the other hand, if protection is desired in a “moderately low” price range (\$3.30 to \$3.90) with variability that also accounts for yield risks, ARC-CO will be more effective. This is a difficult choice. Currently prices are forecast to be in the “moderately low” price range into 2015. Corn prices in the middle to upper \$3.00 range will cause stress. ARC-CO will provide more payments in these situations than PLC. Choosing ARC-CO will limit protection against very low prices.
- Availability of Supplemental Coverage Option (SCO). SCO is a crop insurance product that is only available if ARC is not chosen. Whether SCO is of benefit depends on a number of factors. More on SCO is covered in [Step 6](#) of the ARC-PLC Decision Steps.

Summary

These two tools will assist farmers and landowners in choosing between ARC-CO and PLC. Price and yield expectations will become clearer for 2014 late in February 2015. At that point, USDA will release estimates of county yields. At that point, 2014 ARC-CO and PLC payments will be known with much more certainty. Results from the above two tools will be revised as this and other price information becomes available.